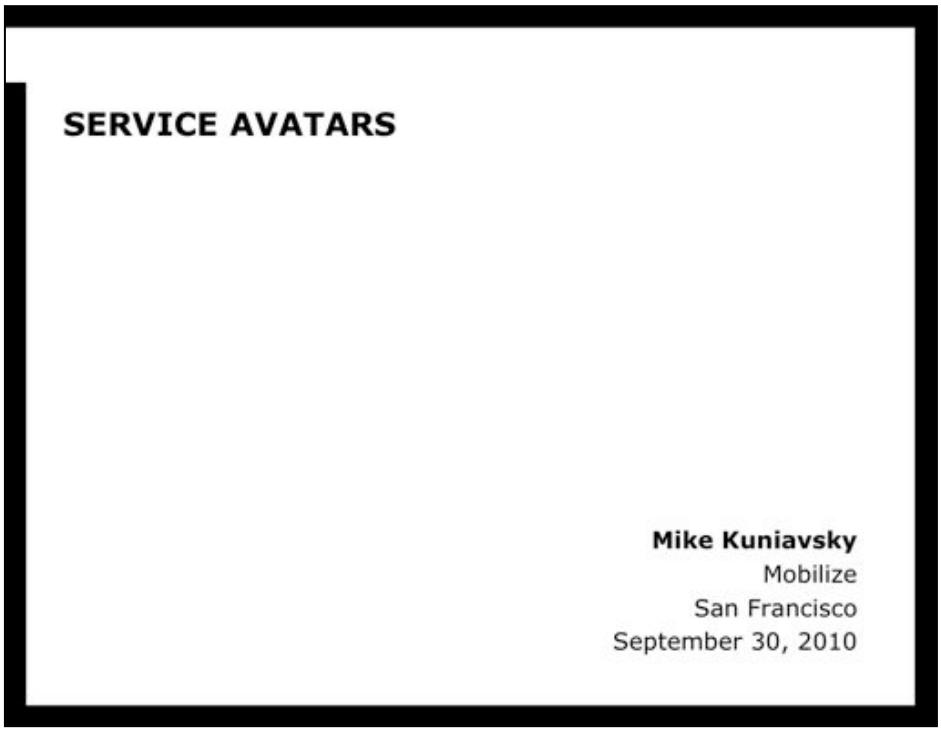
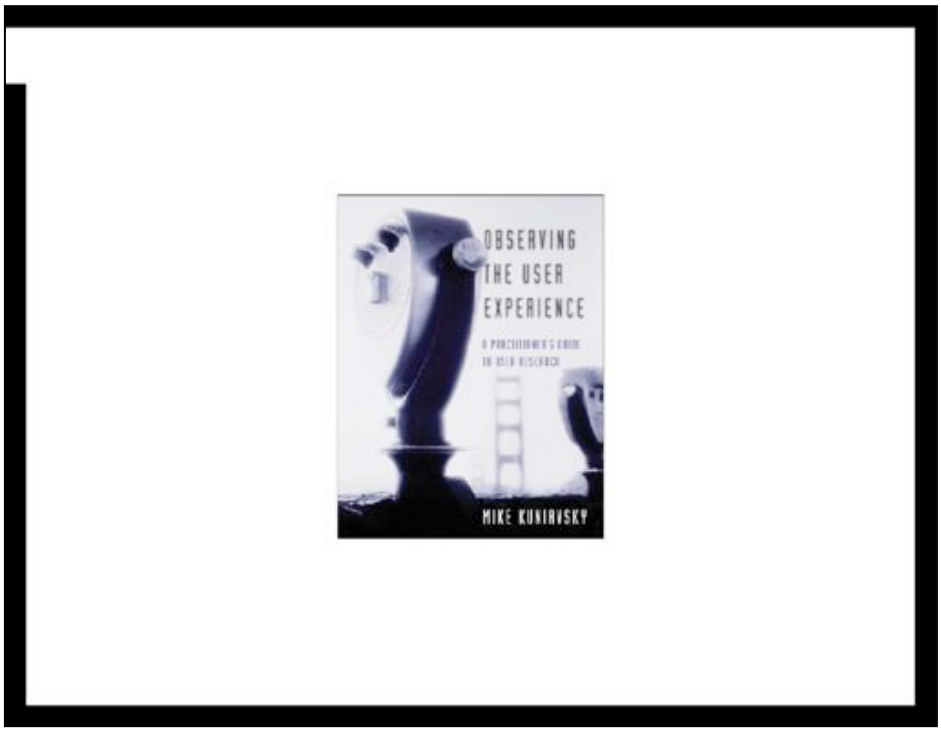


