

Open Innovation & Sustainable Technology Development



Tom Igoe

ITP

Tisch School of the Arts
NYU

Wednesday, June 23, 2010

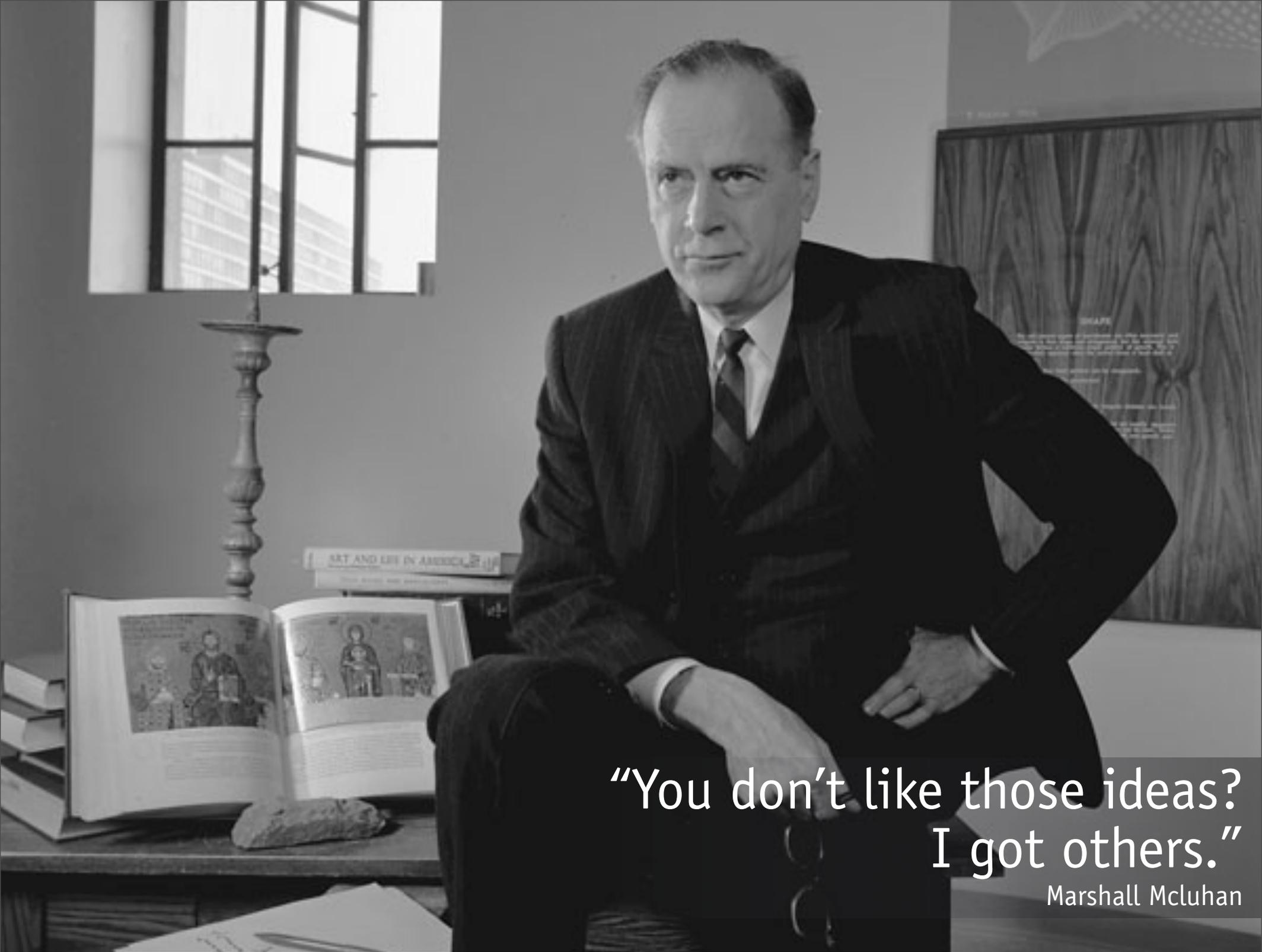
This is the third in a series of talks I gave at RWTH Aachen in June 2010, on Physicality, Conviviality, and openness. The material is adapted from earlier talks.

My third role at ITP is as head of courses in sustainable technology development. I'm an advocate of open technology innovation. I wasn't always so interested in the latter, though. Through understanding more about environmental impact, I've become more convinced that an ecologically aware approach to what we do is necessary. Here's why.



Wednesday, June 23, 2010

I'm interested in open source design for two main reasons. First, I think our current intellectual property practices aren't keeping pace with everyday reality. We're living in a world where product designs are openly copied. We have two choices: expend effort to curtail it, or embrace it. I think we should do the latter.



“You don’t like those ideas?
I got others.”

Marshall McLuhan

Wednesday, June 23, 2010

McLuhan’s attitude is one that’s necessary to survival in today’s market. From a systems perspective, we’ve been thinking of intellectual property as a stock, but it’s the flow of ideas that leads to continual success.

Sparkfun :471, Adafruit:10 –20 new products last year. Both plan have a short run of high volume sales and a long tail of small sales, and build to demand.



Spimes

Wednesday, June 23, 2010

Bruce Sterling introduced the idea of spimes in "Shaping Things," but I think the best part of his concept often gets lost. Every time I talk to people about that book, they focus on the RFIDs, but



Spimes
(are closer than you think)

Wednesday, June 23, 2010

the really interesting part is where he describes physical products as instantiations of information. And networks of information flow. This image shows various Nikon SLRs and DSLRs as instances of Nikon's knowledge (aka intellectual property). If you think about Nikon's vendors (LCD, lenses, etc), then you get a whole network of intellectual property flows, where the nodes are products.

So that's the first reason I'm interested in open source design.



Post-consumerism

Wednesday, June 23, 2010

Now, I have no idea what a post-consumer society is, but I'm pretty sure what post-consumer waste looks like. And as designers, one of the effects of our work is to keep landfills in business. We're not going to stop making products, and we're not going to make less. And increased efficiency isn't a green solution either. Increased efficiency decreases demand, and innovation steps in to create new forms of consumption.



The source of open source

Wednesday, June 23, 2010

We're also in the business of putting holes in the planet. That's the source of everything we make, ultimately. But it doesn't have to be.

1、Customer Supreme: customer leading is Customer Supreme.

2、品質卓越:品質突破,追求卓越.

2、Quality Excellent:quality top,seek excellent.

3、永續經營:持續改善,永續經營

3、Permanent Operate:last improve,permanent operate.

環境政策 Environment Policy

本公司為一專業印刷電路板製造商, 主要以生產多層印刷電路板為主, 製造過程中主要生產含酸鹼之廢水、廢液、廢

Our company is a professional manufacturer which produce PCB,major make multilayer PCB,producing the most part pollutant in process which are waste water(ingredients

of acid and alkali),waste gas,scrap circuit boards and side lamination materials.we realize deeply the limited of global resource and the important of permanent development.To endeavour

故積極建立環境管理系統, 特訂環境。

our national responsibility,to respond to Green Plan, we establish Environment Management System seriously.

