DESIGNING THE SPACES BETWEEN

JOSH CLARK • @GLOBALMOXIE

http://www.flickr.com/photos/geckospake/4082648621

Spent years focused on designing for different gadgets/platforms
Desktop
Phones
Tablets
Android
iPhone
More recently: physical objects, connected devices, IoT.

Tons and tons of gadgets, lots of challenges there.
But I've come to realize that all of that work has created a NEW challenge.

How do we get these interfaces to talk to EACH OTHER?

[next]
We've done a poor job of designing what we do when we're caught BETWEEN interfaces.
Friends, mind the gap, and watch the closing doors.
We're going on a little trip.

Multidevice

21 device changes
per hour

Our journey begins here.
Our multidevice, gadget-saturated life.

We have a LOT of gear, and we put it through the paces.
A recent study in the UK found...

We switch interfaces 21 times per hour when we're at home.

That is: switch between devices—
mobile phones, tablets, laptops 21 times in 60 minutes—
And 95 per cent of people have television on the whole time.

So only do we multitask...
we do it CONSTANTLY.
Switching back and forth even while we're working on a single task.

OMD UK's Future of Britain research project.
http://www.campaignlive.co.uk/news/1225960/

90% accomplish tasks
across multiple screens

67% start shopping
on one device and
continue on another

http://www.thinkwithgoogle.com/research-studies/the-new-multi-screen-world-study.html

In fact, of those who own multiple devices...
90% start tasks on one screen but finish on another.

[next]
So for example:shopping

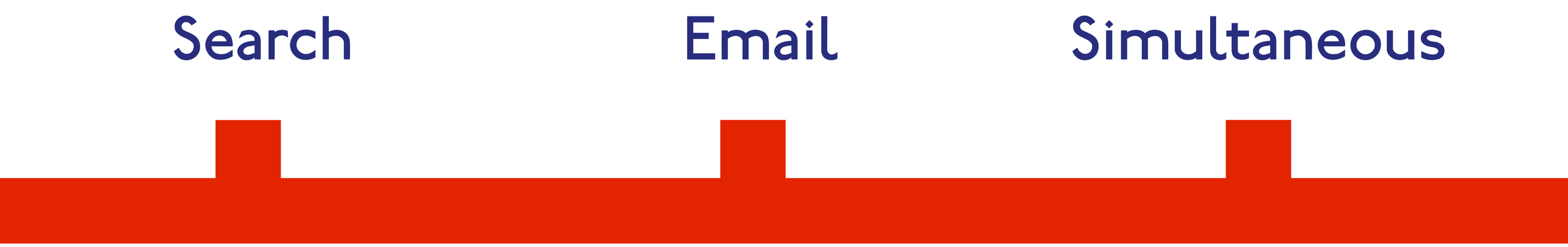
Start shopping on our phones, keep browsing on our tablet,
finish up and enter credit card info on desktop.
SIXTY-SEVEN PERCENT.

Smartphones are by far the most popular
to start thse “sequential” tasks.
The device we always have with us is,
no matter where we are,
the gadget we use to kick off these twitchy, sequential sessions.

How do we do it?
Well, clumsily. We stagger through our interfaces.

Google: The New Multi-Screen World Study. Aug 2012.
http://www.thinkwithgoogle.com/research-studies/the-new-multi-screen-world-study.html

See also:
http://blog.gfk.com/2014/03/finding-simplicity-in-a-multi-device-world/



The research says searching is the most popular way.
Start a task in one place, and when we jump to a second device,
we do a SECOND SEARCH to find our way to where we left off.
Google's search box is the connector.

Or you know this one: I'll just email myself that link, or photo, or text.
Transition via inbox.

We mail ourselves instructions. Terrible interaction.

But it's not always sequential either.
We do tasks on two screens at once. Simultaneous transactions.

And here again, phones are the most common element of those combo tasks.

The Gap

So: we reach our first station stop. Where we confront the gap.

Right now we lurch and haul and hurl our data across the gap,
coming up all these coarse hacks to do it.
Because we don’t have graceful interfaces that can do it better.

It’s a physical gap.

Remote control

It’s not a new problem really. We’ve been here before.

In the past we’ve embraced remote control
to deal with content and media at a distance.

The Wireless Wizard, with hours of pure pleasure.
The ultimate in performance and convenience.

They don’t make TV like they used to. Or do they?

RCA Victor 1961:
http://www.youtube.com/watch?v=opExA1y1xAg

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http://www.youtube.com/watch?v=opExA1y1xAg

This little guy you plug into your TV.
When you watch video in the Chrome browser on any device
—phone, tablet, laptop, whatever—
tap a button and push the video over to the TV.

Apple has Apple TV. Microsoft has Xbox Smartglass.

We’re pushing content from one device to another.
We’re obsessed with beaming content from one place to another.
And yet we’re still not very good at it with the mundane tasks that we manage everyday.

Remember the Palm Pilot? That was easy. Even fun.

Now it’s hard to make this stuff go.
Better at moving content across the world than in the same room.

So we resort to hacks.

Remote control

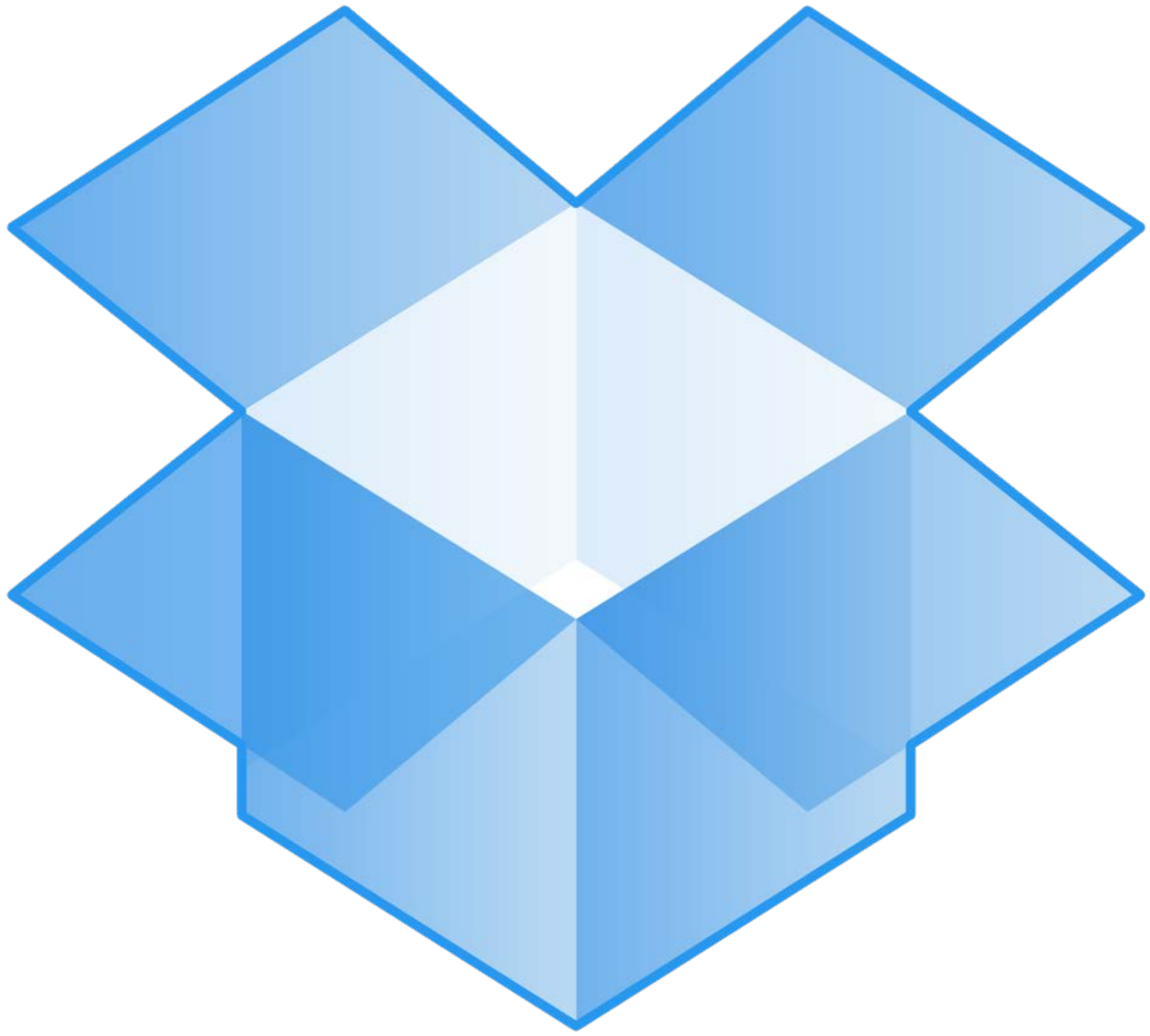
Email and SMS hacks

Content syncing

Sending email and texts to the person next to us.
Or to ourselves.

As an industry, on the back end,
we've gotten a bit better at helping with this.
With content syncing.

These are our three strategies for coping with the gap right now.



Dropbox of course is the gold standard of content syncing when we think about our fils.

The file here automatically shows up over there.
Syncing is a hard problem, but we've largely gotten there.
To the point that it's an expectation.

Whether it's Kindle or Netflix or Dropbox,
consumers expect their stuff to just show up across devices
and, ideally, right where we left off.

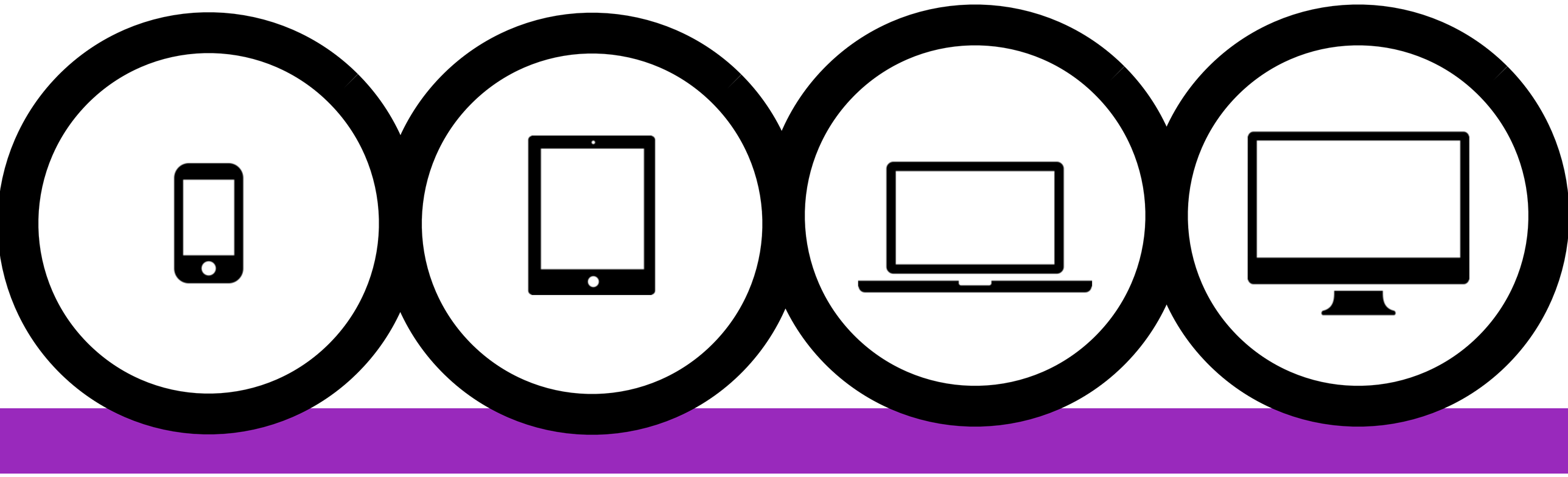
So at least when it comes to STATIC content,
we're not doing too badly.