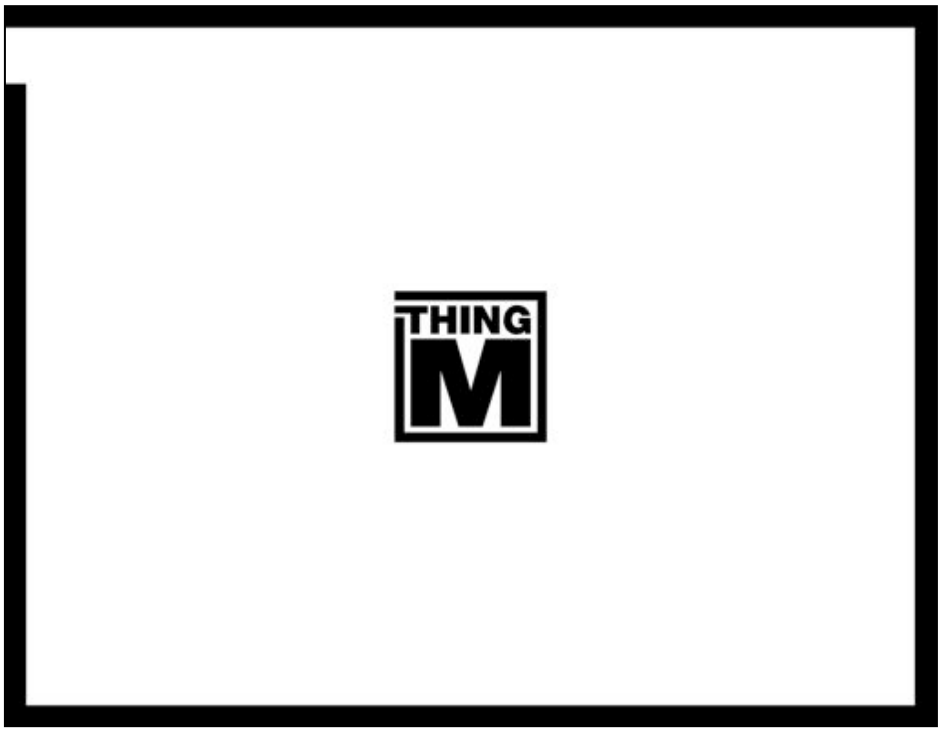
Good afternoon! Thank you Surj and Om for inviting me. It's a pleasure to be here.

First, let me tell you a bit about myself. I'm a user experience designer and entrepreneur. I was one of the first professional Web designers in 1993. Since then I've worked on the user experience design of hundreds of web sites. I also consult on the design of digital consumer products, and I've helped a number of consumer electronics and appliance manufacturers create better user experiences and more user centered design cultures.

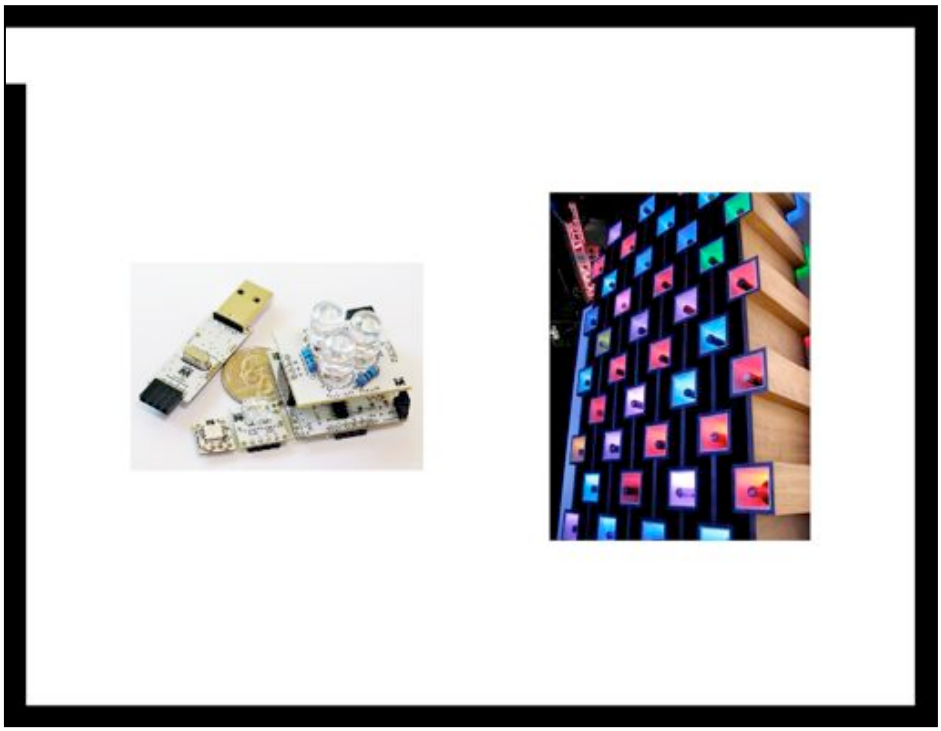


In 2003 I wrote a how-to book of user research methods for technology design. It has proven to be somewhat popular, as such books go.

Around the same time as I was writing that book, I co-founded a design and consulting company called Adaptive Path.