政策為:

Make the Environment Policy:

1、遵守并符合政府頒定之環保法規, 敦親睦鄰。

1、Obide and meet the Environment protection laws and regulations that government issue.having cordial and friendly ties.

2、加強污染的控制與改善, 持續進行制程減廢及污染預防之工作。

2、Strengthen the control of pollute and improvement,persevere in decreasing pollution in process and precuring the polluting.

3、透過能源資源的減量使用及回收, 再利用以達到能源有效使用之目的。

3、Utilize energy resources decreasing use,recycle and reuse,to achieve the effect using the energy goal.

4、實施教育訓練, 提升全員環保意識與能力。

4、Carry out training,promote enrironment protection consciousness and ability of the total staff.

5、公開對外承諾本公司對保護地球環境的決心本環境政策可為公眾所獲取。

5、Public promise our company's determination which protect global environment.The public can obtain the Environment Policy.

Waste = food?

總經理: 謝煥才

PRSEIDENT: XIE HUAN CAI

二零零七年三月十八日

2007.3.18

Photo: Joe Perrott

Wednesday, June 23, 2010

Bill McDonough in "Cradle to Cradle puts forth a neat idea, that the solution is to think about our waste as nutrients for future consumer products. He doesn't suggest how to do it, but I think that's a really interesting problem to tackle. For example:

"One metric ton of circuit boards can contain ... 40 to 800 times the concentration of gold contained in gold ore mined in the US" according to the USGS (Grossman, p.40). Recycling copper uses 15-20% of the energy of mining, per ton. Yet we're still really bad at reclaiming that. One reason is that it's hard for recyclers to know what's in what we make. This sign is from a factory in Shenzen, China.

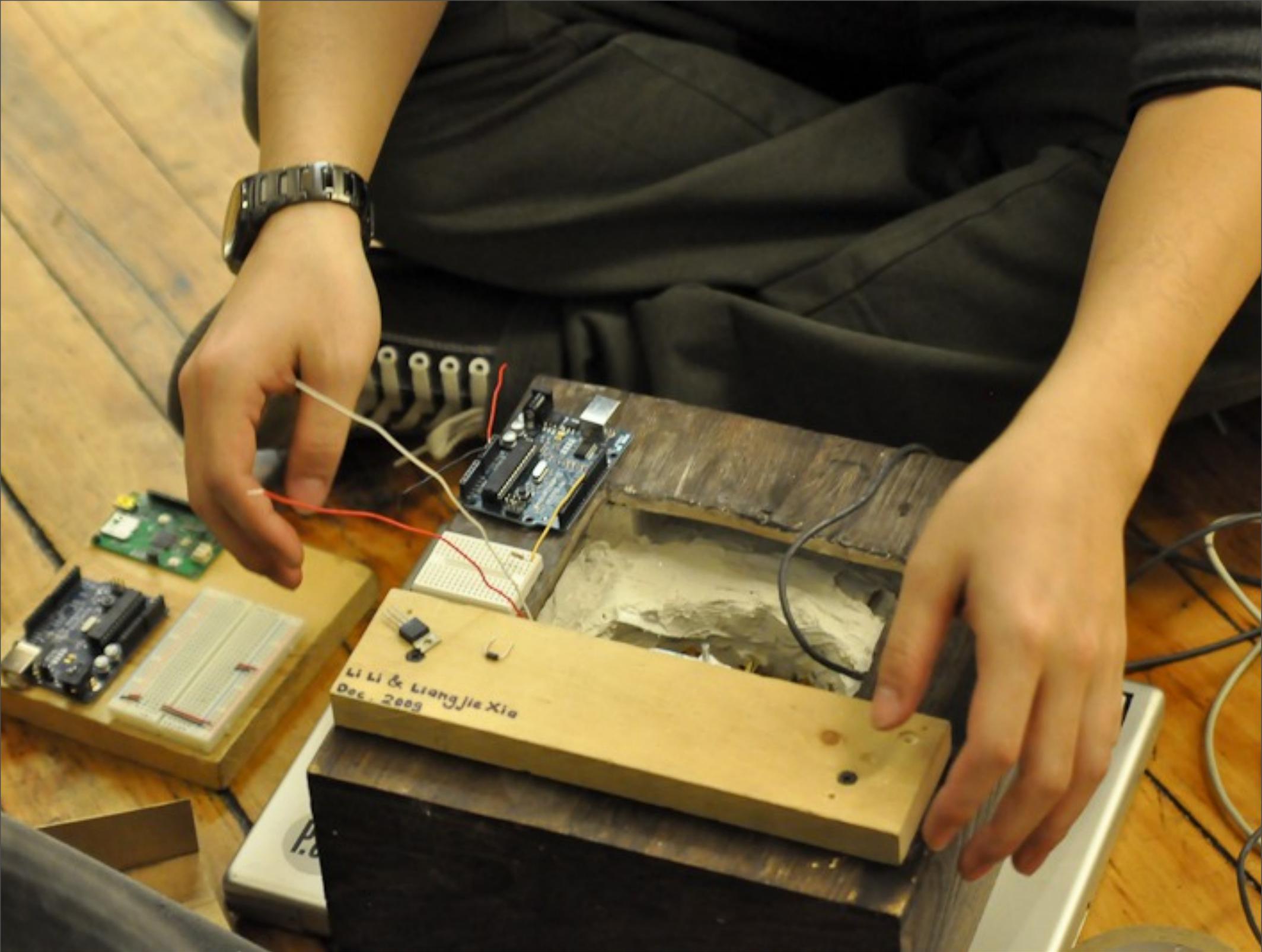
產多層印刷電路板為主，制造過程中主要生產含酸鹼之廢水、廢液、廢
r make multilayer PCB,producing the most part pollutant in process which are waste water(ingredients
源有限及永續發展的重要，為善盡世界公民之責任。響應綠色環保運動

氣及報廢電路板與邊料等污染物，深切體認地球資源有限及永續發展的重要，
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I like this because it's the first example I've seen of a company listing the waste they produce *at the front door*. Could you imagine if we all did that?

It seems obvious to me that if we have information about how things are made, it's easier to repair them, and to take them apart. This is the second reason I'm interested in open source design.



Wednesday, June 23, 2010

Let's start with why I got involved with the little blue board. There were two reasons. Mostly I joined it because it was a tool I knew I could use and teach with. I also joined as an experiment to understand how an open source project worked, and whether open source hardware was viable as a business proposition.

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New Arrivals



Everything Else > "Arduino"

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1.



Arduino Mega Starter Kit

Buy new: **\$69.95**★★★★★ (1)[Show only Arduino items](#)

2.



Arduino Duemilanove

Buy new: **\$31.75**[3 new from \\$30.00](#)★★★★★ (3)[Show only Arduino items](#)

3.