The problem of bridging the physical gap is more fundamental
than syncing content, though that's how we often approach it.

Often we're MID-TASK. How do we sync tasks, behavior, actions.

The Behavior Gap

That's our next station stop.
Beyond the simply physical gap, we have the behavior gap.



We've learned to make our content look great across devices.
But they're independent of each other.
Silos.

Tightly knit into our lives, yet completely separate from one another.
They don't talk to each other directly.
They don't share tasks.

So our challenge and our opportunity is:
create interactions that shift not only content
but BEHAVIOR AND ACTIONS between gadgets.

You see that in multidevice shopping behavior.
I want to jump midactivity from one device to another.
Move midstream.
Something better than just sharing a URL or a file or a snippet of text.

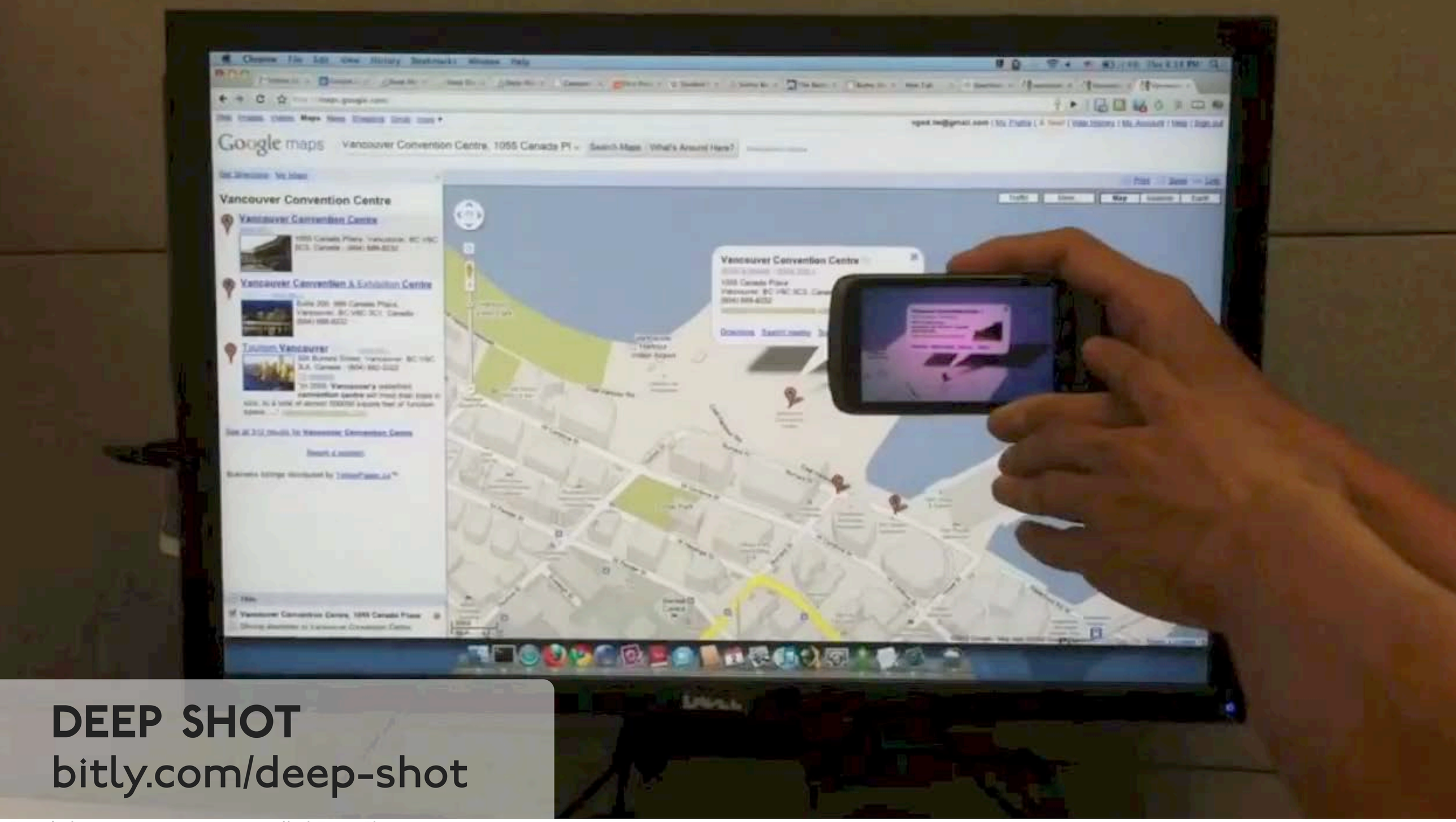
As we design in the gap between devices,
huge opportunity for new and surprising interactions.

Sequenced

Simultaneous

We share tasks across devices in two very different ways.
The first is sequenced tasks.
I'm doing this here, now I want to do this there.

Let's imagine what that interaction might be.



DEEP SHOT
bitly.com/deep-shot

Google has a prototype project called Deep Shot.
Use your phone to snap a photo of a map on your monitor,
and boom the thing jumps over to your phone.
Interactive and ready to roll.

So that's a sequenced behavior.
Doing something here, take it over here to continue.
And the interaction's not bad.

How can we use the phone's sensors
—camera, microphone, gps, acceelrometer—
to trigger the seamless transition of a task
from one screen to another.

But you know what's more fun?
Simultaneous. Especially when you bring in other people.
Friends, let's take this fandango multiplayer.

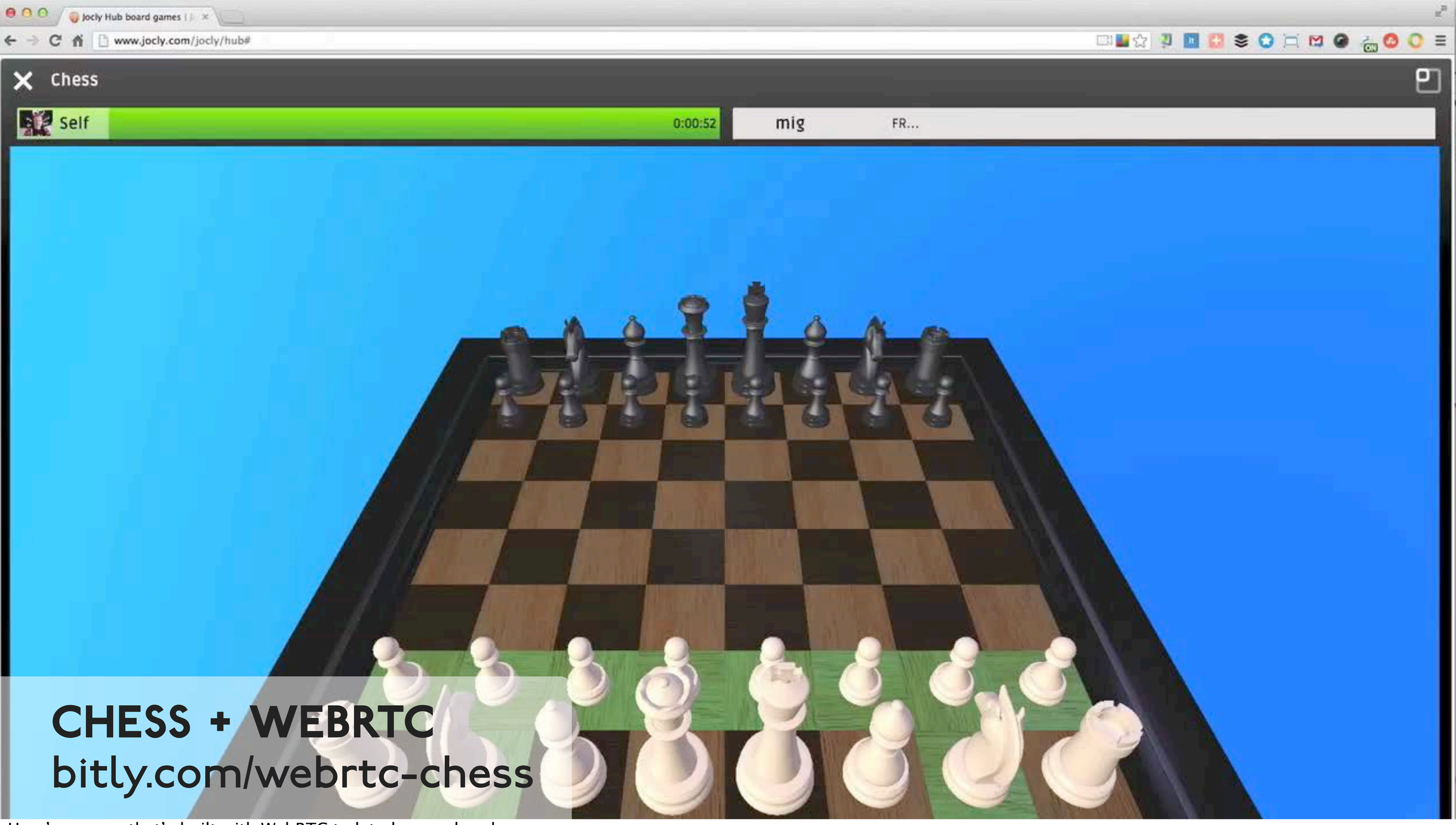
http://googleresearch.blogspot.com/2011/07/what-you-capture-is-what-you-get-new.html
https://www.youtube.com/watch?v=iGTM6xs2sck&feature=player_embedded

Racer is a multi-screen racing game that runs on the web,
in the Chrome browser.

The technology that's making this data transfer possible is WebSockets.
A server in the middle sets up a persistent data stream between
all the gadgets and drives the show.

But you don't actually need that server at all.
If we want gadgets to be truly good communicators,
maybe we can let them talk directly.

http://j.mp/racer-chrome



Here's a game that's built with WebRTC to let players play chess
with each other—in the browser—via video chat.