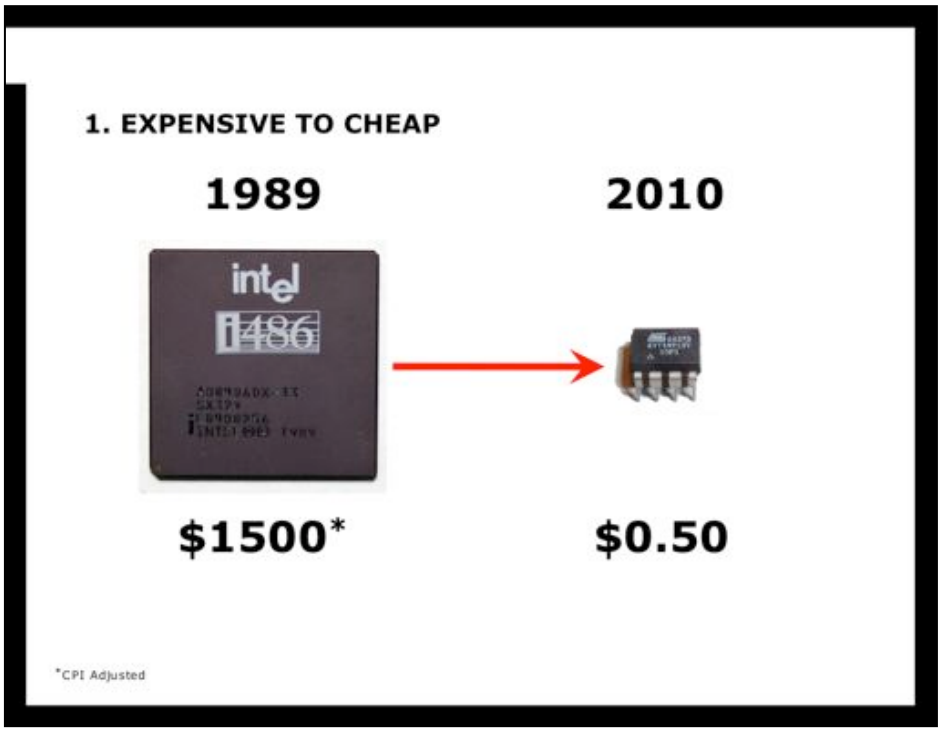
I wanted to get more hands-on with technology development, so I founded ThingM with Tod E. Kurt.



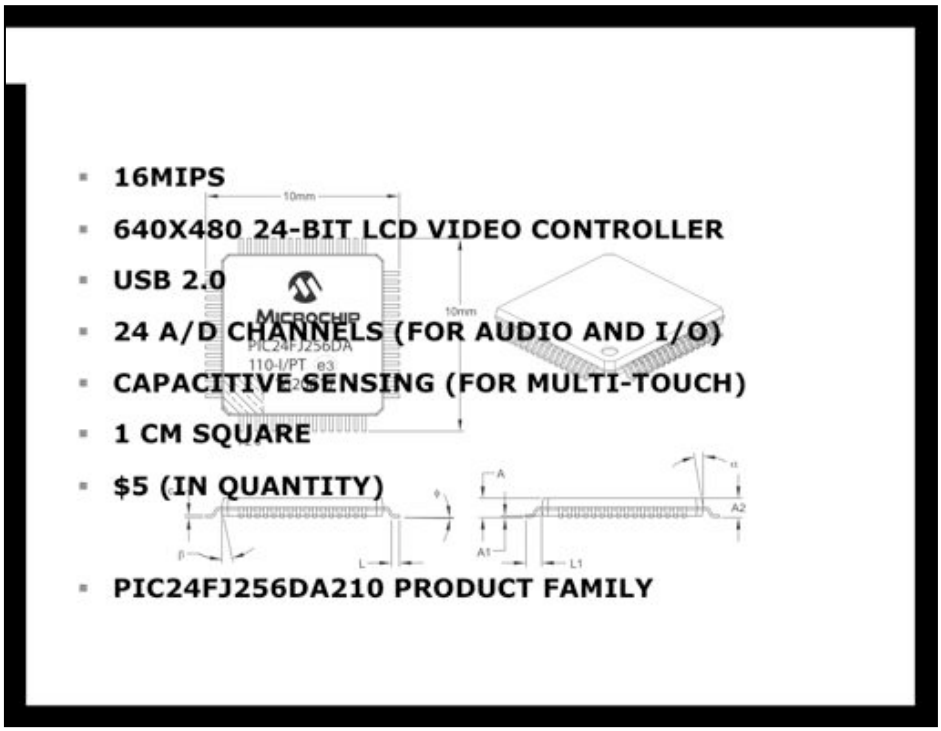
We're a micro-OEM. We design and manufactures a range of smart LEDs for architects, industrial designers and hackers. We're also spinning off a new company that's going to apply this technology to the consumer space. I have lots to say about that, but this talk is about something else, so talk to me offline if you'd like details.

This talk is based on a chapter from my new book. It's called "Smart Things" and it came out a couple of weeks ago. In the book, I describe an approach for designing digital devices that combine software, hardware, physical and virtual components.

I want to start by talking about three trends that are combining to create a new class of digital products which are distributed through the environment and linked by cloud-based services. These devices not only create many opportunities for innovation, but they represent a new way of thinking about both products and services.