Arduino Ethernet Shield

Buy new: **\$49.95**

4.



Arduino Mega

Buy new: **\$65.00**

5.



Arduino Duemilanove

Buy new: **\$34.99**

6.



LilyPad Arduino 168 Main Board.

[1 used from \\$20.00](#)

7.



See price on both sides

8.



9.



Wednesday, June 23, 2010

We've sold about 150,000 units by now, and that doesn't include clones. There are several dozen clones on the market that we know of, and many that we don't, and a decent market in accessories as well. So I'm reasonably convinced that it's viable. And fortunately, it's also still a tool I can use, both in teaching and in my professional work. What next?



Buglabs

Wednesday, June 23, 2010

Most of the open source hardware world is made up of hobbyist tools. The most finished looking is probably Buglabs. It's still a development too, though, not a consumer product. But is it viable in consumer products?



Apple 1
Steve Wozniak

Wednesday, June 23, 2010

Turns out our generation is not the first to think this way. In fact, if you look back at the history of personal computers, open source hardware was the norm. Steve Levy's *Hackers* tells the story well, and mentions that Wozniak brought the first Apple to the Homebrew Computer Club and shared the plans openly. Apple's come a long way.



AlwaysInnovating TouchBook

Wednesday, June 23, 2010

There are some current consumer products that I'd label open source: AlwaysInnovating makes the TouchBook, a netbook that doubles as a tablet



Wednesday, June 23, 2010



Chumby

Wednesday, June 23, 2010
There's the Chumby



Openmoko

Wednesday, June 23, 2010

The openmoko project has made the Neo and the Freerunner mobile phones, and a wikipedia reader.



x0xb0x

Wednesday, June 23, 2010

The x0xb0x is “not just another MIDI-controlled TB-303 clone”. So there are a few. But it’s not mainstream yet. So what has to change? Well first, we have to get some ideas in the popular imagination.

Energy Literacy



Angela Pablo & Gilad Lotan,
Solar Time

Wednesday, June 23, 2010

One of the most popular topics among my students, and from what I can see, among many other physical computing, tangibles, and HCI students and researchers is energy literacy. In fact, we have a whole class devoted to it, Jeff Feddersen's "Sustainable Energy" course.

CORE77
design competition



Wednesday, June 23, 2010

In 2009's Greener Gadgets design competition, of the top 50 projects, almost 40% of them are about energy.



The Inlet-Outlet: Harnessing Energy from Everyday life

Cole Dine and Jeff Hoyle, Smart Design (United States)



Power-Hog

Mathieu Zastawny, Mansour Ourasanah, Peter Byar, Elysa Soffer, Mathieu Turpault
48 Comments



Energy Sensation

Ku San Yang (Singapore)
3 Comments



Vampire Plug

Oliver Poyntz (United Kingdom)
6 Comments



BugPlug

Kamil Jerzykowski (Poland)
17 Comments



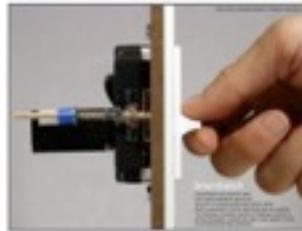
PPP

John Leung (Australia)
8 Comments



eMetric

Jason Deperro (United States)
72 Comments



SmartSwitch

Peter Russo & Brendan Wypich, Stanford University 2009 (United States)
21 Comments



Power Plugs

Stuart Moore (United States)
14 Comments

vittering po



WattBlocks

frog design (United States)
24 Comments



meter

Limor Fried, Adafruit Industries & Phillip Torrone magazine (United States)
16 Comments

Wednesday, June 23, 2010

In 2009's Greener Gadgets design competition, of the top 50 projects, almost 40% of them are about energy.



“If you cannot measure it,
you cannot improve it.”
— Lord Kelvin

<http://www.google.org/powermeter>

Wednesday, June 23, 2010

This is no surprise, because energy is a topic that lends itself well to our skills: it's easy to measure (because the tools we're using have to use it), it's neatly quantifiable, and it's sexy to graph. However, reducing our energy intake is not a panacea.

Khazzoom-Brookes Postulate (Saunders, 1992):

“Energy efficiency improvements that, on the broadest considerations, are economically justified at the microlevel lead to higher levels of energy consumption at the macrolevel than in the absence of such improvements.”

<http://technology.open.ac.uk/eeru/staff/horace/kbpotl.htm>

Wednesday, June 23, 2010

Energy efficiency is a bit of a red herring, though, for a few reasons. Economist Harry Saunders summarized it nicely here, based on work by Daniel Khazzoom and Len Brookes

“...the reduction of the consumption of coal ... to less than one third of its former amount, was followed, in Scotland, by a ten fold increase in total consumption, between the years 1830 and 1863...” (Jevons, 1865)

<http://technology.open.ac.uk/eeru/staff/horace/kbpotl.htm>

Wednesday, June 23, 2010

It goes way back. In short, energy efficiency is not a silver bullet. Furthermore, it's only the tip of the iceberg. So while energy literacy is important, it's only part of the equation.

Material Literacy



Wednesday, June 23, 2010

What that means is that we need to introduce material literacy into our practice and our teaching. In other words, we can learn what it takes to make our things, and we can share that knowledge with our students.

Learning which materials contain which toxins, for example, and selecting our prototyping materials appropriately is important.

Material Literacy

What materials are you using?

Wednesday, June 23, 2010

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What they composed of?

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Material Literacy

What materials are you using?
What they composed of?
How toxic are they?

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Material Literacy



Wednesday, June 23, 2010

Not just what materials make it, but what supporting materials are used to make it.

A photograph of a person wearing a red t-shirt, holding a red knitted hat. A mobile phone is visible inside the hat, which is being held in front of the person's chest. The background is a grey paved area with a white metal fence.

Material Literacy

Che-Wei Wang & Kristin O’Friel,
Momo

Wednesday, June 23, 2010

It also means finding new materials. -- it’s not always overtly about the environment. Momo’s appeal is partly due to its materials. It’s a navigation device, but it doesn’t have the hard-edged authoritative look of most nav devices.

A person wearing a red t-shirt is holding a red knitted hat. A smartphone is visible inside the hat, which is being held in front of the person's chest. The background is a grey concrete floor with a white metal fence in the distance.

Material Literacy

What else can you use?

Che-Wei Wang & Kristin O’Friel,
Momo

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Material Literacy

Angela Pablo & Megan Macmurray,
The Garden Electric

Wednesday, June 23, 2010

or using old ones in new ways. Anyone done papier mache enclosures yet?