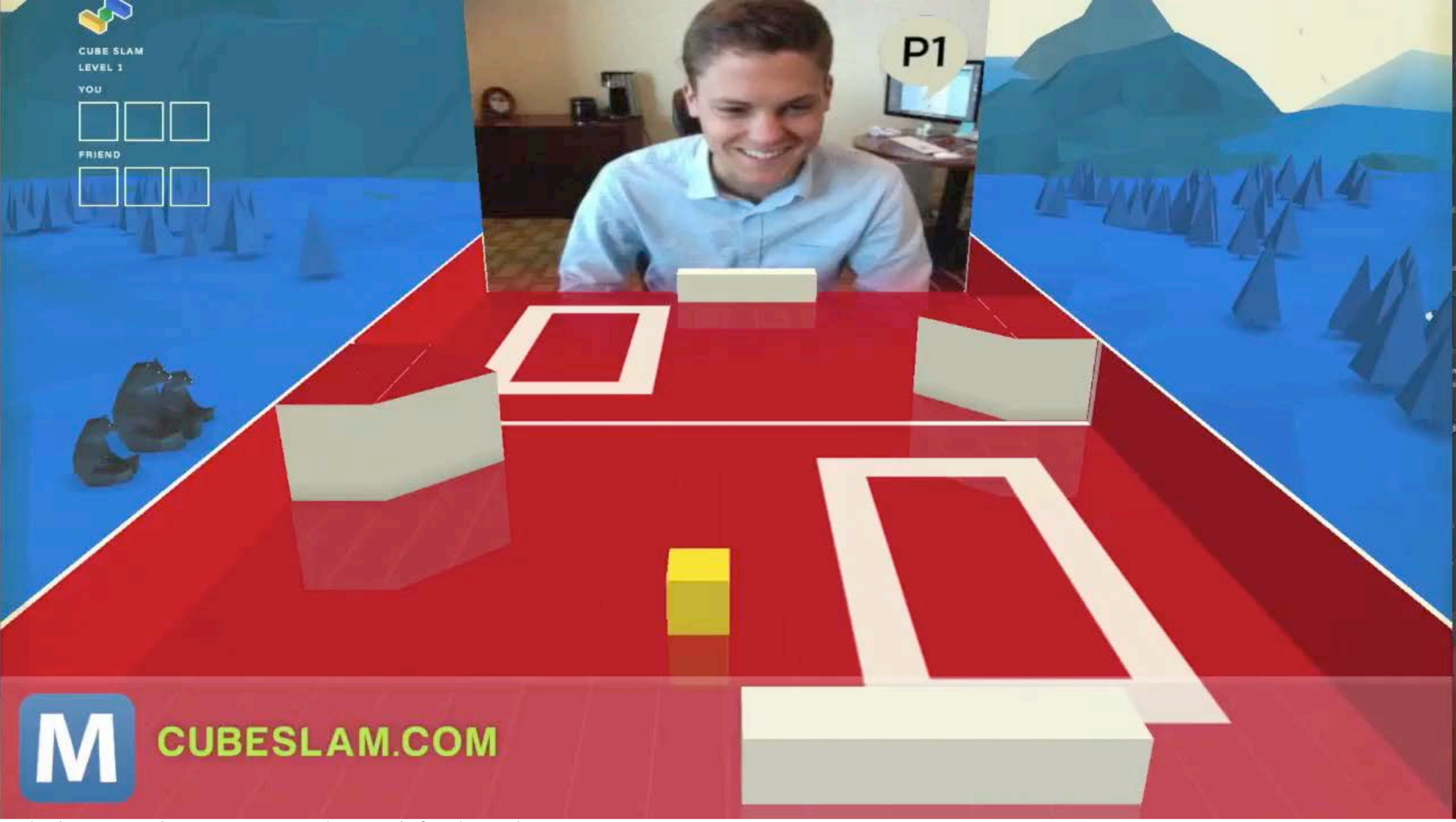
The video chat isn't happening with a server.
That's direct peer-to-peer video chat, entirely via JavaScript.
A JavaScript videochat client.
No server required.

Chrome, Firefox, Opera—
exchange video, audio, or any arbitrary data directly with each other.

WebRTC used mostly for video chat at the moment,
but it can swap all kinds of data, so it can be used for:
remote control,
peer to peer file sharing,
multiplayer gaming,
anything that needs a persistent data stream between browsers.

WebSockets without the server in the middle.

http://www.youtube.com/watch?v=KWuSnwD2gJ8
http://www.jocly.com/node/339
http://bit.ly/webrtc-chess



CubeSlam is a similar game, prototyped in Google for Chrome browser.

In other words, using WebSockets or WebRTC,
we can exchange not only content but control. Action.

And that's not something we're very good at.

http://cubeslam.com
http://on.aol.com/video/play-3d-pong-against-your-friends-in-chrome-517827372

RTCRTCDataChannelDataChannel

It’s not enough to share content across devices.

Share action.

Share action, not just content, across devices.

Dropbox, Google Apps, other cloud-based services:
we’ve gotten pretty good at making content move from device to device.

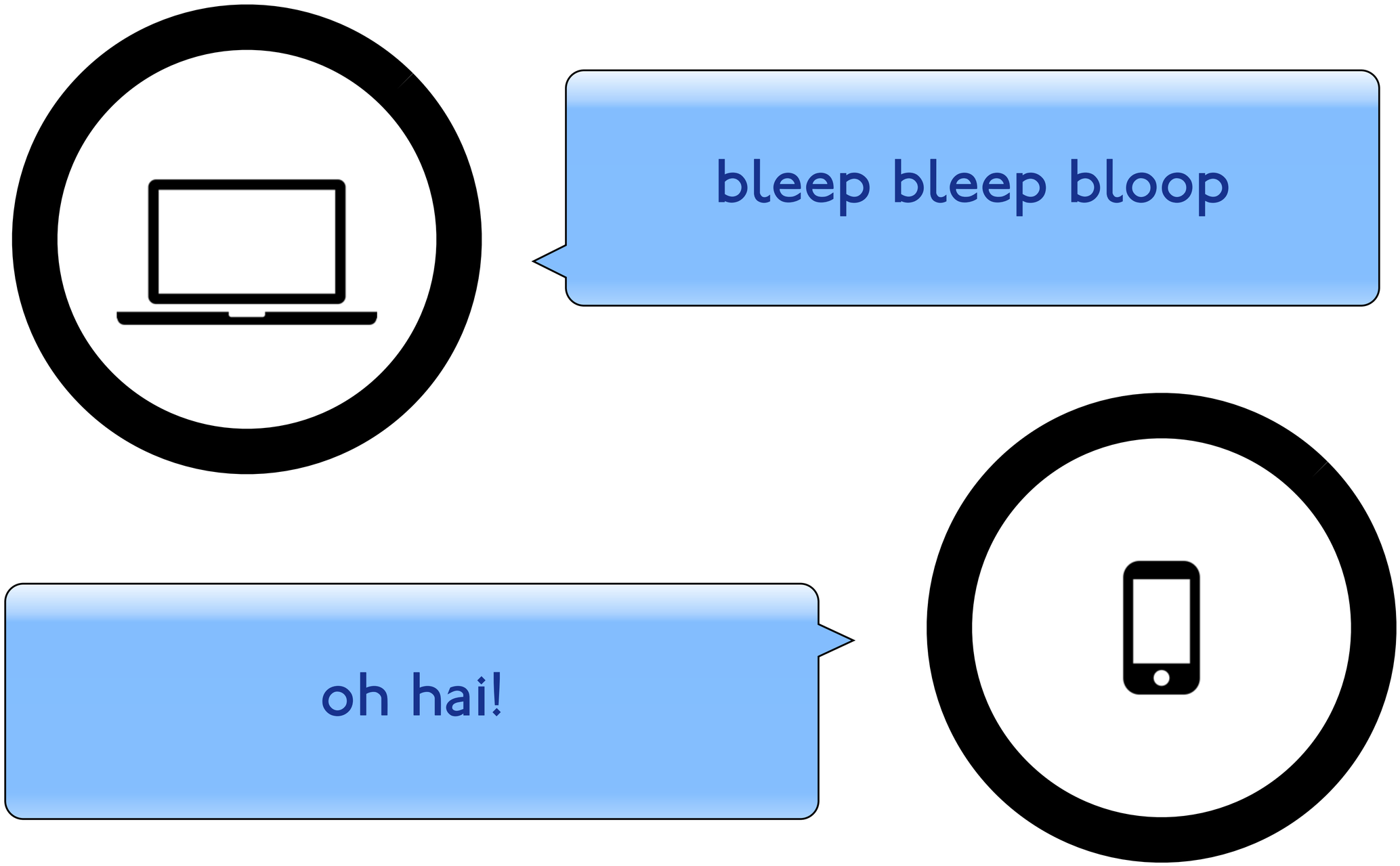
But we’re not yet good at moving an activity from one device to another.

We have to do a better job at syncing action, not just things.

Sync verbs,
not just nouns.

WebSockets WebRTC Bluetooth LE

These are the key underlying technologies for doing stuff like this.
Get to know em.

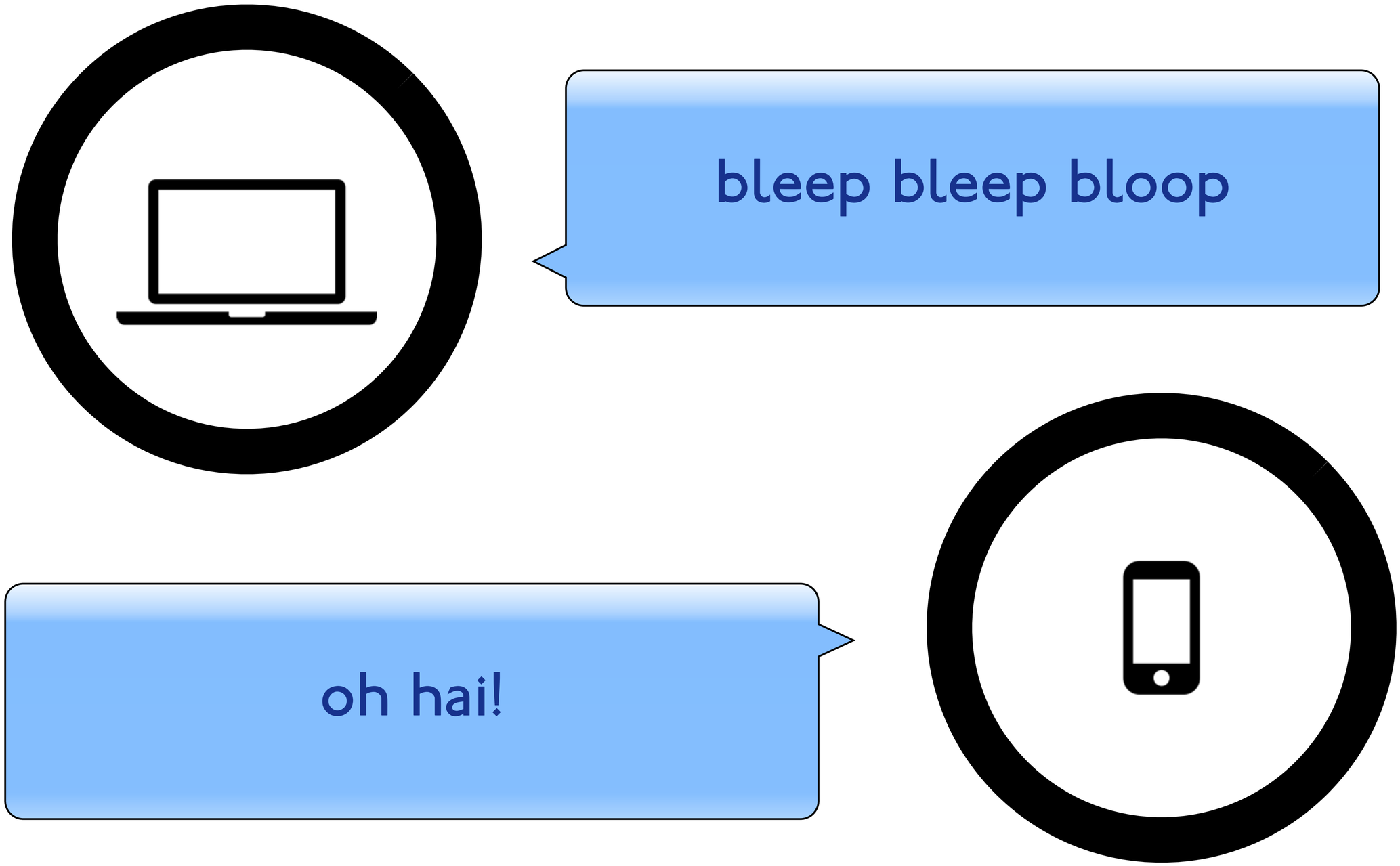


So we're talking about devices talking to one another, directly.
But what if they literally talk to each other. Like with sound.

So one computer says this...
...and the other hears and grabs the data and responds.

That's really the fax machine concept that we all know and love.

But what if browsers could do this. Talk to each other like this.
Well, it turns out they can.