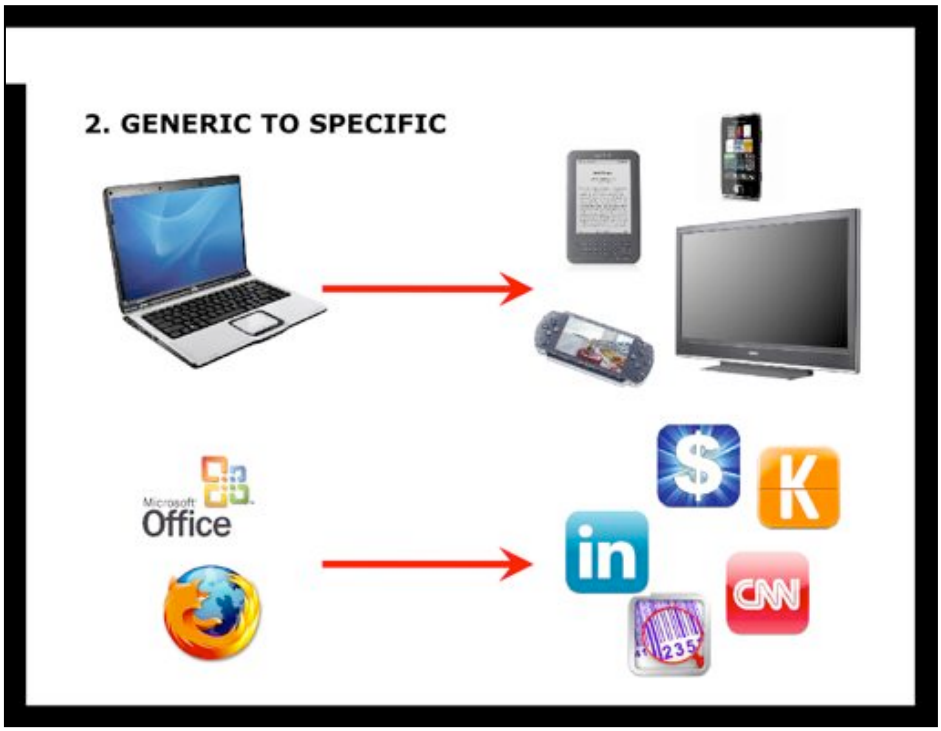


The first trend is a product of Moore's Law. Normally people think of Moore's Law in terms of processor speed, but the same technologies that makes the latest chips powerful push the price of older technology down. We have now reached a point where many powerful technologies are priced like basic commodities. For example, the Intel 486 was the processor that the Web was built for and with. It cost $1500 in 1989. Today you can get as much processing power for about 50 cents.



This new System on a Chip from Microchip has about as much processing power as that initial 486, but is also has an onboard video controller that can drive a VGA-class screen, a USB controller for peripherals, a 24-channel analog to digital converter for sensor, and a capacitive sensing driver that can drive a touch screen. It costs about $5, uses less power than a keyring LED flashlight, and fits on a chip the size of your fingernail. It's also not unusual. Almost every semiconductor maker makes similar products.

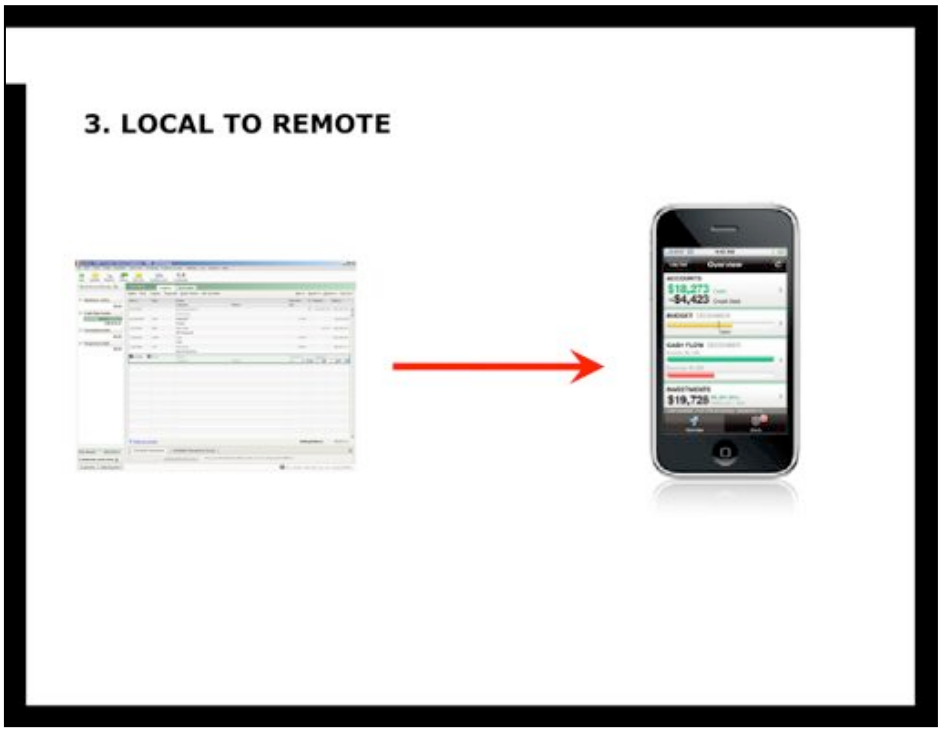
This means that you can now include powerful processing and networking in almost anything, and start rethinking the design of everything in terms of embedded digital technology. The "how" problem of creating ubiquitous computing has almost been answered. Now the questions are what to create, and why.



