Are "Infrastructures for Smart Devices" Needed?

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While talking to people from the Ubiquitous Computing community, opinions about the need
for a general infrastructure for devices, and more generally, services are quite different. Basically
they range from statements such as "Infrastructures are nonsense!" to "Without proper infrastruc-
tures UbiComp will never become reality." Such controversial statements lead to our general thesis
that we have not yet reached a common agreement in the community on what infrastructures are,
and whether they are useful at all.

What is meant by the term "infrastructure" and what are the special requirements "smart de-
vice" impose which an infrastructure has to meet? Is this "infrastructure" something like "Plug
and Play", an IP-protocol stack, or some middleware-system, like CORBA? What are the basic
differences of "smart devices" in comparison with, e.g., traditional PCs? Are they a fundamental
different set of appliances or is there an easy way to integrate them into current infrastructures? Is
it the mere number of smart devices that makes it difficult to build ubiquitous systems? Why does
it seem that there is no obvious answer to the question "What is an infrastructure" and "What is
the right infrastructure"? Is there really something worth to research or is it all industry-driven?

Moreover, the term "ubiquitous" in "ubiquitous computing" implies that the not-further-named
infrastructure has to be deployed everywhere and almost at the same time to make the
"ubiquitous" part work. What is the business model for this huge investment? There are only
few examples for widely-adopted infrastructures: Networks, IP (plus DNS), and GSM for mobile
telephony. But these (successful) infrastructures are very "basic" infrastructures in comparison
to high-level-infrastructures, like CORBA. Even the Web, i.e., HTTP, HTML, etc., is simple from
an architectural point of view.

One major difference between the Internet and its infrastructure and some ubiquitous-com-
puting-infrastructure (UCI) for Smart Devices is the time-scale: To make a deployment of a UCI
successful it has to be deployed fast and, well, ubiquitous. The Internet, on the other hand,
grew slowly over a quite long period of time. Only as the overall complexity was large enough,
it gained commercial interest. For UCIs it has to be the other way around: There has to be
a vendor-independent common commercial interest in standardizing, realizing, and deploying
such an UCI to make ubiquity an actuality.

This lack of common sense motivates our aim for a suitable characterization of the notion of
infrastructures. Some questions to be discussed are:

- Is infrastructure like oxygen: Anytime, anywhere, on any device?
- Does infrastructure deal with hardware artifacts?
- Does infrastructure connect things?
- Does infrastructure facilitate and standardize information exchange?
- Are infrastructures a potential hook to implement security features?
- Who adapts? The infrastructure to a device/service or vice versa?

We are looking forward for interesting discussions in Bristol.