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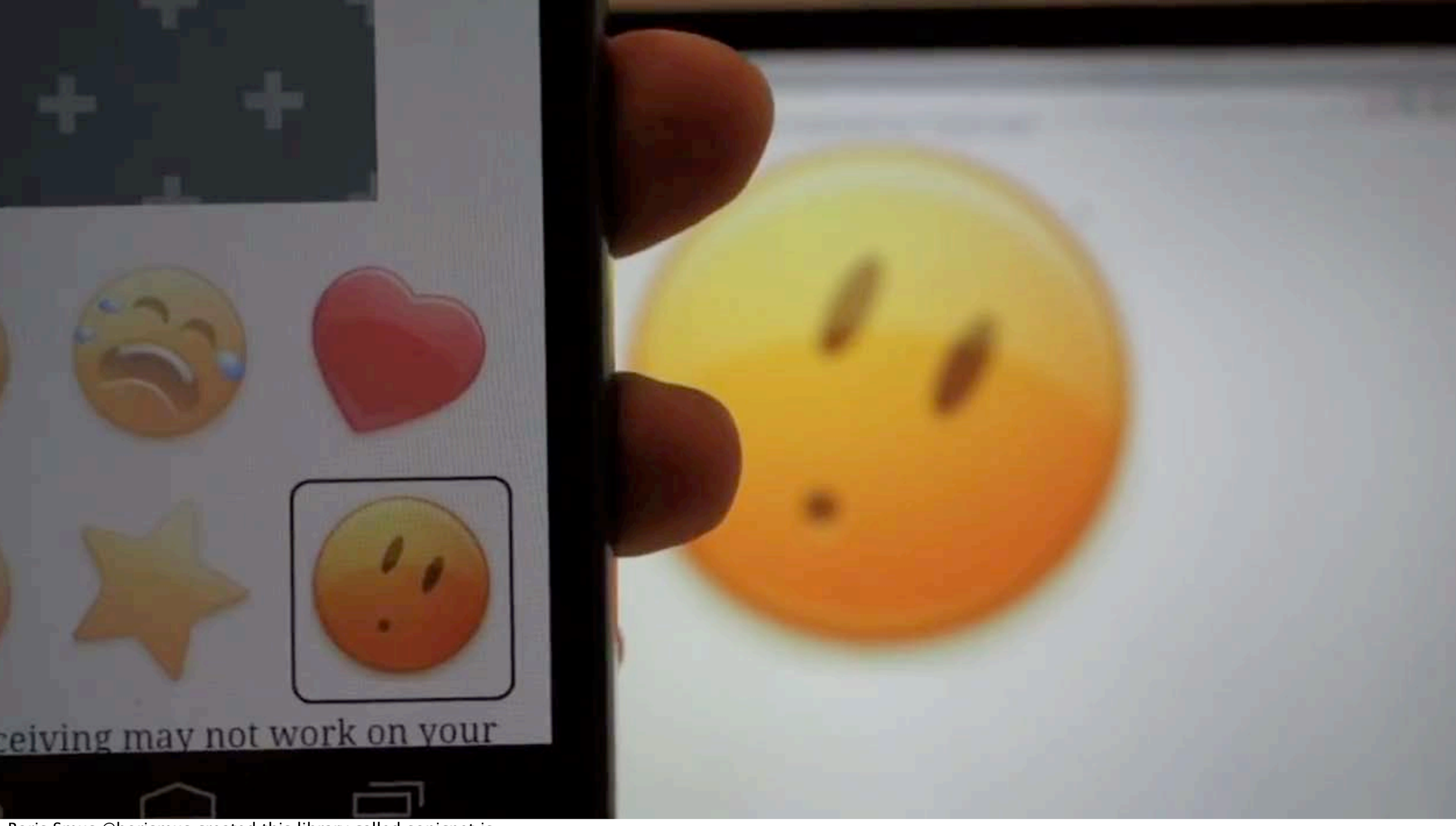

Boris Smus @borismus created this library called sonicnet.js.
It uses the web audio API to make browsers make and listen for audio.
In this demo, he's associated a sound with different icons,
so you can broadcast an icon from one web browser to another
—no server required.
[play]
This also works at super high frequency.
So only the browsers and your dog can hear it.

That last example sends a string of characters, an authentication token,
so you can use this to pair two devices via a third-party server.

Very similar to what a company called SlickLogin does.
SlickLogin acquired by Google in late 2013.
Your phone broadcasts a unique ultrasound signal.
Put it down next to your computer. And boom, you're logged in.

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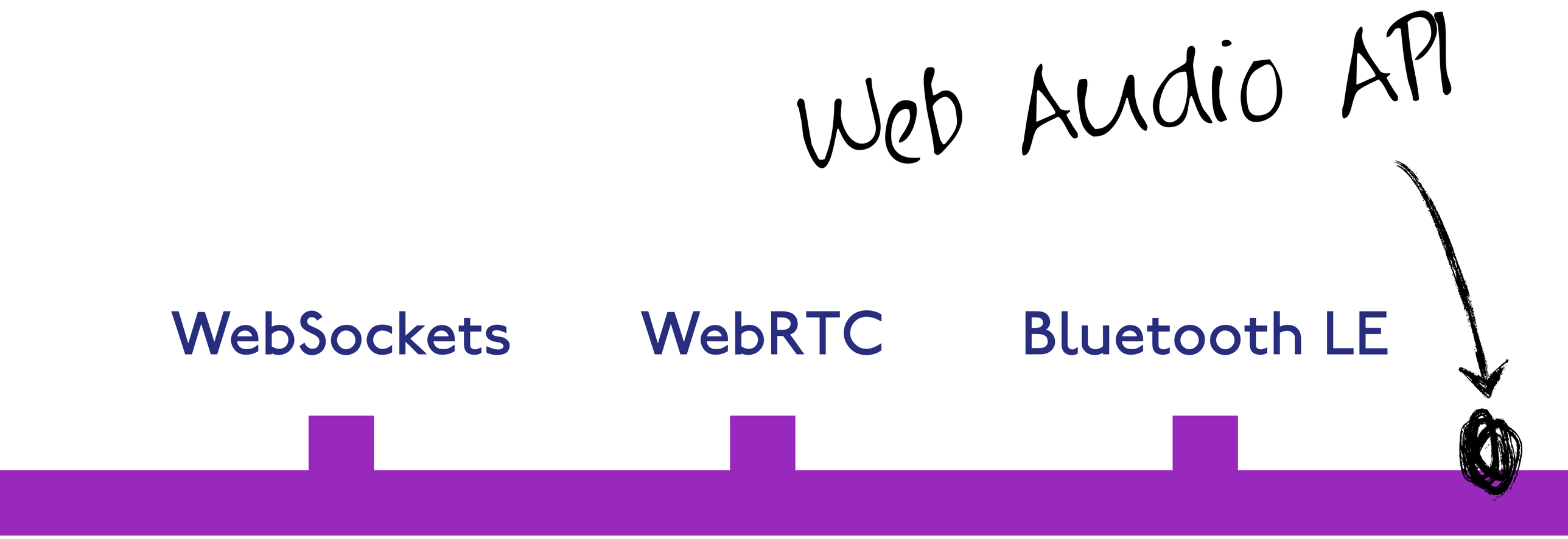
http://smus.com/ultrasonic-networking/
http://www.engadget.com/2014/02/16/google-acquires-slicklogin-sound-passwords/



So maybe we can add this to the list for some experimentation.

So... a bunch of demos hinting at underlying tech we could use
to share ACTION, not just CONTENT.

But as I mentioned, these aren't really ideal interactions.
All these examples are very based around the screen.
Staring at the screen to get things done and share info.

Danger

Screens encumber and constrain.

It used to be that it was the computer itself that kept us tethered. But the brains of personal computers stopped requiring meaningful amounts of space many years ago.

Instead, it’s the display which determines the shape, weight and portability of personal computers.

We're putting screens on everything.
Our poor kids don't get a break.
Here's a little parenting revolution to help potty train kids.

But now that phones and tablets are so laden with sensors,
perhaps we don't need to rely so much on screens for the interaction.

The 2-in-1 potty for iPad
http://www.ctadigital.com/item.asp?item=3016

Design for people, not screens.

Interaction design is not inherently about screens.

How can we use all the sensors to let
device figure out what we want
instead of tethering ourselves and our actions to the screen?

Because, the best parts of our life happen when we're not directly interacting with a screen.

It's our obligation to bend technology to our life instead of vice versa.

Again, screen constrains to visual information,
but it's not well suited to ACTION and MOTION.

Let me show you what I mean.

Physical Interaction

Which takes us to our next station stop.
Mind the gap, friends, I'd like to talk about physical interaction.

Simple proximity is a good place to start.
Put my phone next to my computer, nothing happens.
How can I make devices more social, friendly?

Well part of that means interacting with them not through screens but with more natural interactions.

And what could be more natural than this...

Is that a drum in your pants, etc?

So that's fun and it begins to get at physical interaction.
Taking advantage of what lots of people already do to drum out a rhythm.
Making that the key interaction.

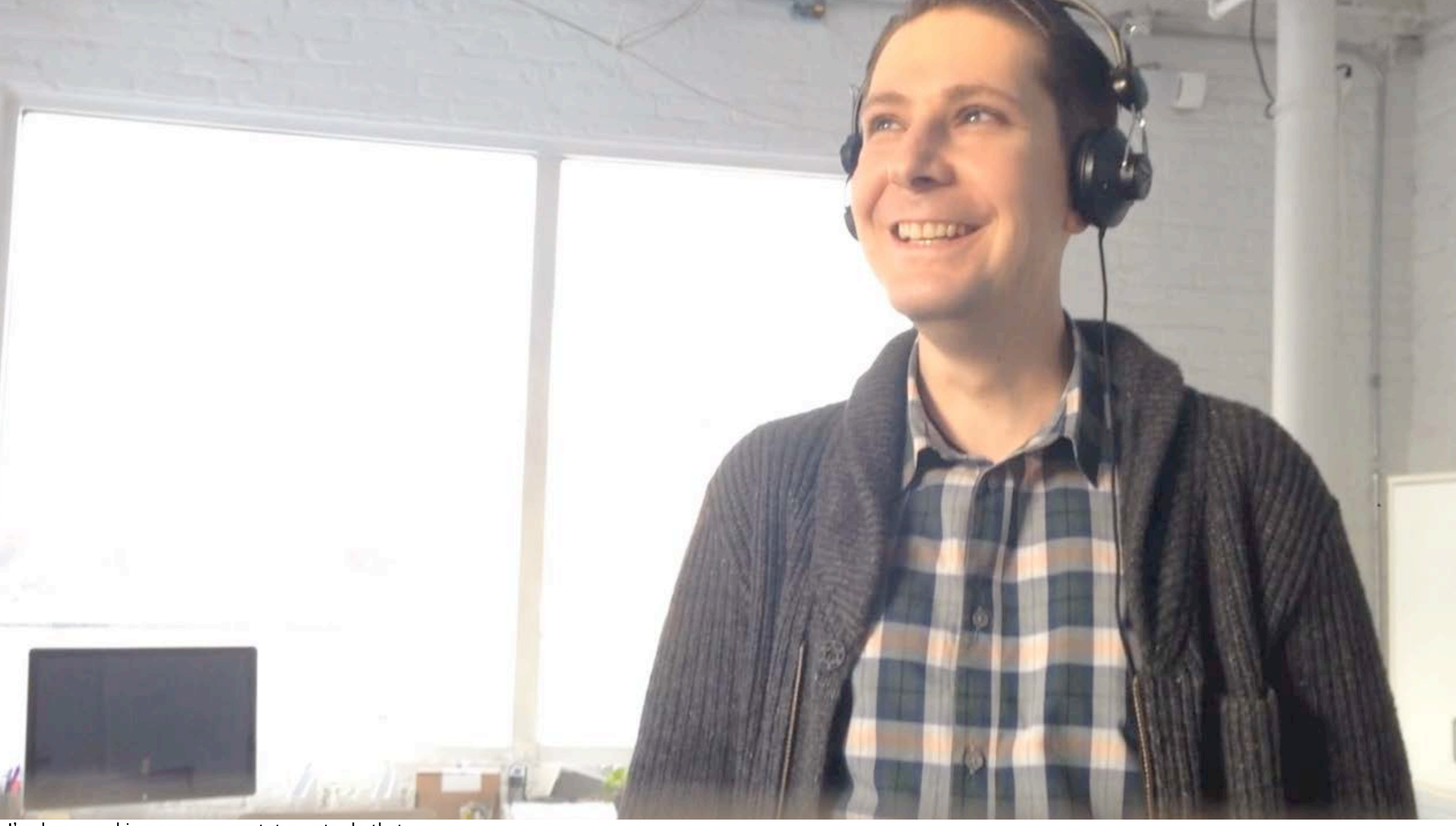
But that thing with with the phone or the powerpoint...
But also turning it into a remote control interaction for other devices.
A clapper for anything.