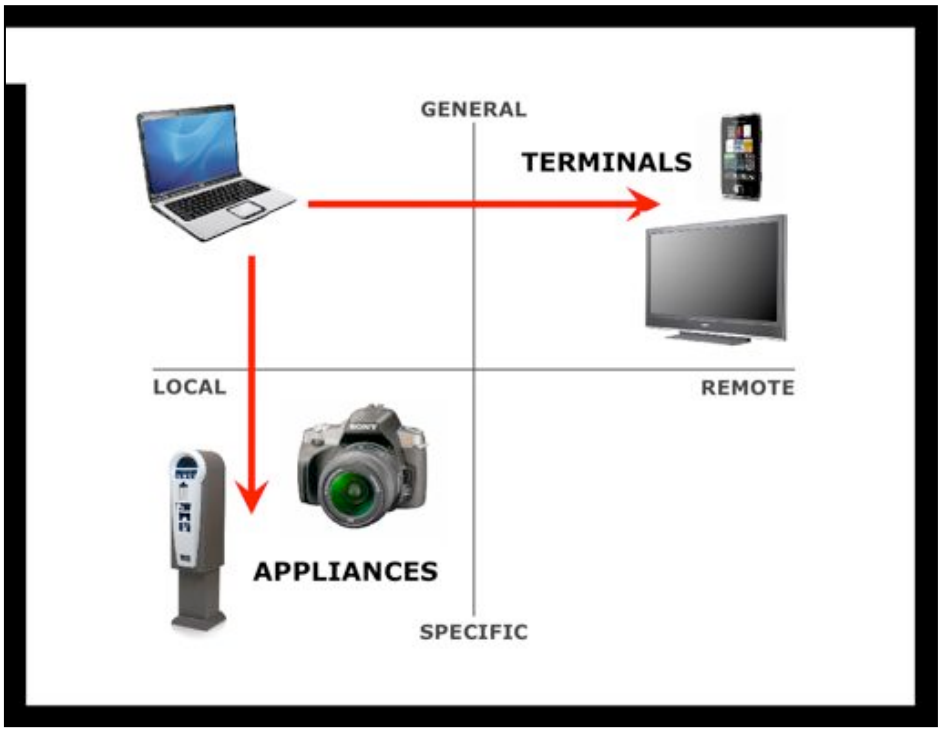
The answer to these is being driven by two other shifts.

First, is a shift from generic devices and software to specialized devices and software. When computing was expensive, you had one or two general purpose devices that had deal with almost every situation. This necessitated design compromises that resulted in devices and software that could do almost everything, but did none of it well. It was then up to the user to take these generic tools and making them appropriate to the current situation.

Now that processing is so cheap, you can have a combination of 10, 20, or 30 computing devices and apps for the price of that one device, and you can acquire new functionality as needed. This means that every device and software package can have a narrower purpose.



The third trend is that the lasting legacy of the Web has been a shift in the value digital technology from being primarily local to being primarily remote. The Web demonstrated that moving functionality online enables access to more compute power, continuous updates, real-time usage analytics, and (of course) social connections. It also created a shift in people's expectations. Today, most people understand that the experience you see on one device is often a part of something that's distributed throughout the world. There's no longer a need to pack everything into a single piece of software, and there's no expectation that everything will be there.

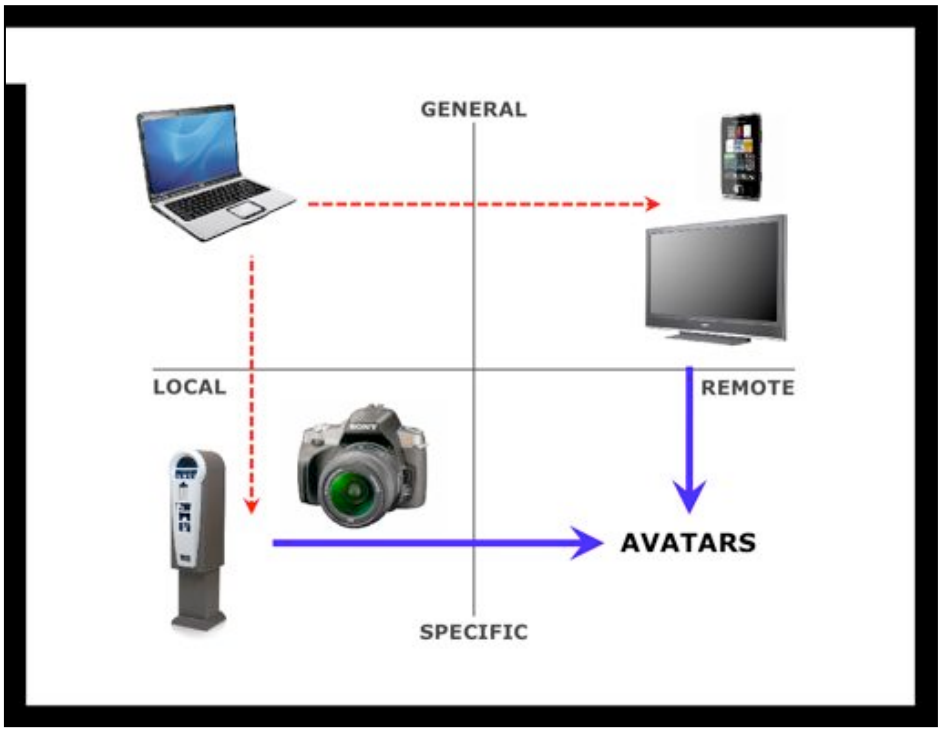


If we chart these last two tends, two broad classes of digital products emerge.