Material Literacy

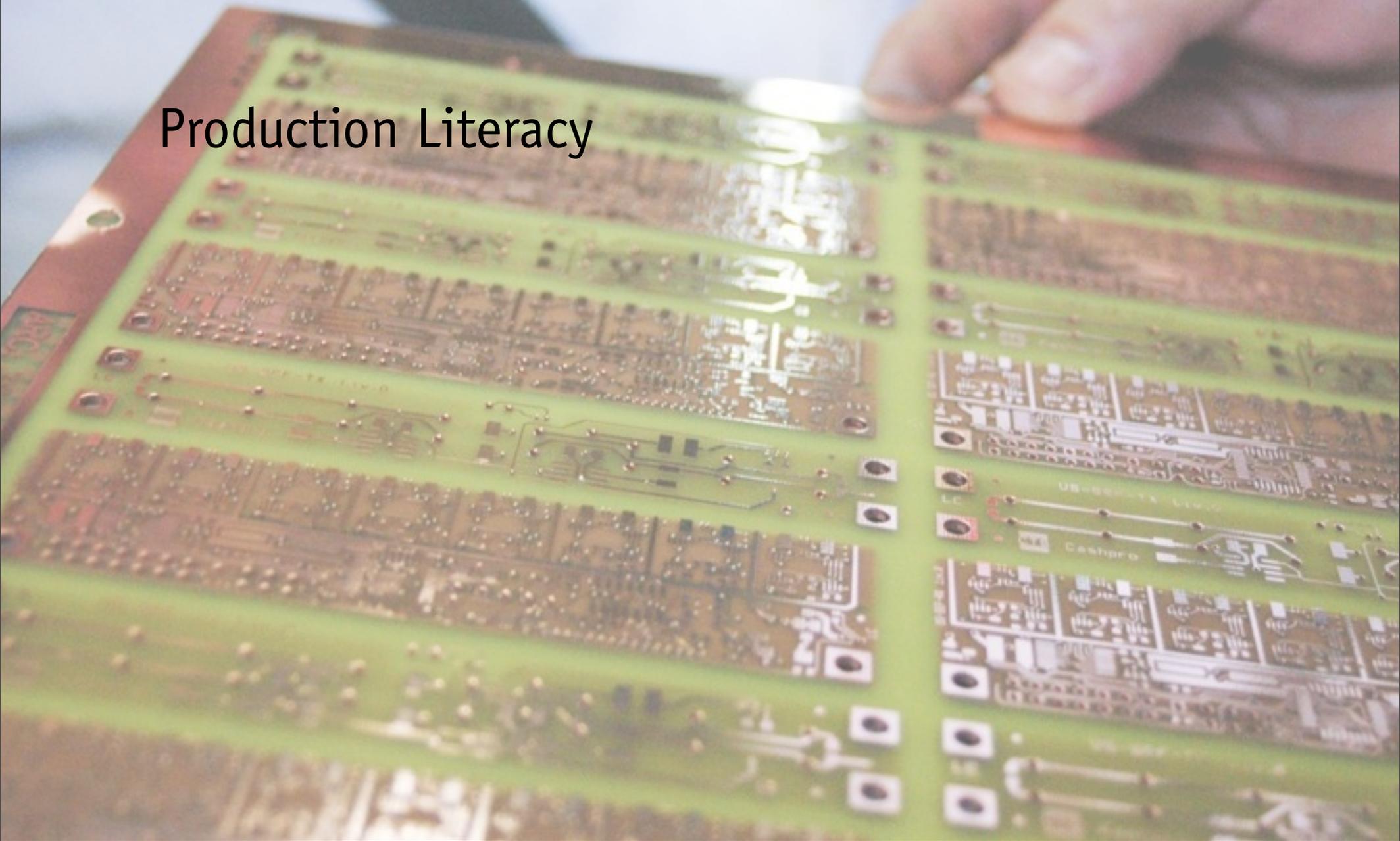
What else can you re-use?

Angela Pablo & Megan Macmurray,
The Garden Electric

Wednesday, June 23, 2010

or using old ones in new ways. Anyone done papier mache enclosures yet?

Production Literacy



Wednesday, June 23, 2010

We need to become aware of what it takes to make the things we make, at every level. For example, to create the chips in a typical PC, about 89 pounds of waste were produced, and 2800 gallons of water were used.

Coming next: the e-ink cover as an example of knowing how production can make things seem less appealing.



Production Literacy

Where's it produced?

Wednesday, June 23, 2010

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Coming next: the e-ink cover as an example of knowing how production can make things seem less appealing.