That's human to device interaction.
How do we bring that to device to device interaction?

Misfit Shine demo.

That’s sociable.
Making these little gadgets happier together.
They just recognize each other and do the right thing.

How might we make phone and desktop more happy together, too?



I've been working on some prototypes to do that
with my buddy and studiomate Larry Legend.

We hacked an app and server together in a few afternoons
and made this video to show you.

When the phone and desktop are happy together,
Larry's happy.

In case you missed it, let's see the instant replay.

http://vimeo.com/globalmoxie/happy-together

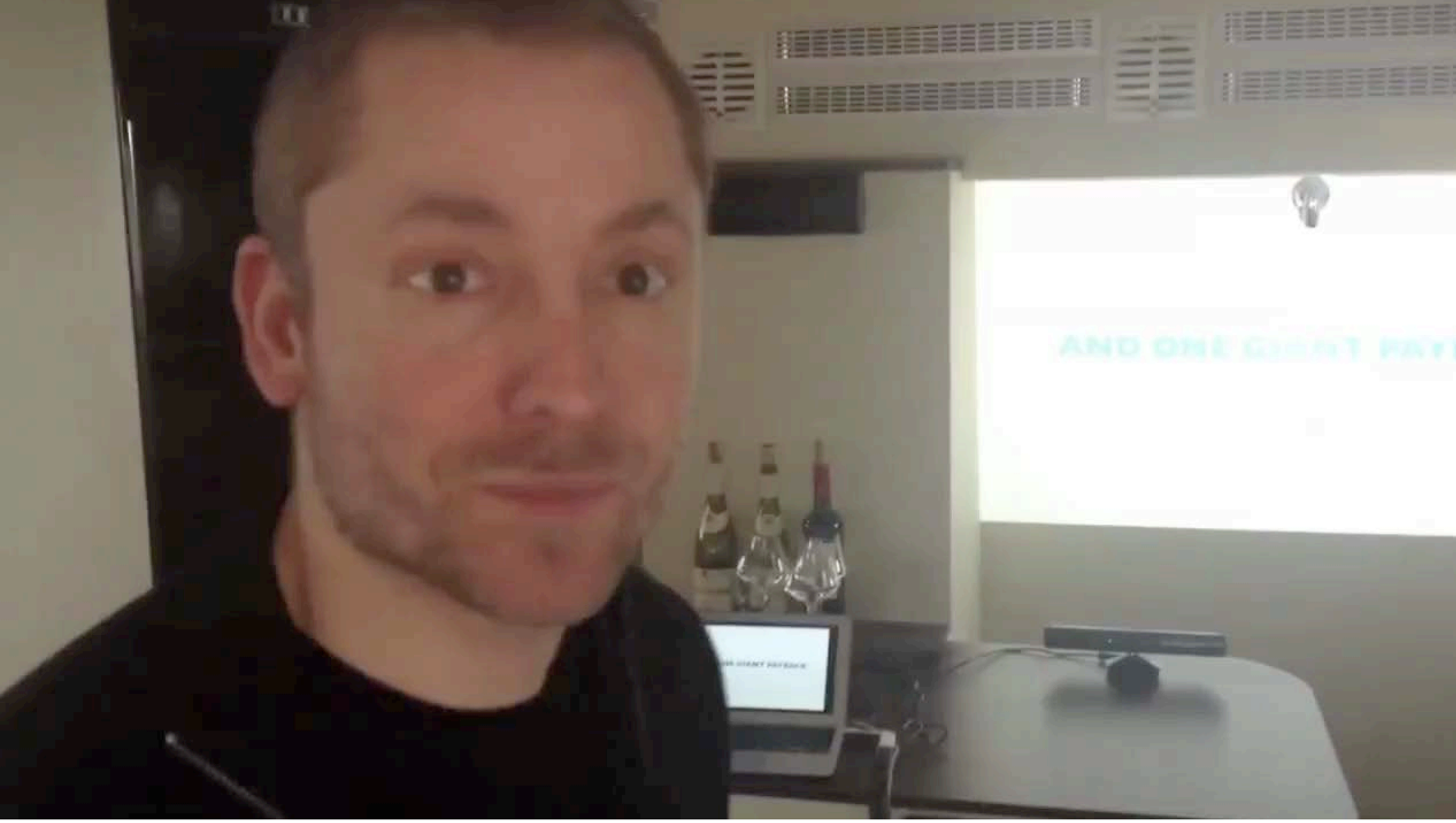
Join us on github:

GITHUB.COM/ HOUSEOFLEGEND/ HAPPYTOGETHER

This really works.
We've got a little prototype app that does this for music,
and also lets you tap photos or text from the phone to the computer.

If you're interested, we set up a github project for it.
Or talk to us about it.
It is hacky as all get out right now.
But we'd love you to take a look at it, work on it with us,
help make desktop and phone happy together.

We're not the only ones working on using gesture
to shift content and behavior between devices.


AND ONE COULD PAY

It’s not a challenge of technology.

It’s a challenge of imagination.

We already have all the stuff in our pockets, handbags and living rooms.
The tech is here.
Our gadgets are loaded with sensors.
The APIs are here.

Now we just have to design the interactions that use them.

When you put these sensors together, when you combine for example, speech and gesture, do you know what you get?

THERE IS
MAGIC
IN THE GAPS BETWEEN DEVICES

Design has often coopted the language of magic and delight
without actually delivering something that's truly delightful.

But we have a chance to do that.
Speech and gesture, physical action,
to make things sail through the sky and appear at a distance.

This is what I mean by designing in the gaps between devices.
And between us and devices.
I mean magic.

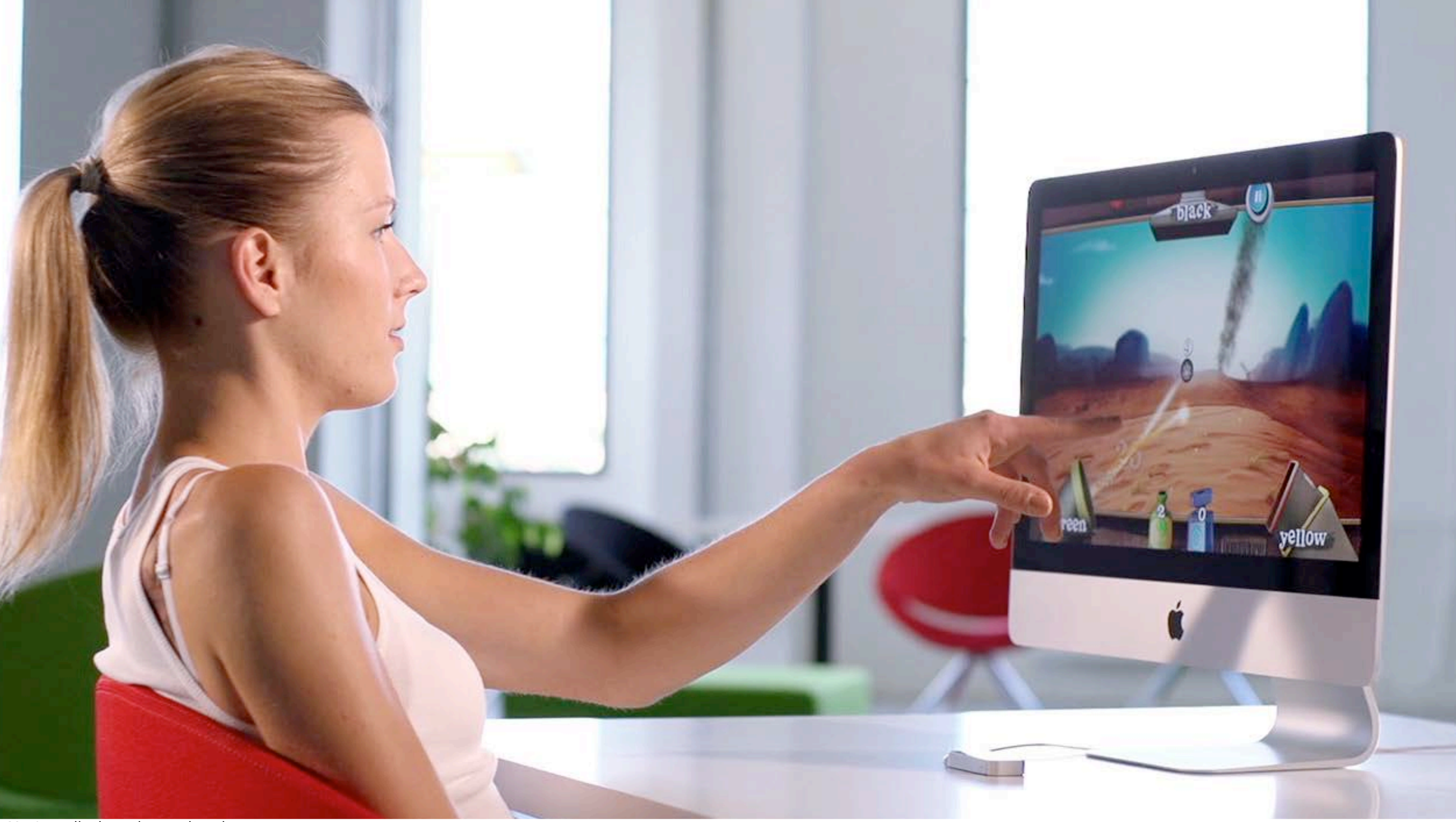
http://www.youtube.com/watch?v=oWu9TFJjHaM

This is the Myo armband. Available shortly for $149.

It picks up minute electrical impulses in our arm muscles.
This allows any wrist movement,
finger twitch or fist clenching to be interpreted as a gesture.
Communicates by Bluetooth.

There's also an accelerometer,
a gyroscope,
magnetometer,
so arm and body movements are accounted for as well.