If we follow the general to specific axis, we see a shift is to more narrow-function devices that are designed to do a small, specific set of things really well. They primarily differ in what those specific things are. I call these devices appliances.

If we follow the local to remote axis, we find general-purpose devices that do roughly the same set of things, and differ primarily in size. They exist to provide access to online services, in a form factor that's appropriate to the context in which they're used.

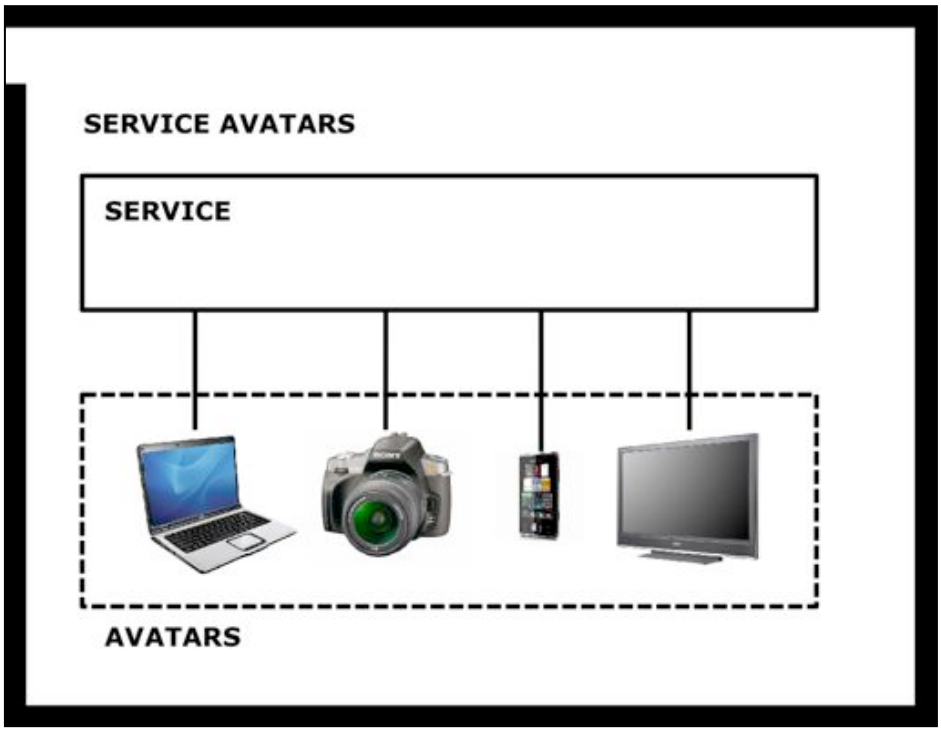
I call these devices terminals.



What I think is most interesting, however, is that these shifts appear to be the first part an even larger transition, one where devices are simultaneously specific AND deeply tied to online services. In this model, the service provides the majority of the value, and can be represented either as an inexpensive dedicated hardware device, an app running on a terminal, or anything in between.

It's an approach that combines the precision of appliances with the flexibility of terminals to create a fundamentally new class of products that can fill every possible niche where a service may be appropriate.

I call these devices service avatars.