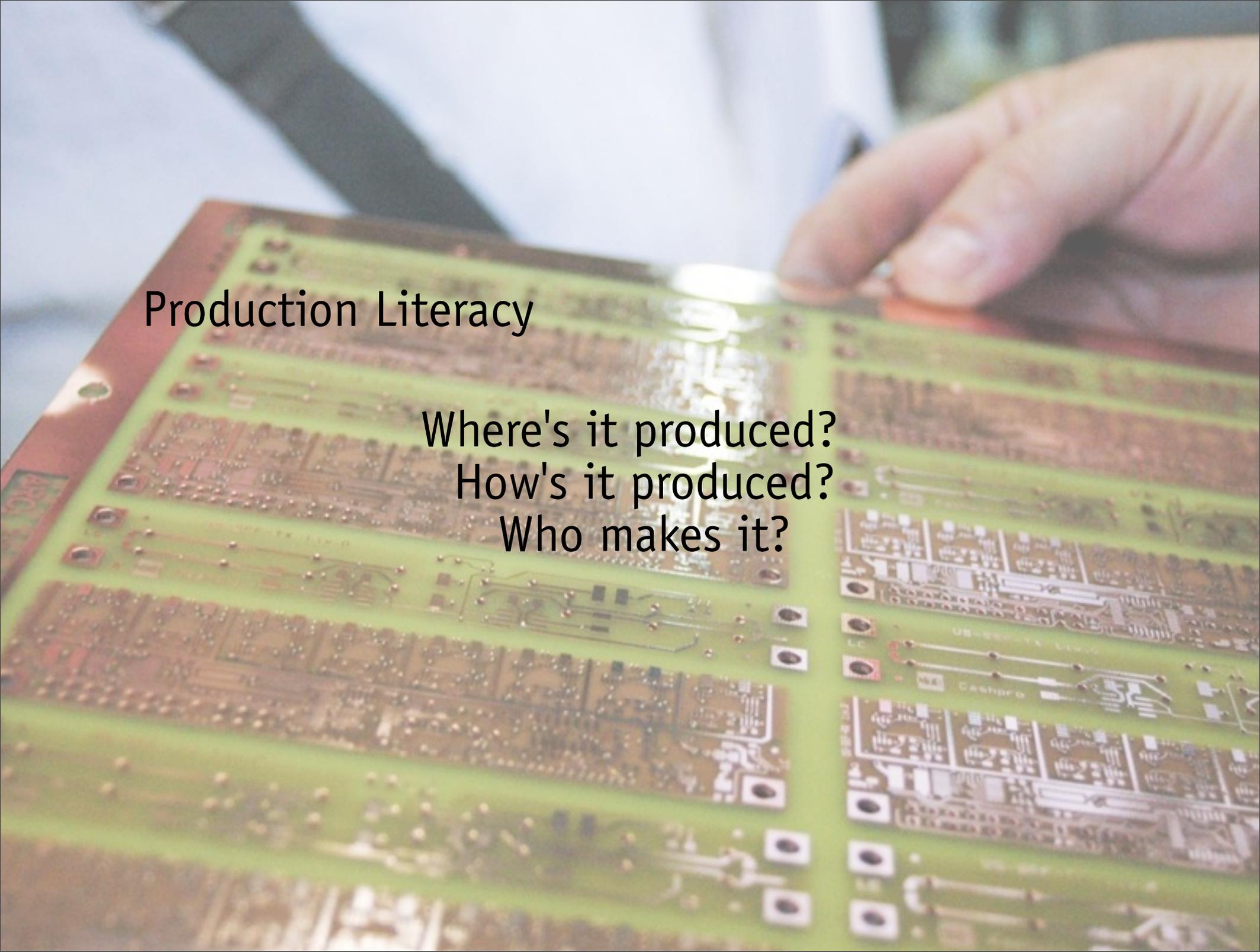
Production Literacy

Where's it produced?
How's it produced?

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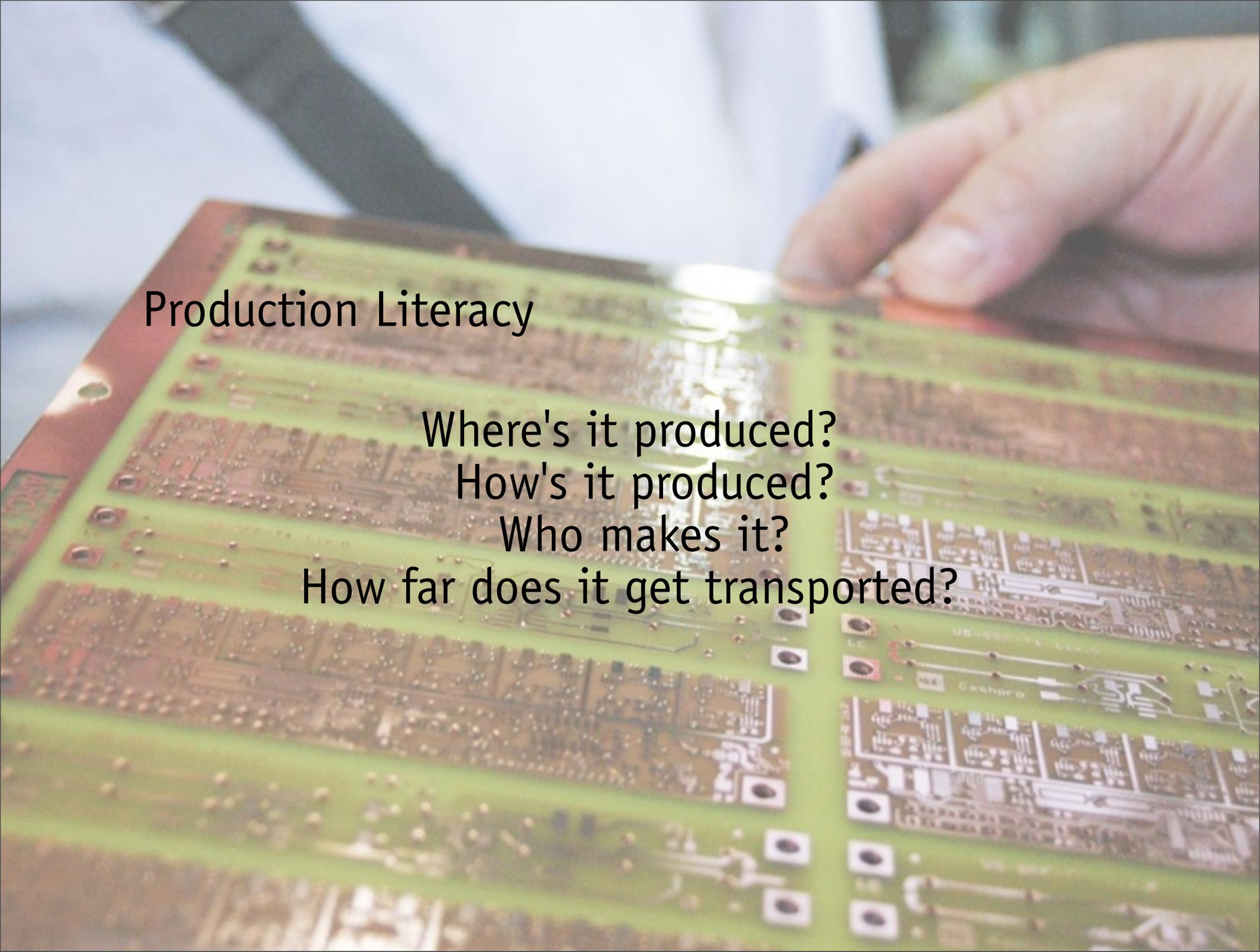
Production Literacy

Where's it produced?
How's it produced?
Who makes it?