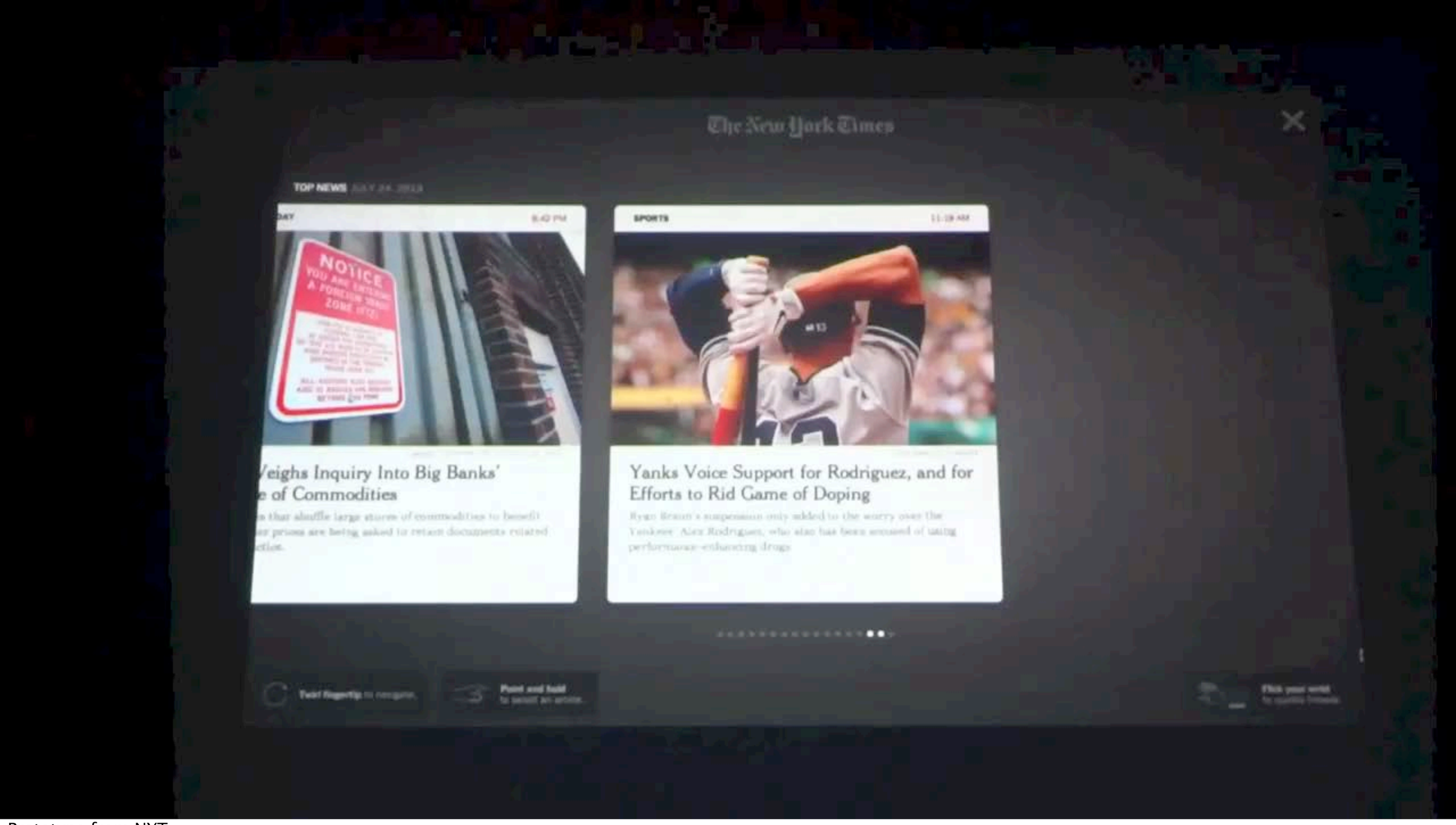
And look! It’s a drumpants alternative!



Magic spells through speech and gesture.
Leap Motion sensor.
Like a Kinect but for individual computers instead of a whole room.

It's this little $80 gizmo that you put in front of your computer,
and boom -- your app is the minority report.

So far, though, we're seeing only very basic uses.
Designers and developers using it like a mouse.



Prototype from NYT.

Never ever ever ever try to out-mouse the mouse.

If you have a new input, whether that's touch or kinect or leap motion,
figure out what that thing can uniquely do and take advantage of that.

You're not going to be a better mouse than the mouse.
It's a terrific pointer.

For Leap Motion, I suggest that the best thing it can do actually doesn't have to do with the screen at all. It can actually make physical objects digital through simple interaction.

The physical/digital gap is a really fun one to cross.

Physical / Digital

And that’s our next station stop.

When you unhook your input from the screen,
you can interact with anything in your environment.

Here’s a prototype of using a Leap Motion with an architectural model.

How can we use sensors and new input types to interact directly
with the physical world and give digital objects a physical presence?

Physical / Digital

Internet of Things

Digital becomes physical.

Physical becomes digital.

It’s so trivially inexpensive to put a sensor
and an internet connection on anything,
that anything can become not only a source of data
or a controller for other gadgets in our lives.

In other words, anything can have a digital avatar now.
And some of this may seem a little, well, far out.

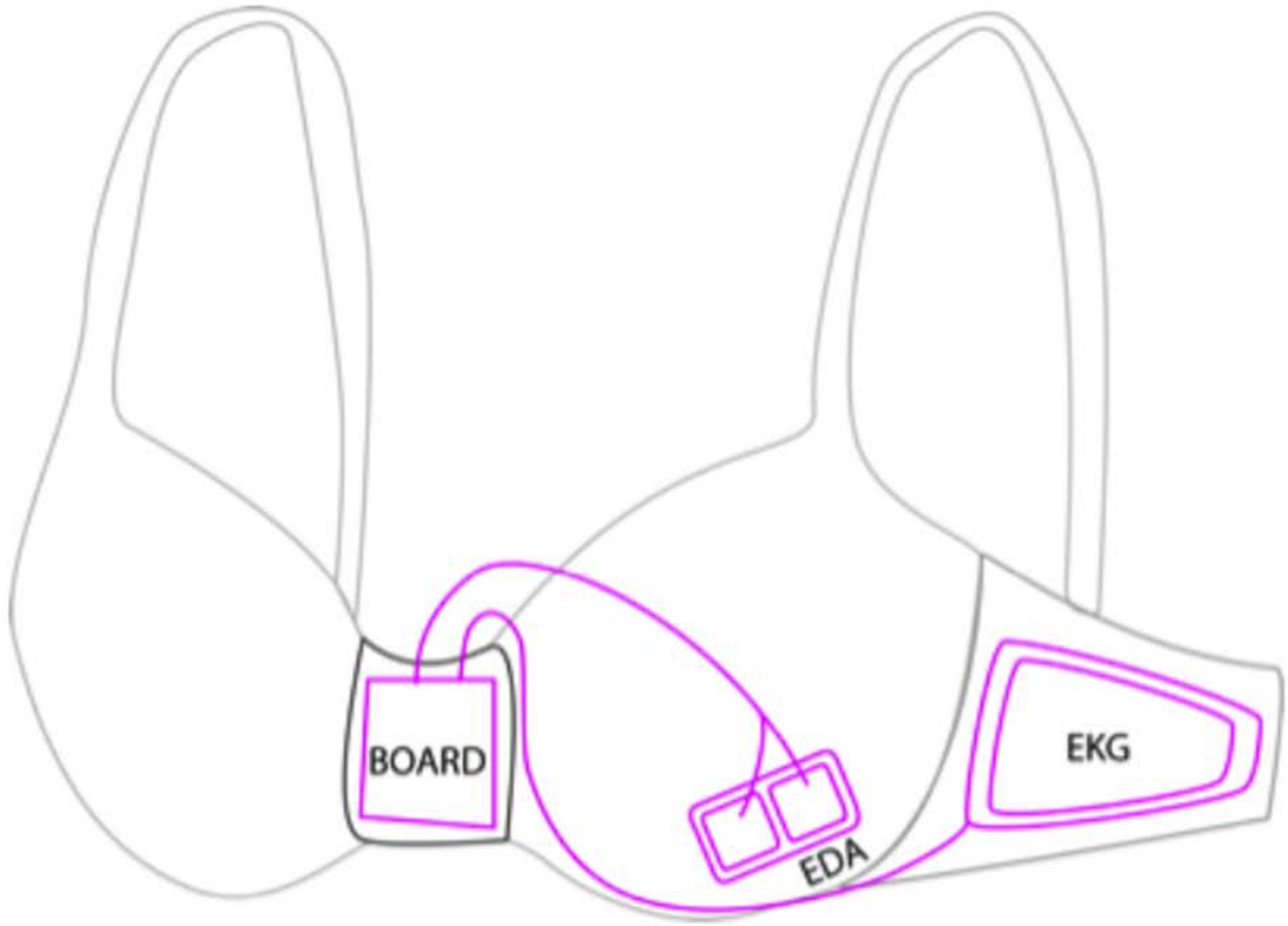
Garment Tracking RFID Uniform Rentals CT Connecticut | White Way Cleaners
https://www.whitewaycleaners.com/content/rfid_tracking.asp

Mimo the smart baby monitor, a onesie that measures temperature, respiration, body temperature, movements.

Your kid gets a digital avatar. Full of data and presence.

We’re giving digital avatars to everything.
To our homes with devices like the Nest or home automation stuff.
Houseplants, robot vacuum cleaners, medicine bottles.

http://mimobaby.com



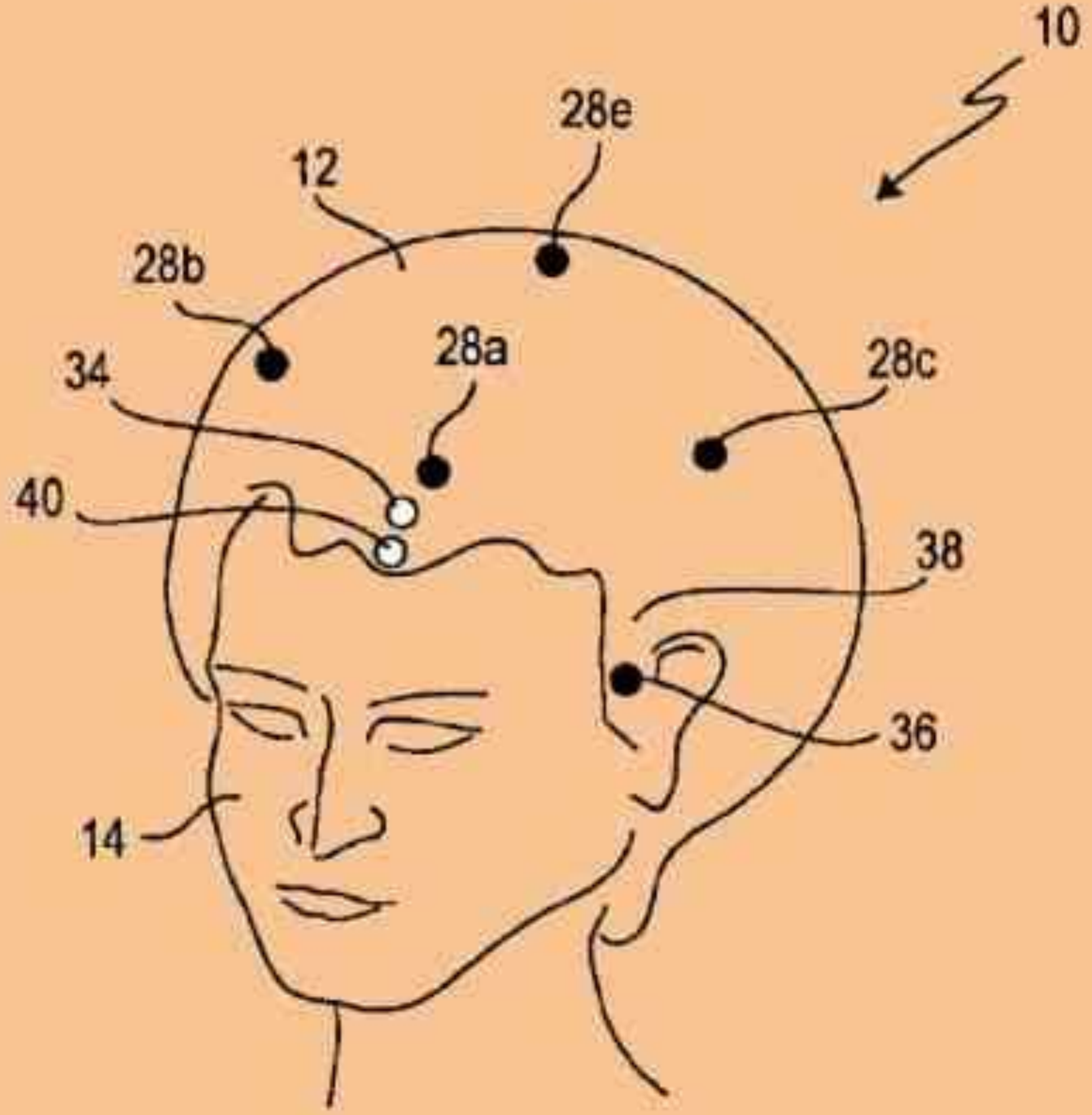
Microsoft has a mood bra.