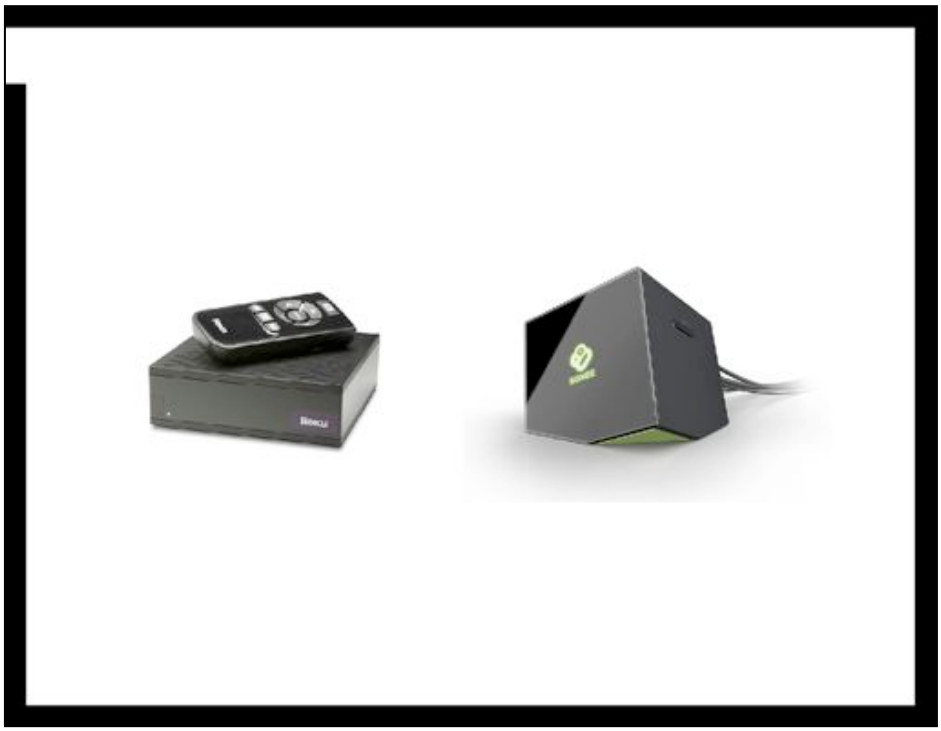


As value shifts to services, the devices, software applications and websites used to access it—its avatars—become secondary. A camera becomes a really good appliance for taking photos for Flickr, while a TV becomes a nice Flickr display that you don't have to log into every time, and a phone becomes a convenient way to take your Flickr pictures on the road.

Hardware becomes simultaneously more specialized and devalued as users see "through" each device to the service it represents.

For example, you can now get Netflix on virtually any terminal that has a screen and a network connection. You can pause a Netflix movie on one terminal and then upause it on another. This may feel a bit novel, but it also seems natural. Why?

Because to the Netflix customer, any device used to watch a movie on Netflix is just a hole in space to the Netflix service. It's a short-term manifestation of a single service. The value, the brand loyalty, and the focus is on the service, not the frame around it. The technology exists to enable the service, not as an end to itself.

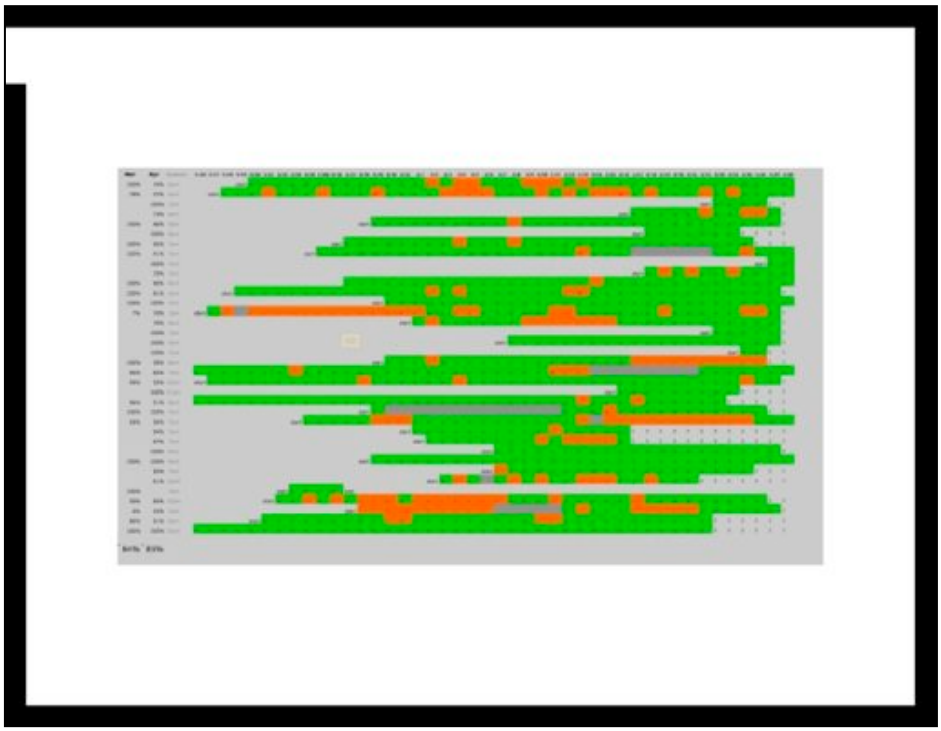


Netflix appliances are created for a single reason: to make it easier to access Netflix. That's what Roku does. It turns every terminal that's not already Netflix enabled into a Netflix terminal. The Boxee box does that for the Boxee service. The new Apple TV does it for iTunes.

Let me give you another example. This is Vitality's Glowcap, which is a wireless network-connected pill bottle appliance that's an avatar to Vitality's service for increasing compliance to medicine prescriptions. When you close the cap, it sends a packet of information through a mobile phone-based base station to a central server and it starts counting down to when you next need to take your medicine. When it's time, it lights up the LED on the top of the bottle.