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Production Literacy

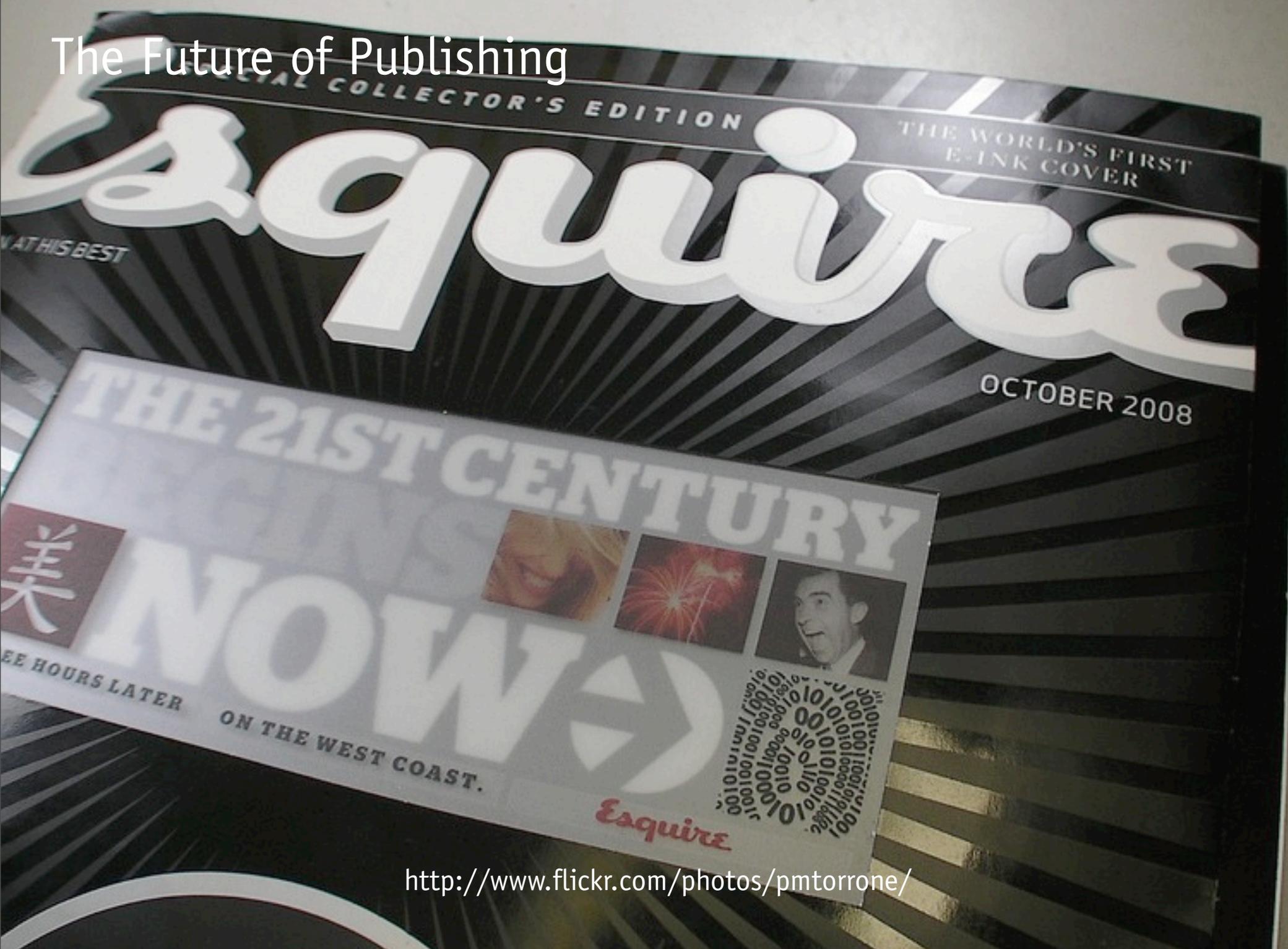
Where's it produced?
How's it produced?
Who makes it?
How far does it get transported?

Wednesday, June 23, 2010

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The Future of Publishing

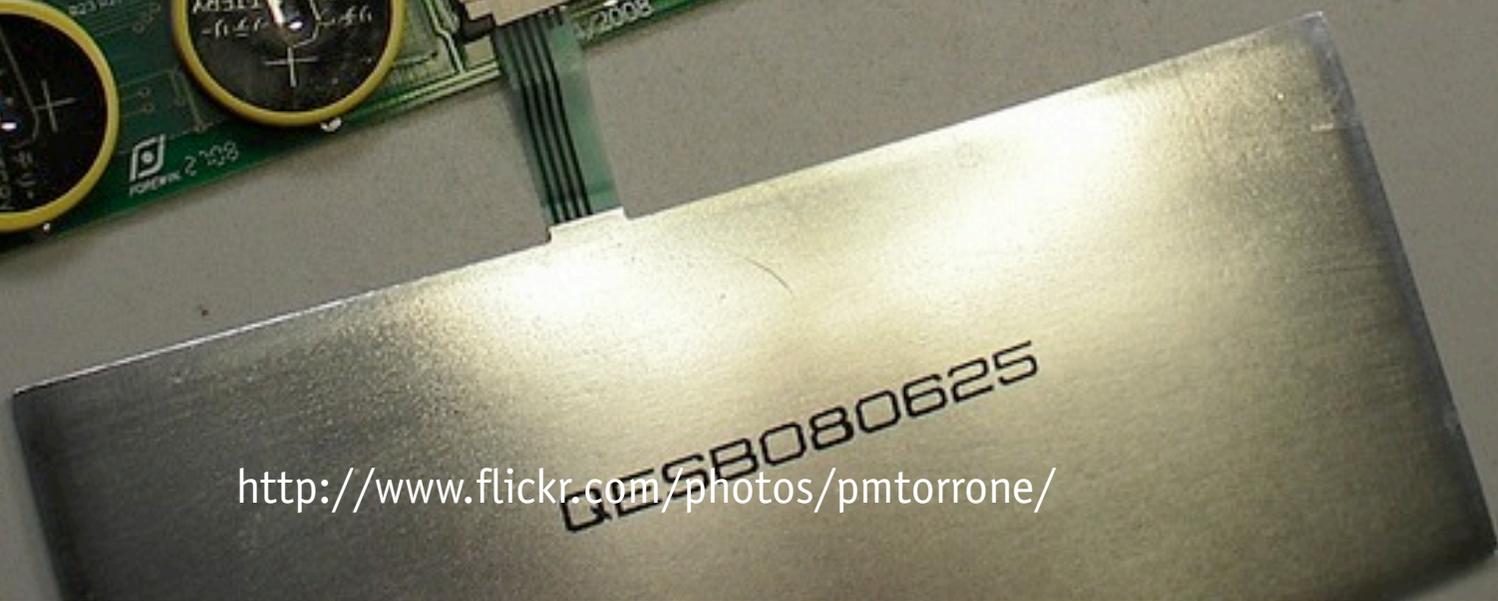
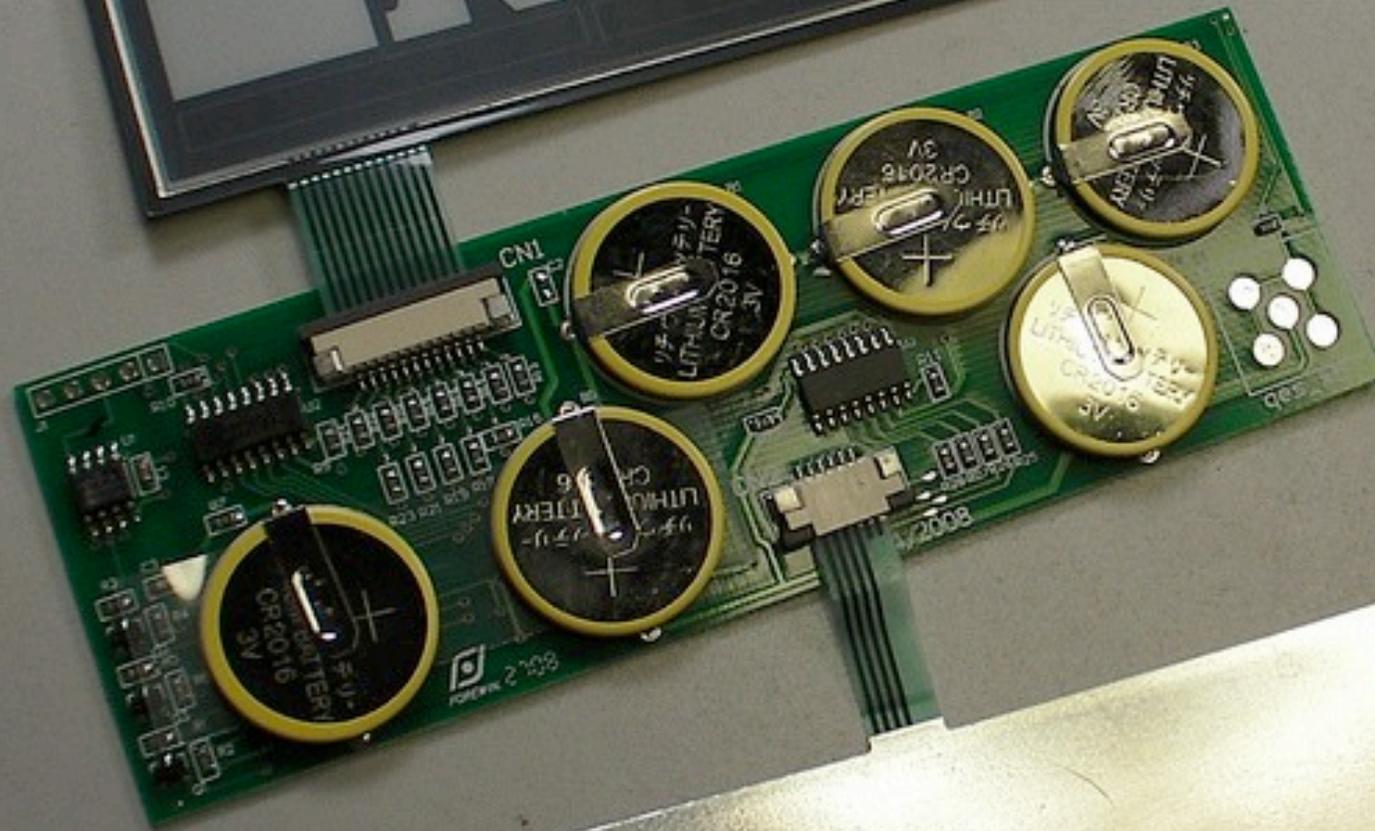