http://www.latimes.com/nation/shareitnow/la-microsoft-mood-bra-20131206%2C0%2C5125711.story#axzz2nAhCK5aP

http://www.bbc.co.uk/news/technology-25197917

A bra that helps stop you from pigging out when you're an emotional mess. An uplifting experience? That's what Microsoft is going for with its prototype "smart bra."
A team of researchers at Microsoft developed the smart bra that comes embedded with sensors, similar to that of an EKG, that monitor a woman's heart rate to track her mood throughout the day.
The aim in developing the smart bra is to track the wearer's emotional state throughout the day to help tackle emotional eating.
The data are provided to the wearer via a smartphone app and warn when emotional eating is likely to occur, according to BBC.
According to Microsoft's own report, 87.5% of bra-wearing participants reported that they became more aware of their emotions while using the app.
However, being aware of their emotions did not lead many of the participants to change their eating habits. Only 37.5% of participants reported that their eating behaviors changed.
Microsoft's research team did attempt to develop similar wearable underwear technology for men, but the sensors proved to be too far from the heart to take an accurate measurement.

Microsoft researchers have designed a smart bra that can detect stress.
The prototype contains removable sensors that monitor heart and skin activity to provide an indication of mood levels.
The aim was to find out if wearable technology could help prevent stress-related over-eating.
Mood data was provided to the wearer via a smartphone app in order to highlight when "emotional eating" was likely to occur.
A team from Microsoft's visualisation and interaction research group embedded an electrocardiogram and electro-dermal activities sensors as well as a gyroscope and accelerometer in the bra.
In their paper, the researchers say using a bra "was ideal because it allowed us to collect EKG [electrocardiogram] near the heart".
Efforts to create a similar piece of underwear for men worked less well, largely because the sensors were located too far away from the heart.
The women testing the technology reported their emotions for about six hours a day over a period of four days.
"It was very tedious for participants to wear our prototyped sensing system, as the boards had to be recharged every three to four hours," Microsoft senior research designer Asta Roseway said.
Electric shock
Wearable technology is increasingly being used to monitor a range of health conditions.
Last month saw the release of a Twitter-connected bra, that tweeted every time it was unhooked to encourage women to self-examine their breasts.
And last year a patent was awarded to a US firm that was working on a wearable device that analysed breast heat in order to detect cancer.



Sony has a smart wig. Here's the illustration from their patent filing.

These last are a bit silly, but here's my point.

Sony's SmartWig in its guise as an aid to navigation (Image: USPTO Patent Application Publication US20130311132)

http://www.bbc.co.uk/news/technology-25099262

Sony has filed a patent application for "SmartWig", as firms jostle for the lead in the wearable technology sector.
It says the SmartWig can be worn "in addition to natural hair", and will be able to process data and communicate wirelessly with other external devices.
According to the filing, the SmartWig can help navigate roads and collect information such as blood pressure.
Google and Samsung are among the firms that have launched products in wearable technology - seen as a key growth area.
"Wearable gadgets are definitely going to be one of the big areas of growth over the next two years," Andrew Milroy, an analyst with consulting firm Frost & Sullivan, told the BBC.
"And Sony - which is trying to regain some of the sheen it has lost in recent years - clearly understands that and wants to play a major role in the sector."

The Japanese firm said the wig could be made from horse hair, human hair, wool, feathers, yak hair, buffalo hair or any kind of synthetic material.
At the same time, the communication interface and sensors placed in the wig are at least partly covered by parts of the wig in order to be hidden from sight during use.
It said that as a result, the device has the potential to become "very popular" as it could be used as a "technically intelligent item and fashion item at the same time".
Continue reading the main story
"
Start Quote
The usage of a wig has several advantages that, compared to known wearable computing devices, include a significantly increased user comfort"
Sony patent filing
"The usage of a wig has several advantages that, compared to known wearable computing devices, include a significantly increased user comfort and an improved handling of the wearable computing device."
Potential uses
Sony listed various potential uses of the SmartWig in its filing, including helping blind people navigate roads.
It said that a small video camera or a sensor on the wig could help to provide the position and the location of the wearer.
A remote user can then use the images provided and send vibration commands through the network and navigate the wig user manually to a desired destination.

Anything that can be connected will be connected.

It’s so trivially inexpensive to put a sensor and an internet connection on anything, that anything can become not only a source of data but a controller, too. Prompting other devices to do things on our behalf.

Anything that can be connected will be connected.
And everything can be connected now.

Josh Clark: "Garment Tracking RFID Uniform Rentals CT Connecticut | White Way Cleaners"
https://www.whitewaycleaners.com/content/rfid_tracking.asp

Everyday objects
are now
digital gadgets, too.

So when I talk about designing in the gap between gadgets,
I'm talking about this stuff, too.

We have to design across not only the smart electronic gadgets in our lives—
our computers, our tablets, our phones, our tvs—

...but also everything in the physical world. How can I usefully sync content and action across everything. That's the crazy exciting challenge and opportunity of the next decade.

Here's another way to say this that "everyday objects are now digital gadgets"...

Physical things now have digital avatars.

So much data locked up in objects, inaccessible. When you give an object a digital representation, you can suddenly get at all of its information.

A physical object becomes a data object, in developer terms.
With attributes and methods and all the things
you would have in the digital realm.

But there's also this idea of an avatar.
A personality. A social presence.

It's like we have them on our social network.

Physical / Digital

Internet of Things

Social Machines

What happens when your car is your friend on Facebook?
Or you follow your house on Twitter?
Or your baby monitor?
Or your office chair?
Or your running shoes?

What does that mean when suddenly devices are participating in digital life?

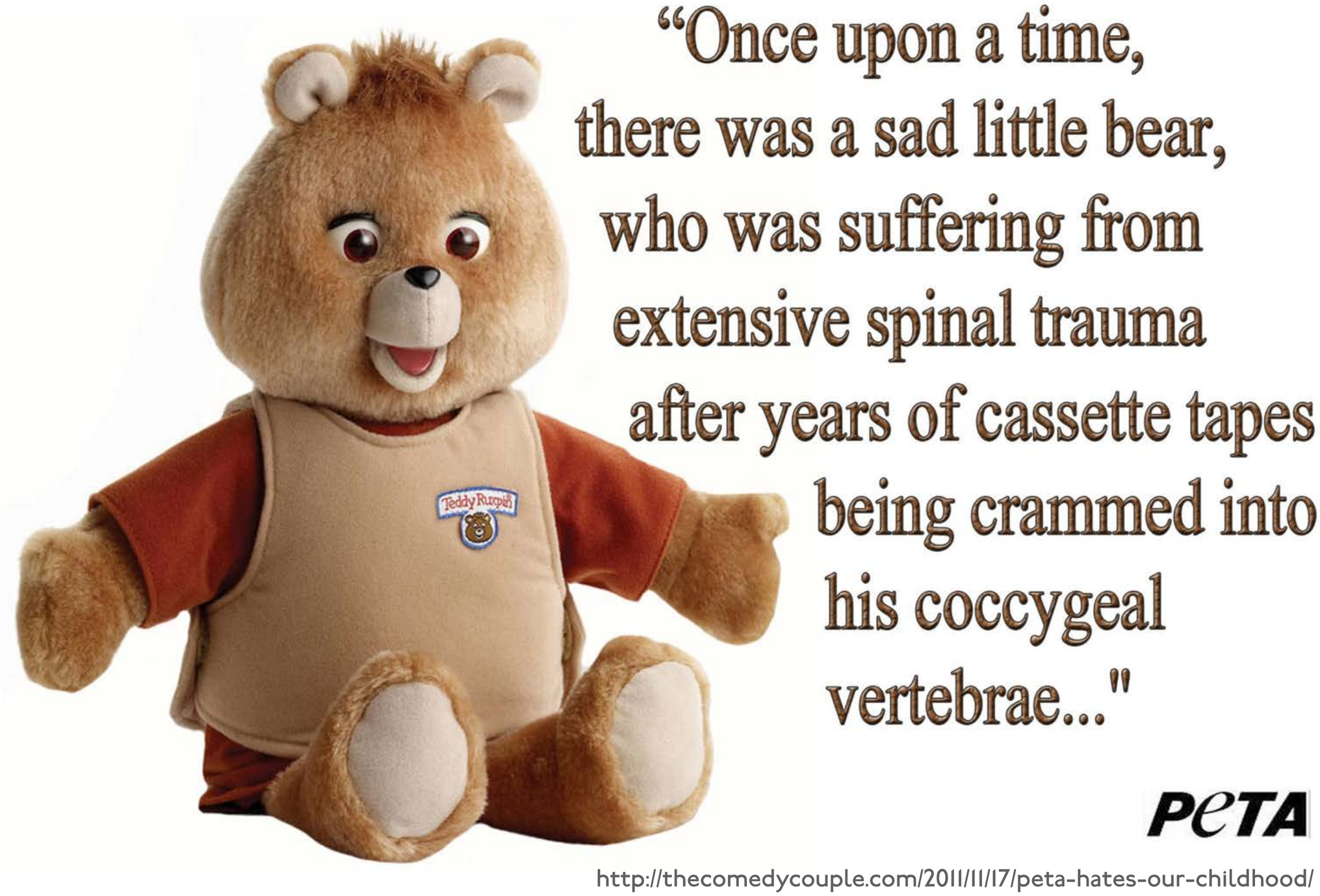
WHAT ARE THE DESIGN OPPORTUNITIES THERE?

Well let's start with at what a social machine USED to be.

MINDS BLOWN.
Teddy Ruxpin totally OWNED those kids.

I wanted one of these so hard.
Teddy bears are avatars of our imagination as kids.
They ARE part of our social network.
Teddy Ruxpin tried to make that real by adding some electronics.

It demo'd great. But it was a little creepy.
And there was a key conceptual flaw.