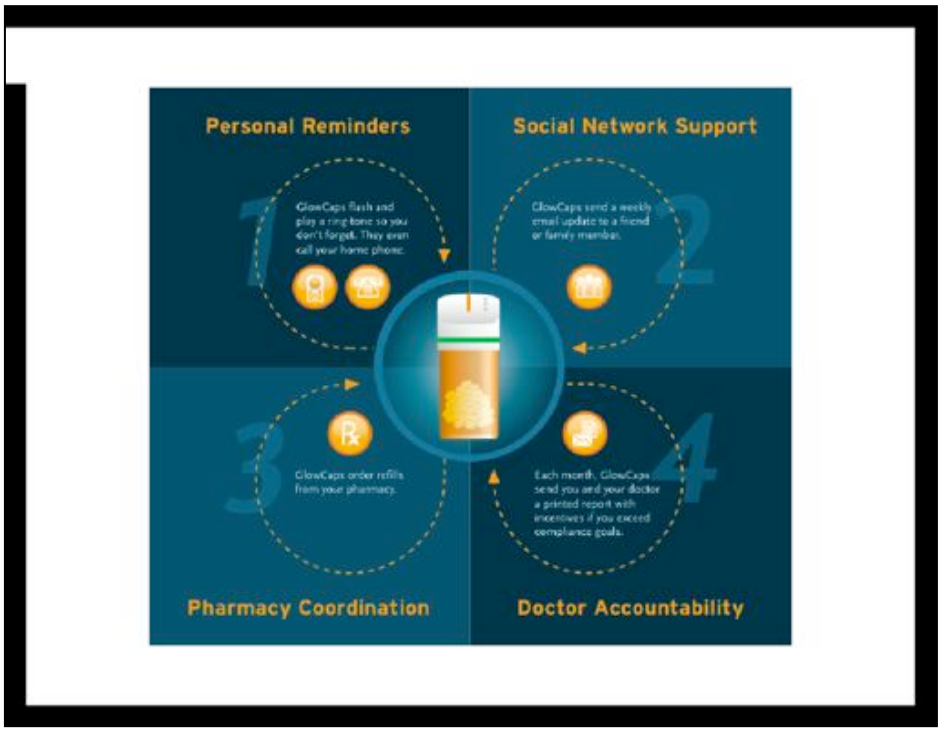
However, the real power is in the packet of data it sends. That packet opens a door to the full power of an Internet-based service. Now Vitality can create sophisticated experiences that transcend a single piece of software or a single device.

For example, another avatar of the Vitality service is an online progress report that can be used interactively or delivered by email. It's like Google Analytics for your medicine.



Health care practitioners get yet another avatar that gives them long-term and longitudinal analytics about compliance across medications and time.

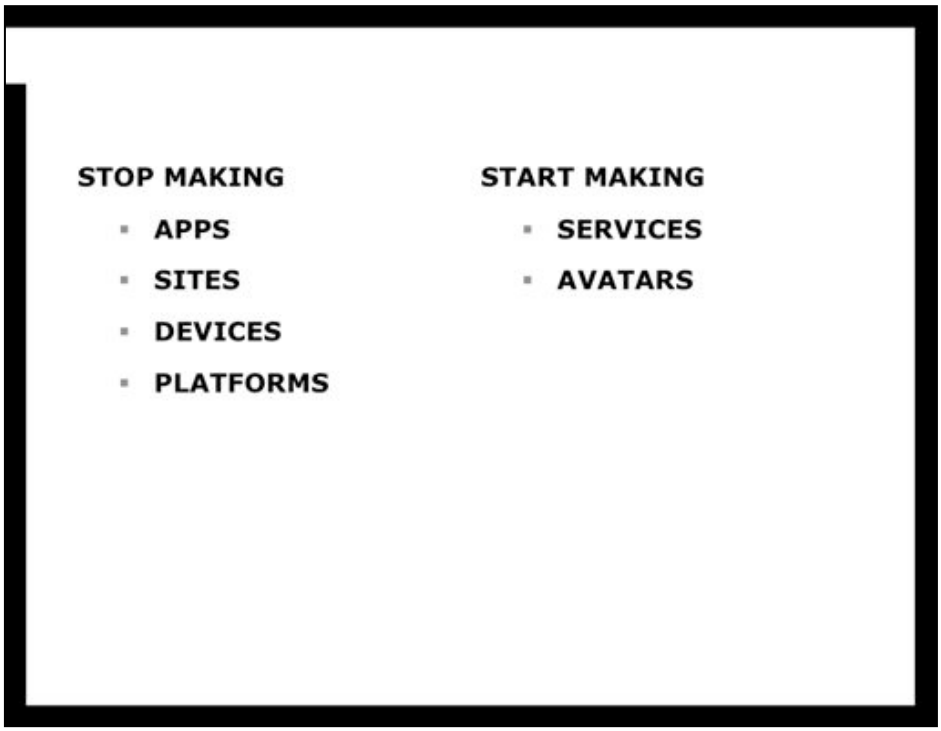
To me, this kind of conversation between devices and net services is where the real power of The Internet of Things begins.



Vitality has developed a complete system around this service that includes a social component, and different avatars for patients, patients families, health care practitioners and pharmacies. Each avatar looks different and has different functionality, but they're perceived, and designed as a single system.

I think it's a model of how many everyday things are going to be designed in the future.

Soon designing objects that have significant social lives in the cloud will become just how everything is made.



In preparation, I recommend a shift in thinking away from whether to make an app, a mobile web site, a platform, or a dedicated device, and to start thinking about how you design your service, and what avatars will best facilitate that service.


SMART THINGS
Ubiquitous Computing User Experience Design
MIKE KUNIAVSKY
THING M
Mike Kuniavsky
mikek@thingm.com

Thank you.