<http://www.flickr.com/photos/pmtorrone/>

Wednesday, June 23, 2010

For me, the nadir of planned obsolescence was the October 2008 Esquire e-Ink cover. In a bid to prop up weak sales in a dying business, they ventured into territory they never should have.

The Future of Publishing?



<http://www.flickr.com/photos/pmtorrone/>

Wednesday, June 23, 2010

Inside the cover was a circuit board, battery, and display

The Future of Publishing??



<http://www.flickr.com/photos/pmtorrone/>

Wednesday, June 23, 2010

The whole thing had to be wrapped into a special protective foam insert (remember, this is a one-time-use, disposable item, designed to last maybe a week)

The Future of Publishing???



<http://www.esquire.com/features/how-e-ink-was-made>
<http://www.fastcompany.com/blog/anya-kamenetz/green-friday/real-cost-e-ink>

Wednesday, June 23, 2010

Then there's the transport costs. The total footprint of this puppy in greenhouse gas emissions, based on loose estimates by Anya Kamenetz of Fast Company, comes to 150 tons of CO₂ equivalent, similar to the output of 15 Hummers or 20 average Americans for an entire year, and a 16% increase over the carbon footprint of a typical print publication. We can't afford this kind of thinking.

Next: resource literacy

The Future of Publishing???