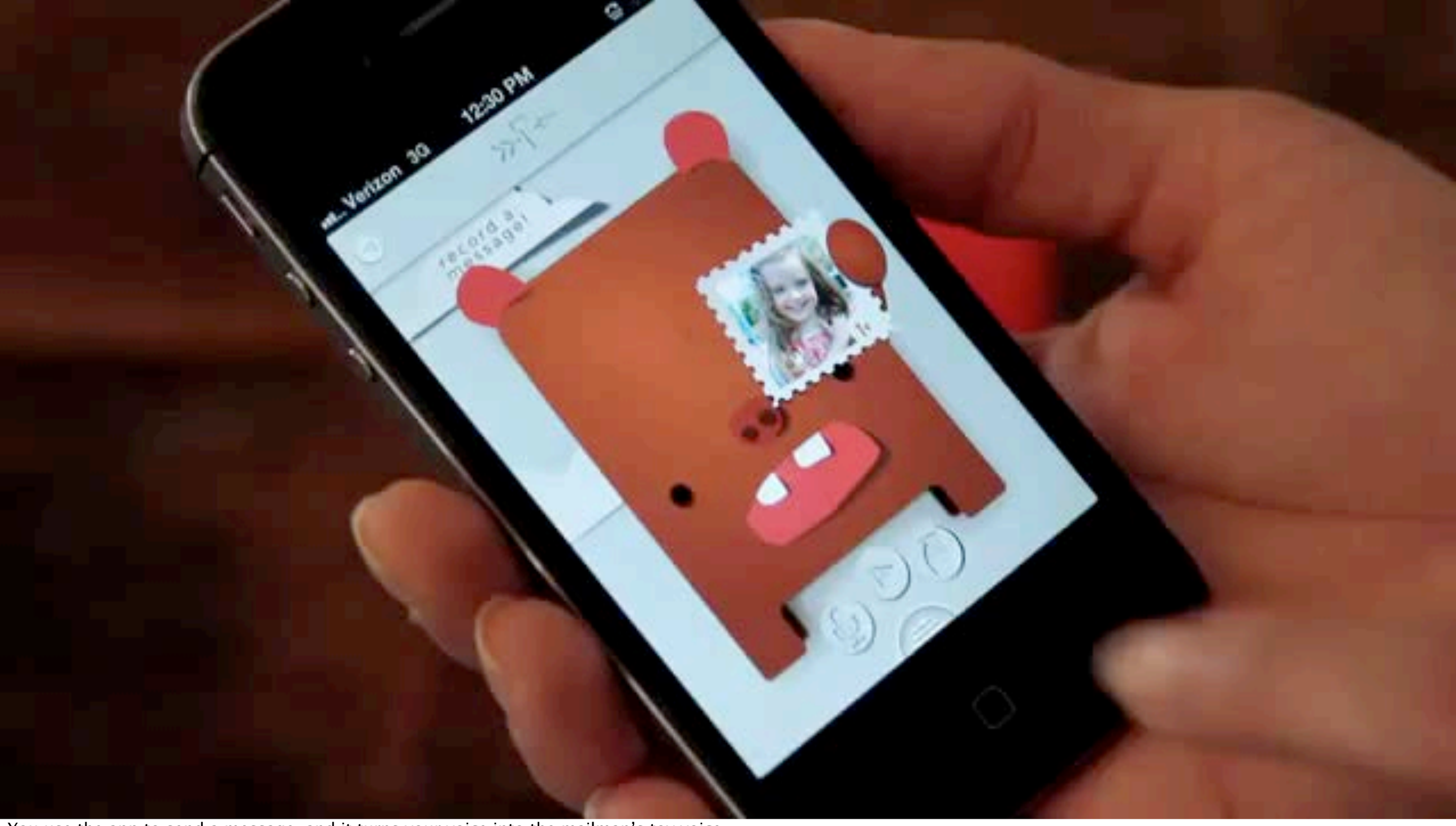
The thing worked by cassette tape.

He only had so many lines to say.
And it was limited by how many inches of magnetic tape you fed into his back.

Ultimately a mechanical machine.
A device that pretended to be a social machine but wasn't.

http://toymail.co

So let’s unpack what’s happening here.
It takes the Teddy Ruxpin idea and turns it into a personal communicator.
The mailmen are avatars for a child’s family.



You use the app to send a message, and it turns your voice into the mailman's toy voice.

...and then it sends that message through.
On the other side, the kid records and sends her own message.

Here's the point.

Software makes hardware scale.

Teddy Ruxpin played a cassette. Most talking toys do that. A fixed set of content.

But Toymail scales.
Endless variety of content because it’s powered by people.

Slow:
The software lets hardware be an avatar for people.
It a HUGE reason we’re so attached to our phones.
They’re portals to all the people we care about.

Software enables the machine to become a social machine.
So it scales in that way.

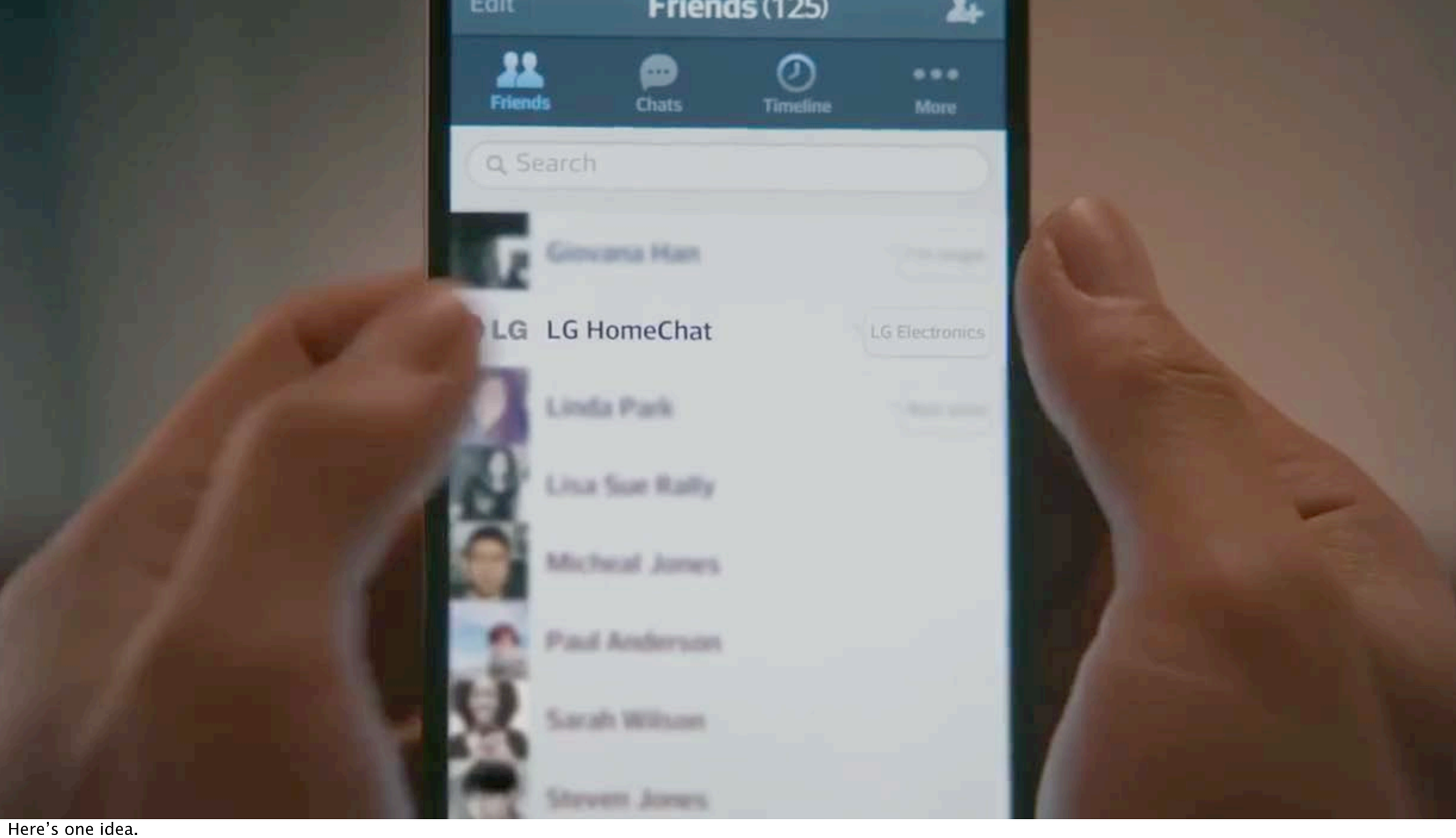
But it also scales the lifespan and durability of the device itself.
For Toymail, the dialogue becomes more sophisticated as the kid does.
She’ll never outgrow its content.
She won’t throw it out.

So connecting objects means
adding value
adding longevity
adding environmental sustainability

In this case, Toymail is a portal to people.

But what about all the THINGS OR PLACES we care about?

How do we design interactions
with the digital avatars of, say, appliances?



Here’s one idea.
It’s a platform called Home Chat from appliance maker LG.
[start]

You text your kitchen or your appliances,
have little conversations with them to make them go.

[OR EGGS! HOW MANY EGGS!]

http://www.latimes.com/business/technology/la-fi-tn-ces-2014-samsung-lg-lead-smarthome-push-with-connected-appliances-20140106,0,4381746.story#ixzz2pvJV5s6g

http://www.youtube.com/watch?v=PplAymrv0hA

http://www.theverge.com/2014/1/7/5285316/lg-homechat-instant-message-control-smart-appliances-through-line

LG is now extending that idea to smart appliances with a new service called HomeChat, but it isn't focused on using your voice — it's instead based around the instant message.

The service lets owners of a new LG smart washer, drier, fridge, air conditioner, or vacuum cleaner control functions of their appliances just by sending a message. You could tell the washer to start a load of laundry, have your vacuum stop cleaning before you get home, or turn off your air-conditioner if you plan on staying out of the house.

But rather than making HomeChat a standalone app, LG is trying to build it into popular messaging services to make talking to it feel all the more natural. Right now, it's only built into Line, but LG says that it's working toward launching the service on WhatsApp and the popular Korean messaging service Kakao Talk as well.

Though the conceit is a bit convoluted — LG does have standalone apps that can perform these functions already, after all — interacting with the appliances over Line is surprisingly fun. When you start a load of laundry, HomeChat will message you back with a big sticker of a smiling cartoon washer and a bunny laying out a shirt. When the load finishes, it'll alert you with another big sticker to tell you that it's done.

Danger

Connected devices won’t always say nice things.

When appliances can talk back, what will they talk about?
Turns out it could very likely be:
viagra offers
get-rich-quick schemes
Nigerian money transfers.

In January 2014, security researchers discovered home appliances like TVs and refrigerators sending malicious spam.

Hackers had hijacked these smart gadgets and sent 750,000 email messages from over 100,000 Internet of Things connected devices.

“Everything that can be connected will be connected” has corollary...

http://www.proofpoint.com/products/targeted-attack-protection/internet-of-things.php

Danger

Anything that
can be hacked
will be hacked.

“everything that can be hacked, will be hacked”

So we can’t be naive about this.
Security and privacy are huge themes here this week.
So it’s important to remind you guys...

Software is ideology, embedded with values.

Software is ideology.
It is an expression of a point of view, and it's embedded with values.

As we march into a new era of interaction
and invent new ways to negotiate not only the digital but physical world.
Be thoughtful about what values you're cooking into your creations.

It's more important than ever.
I think it comes through, though,
that I'm optimistic—enthusiastic!—about all this.

Imagination

Plan for gadget hopping

Share action, not just content

Peer-to-peer sharing

Design for sensors

Push interaction off the screen

Avatars for physical objects

...which brings us to our final stop.
A few closing thoughts to help you get this stuff done.

Gadget hopping:
Continue easily from one device to another.
Pick up a shopping cart, continue that loan application.

Share action not just content:
Nouns, not just verbs.
Move your action and behavior across devices.

Peer-to-peer sharing.
Know the tech. Can do direct beaming of content and behavior.
WebSockets,WebRTC, Bluetooth LE

Design for sensors, not just screens.

Push interaction off the screen and into the environment around us.

It’s not a challenge of technology.

It’s a challenge of imagination.

We already have all the stuff in our pockets, handbags and living rooms.
The tech is here.
Our gadgets are loaded with sensors.
The APIs are here.

Now we just have to design the interactions that use them.

Start thinking of the physical interaction.
How do you combine speech and gesture,
for example to make things happen on our devices.

We have the best jobs in the world.

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