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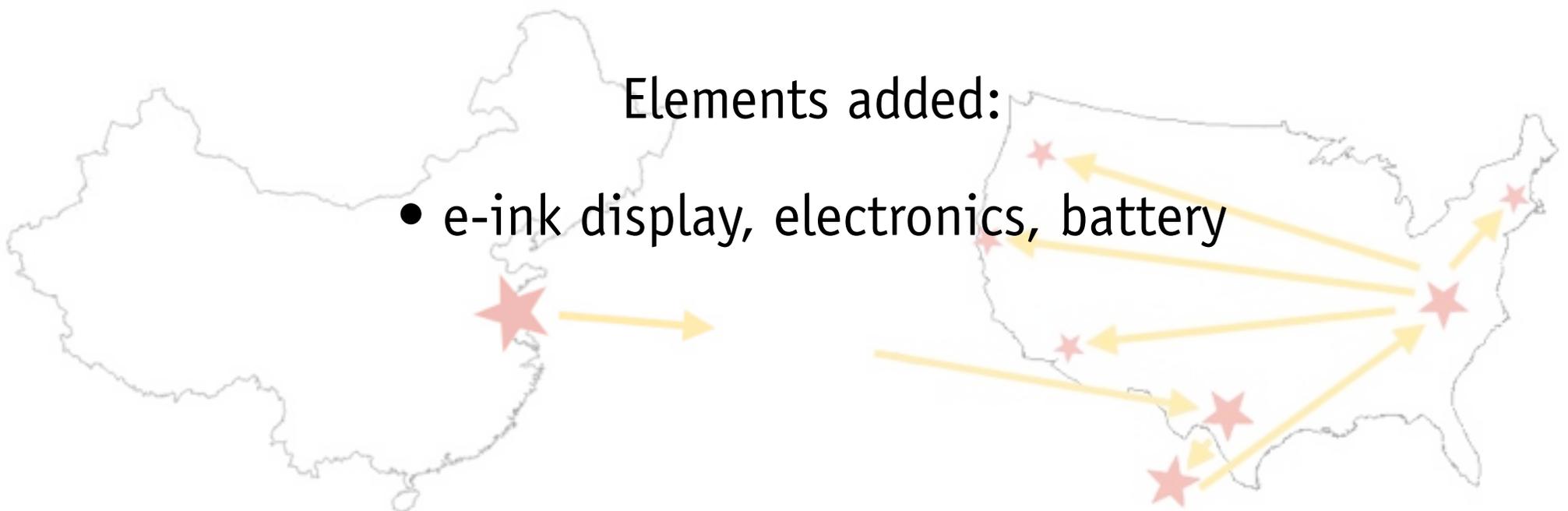
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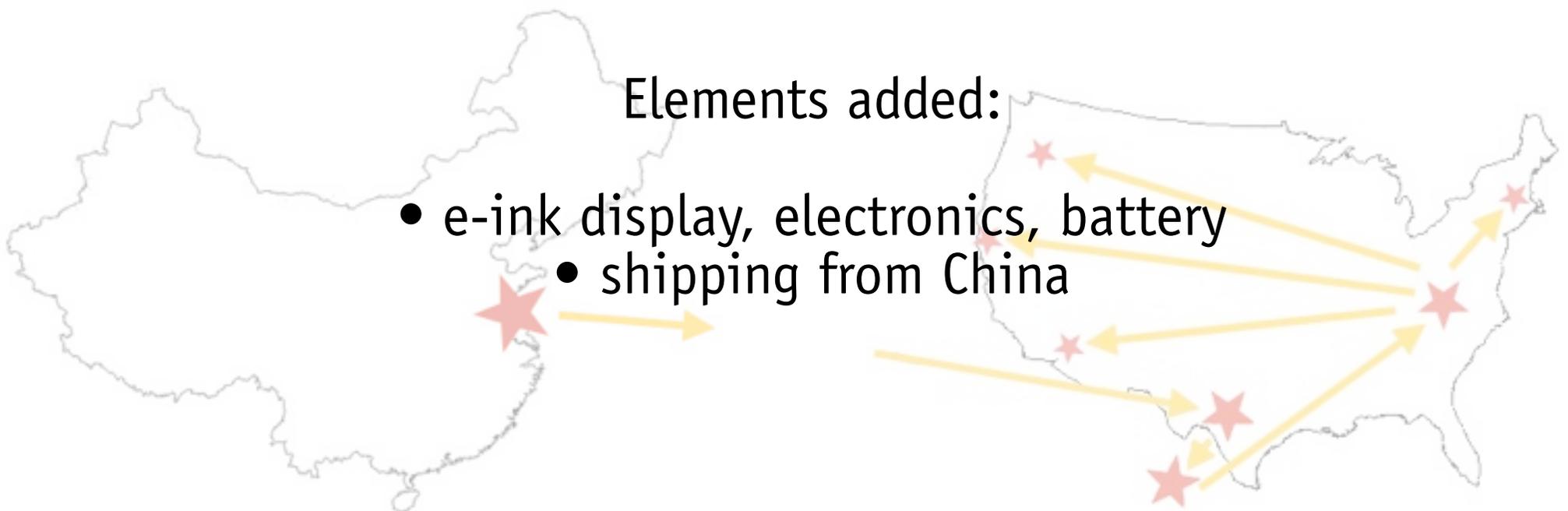
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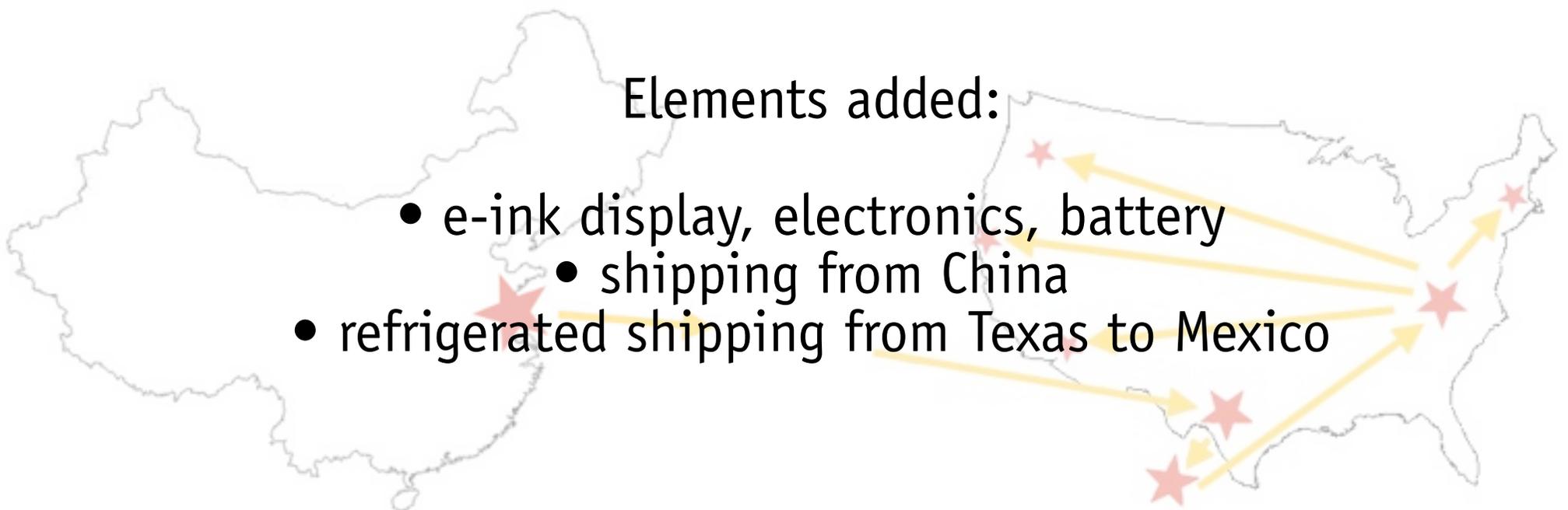
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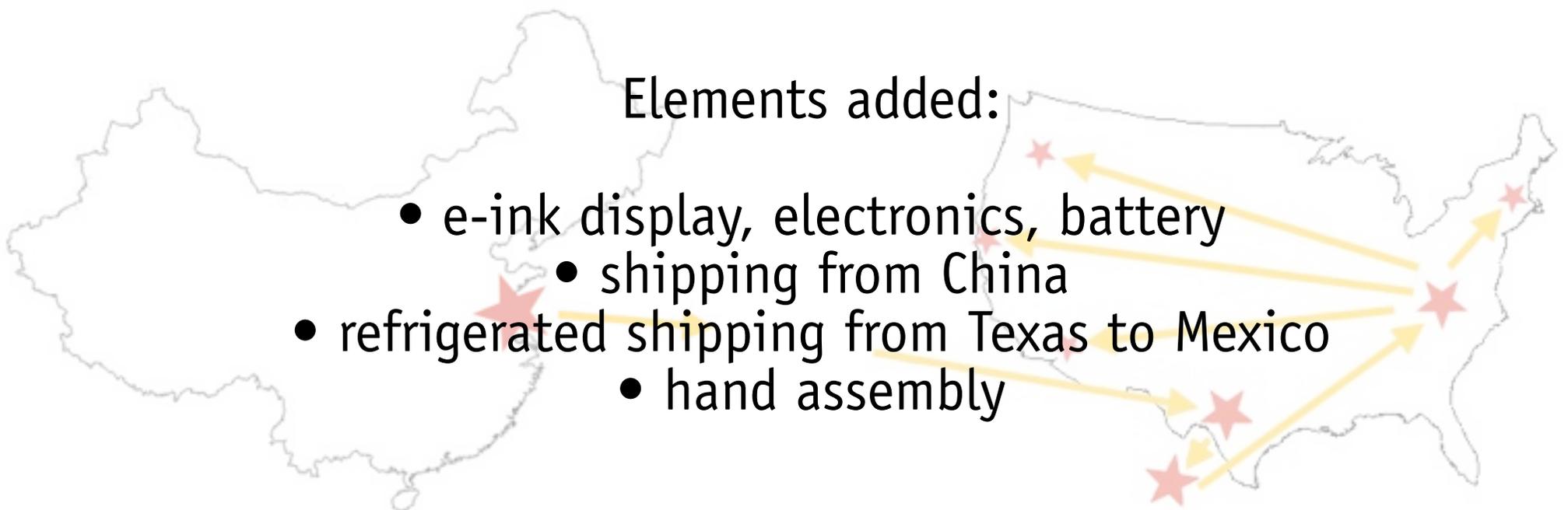
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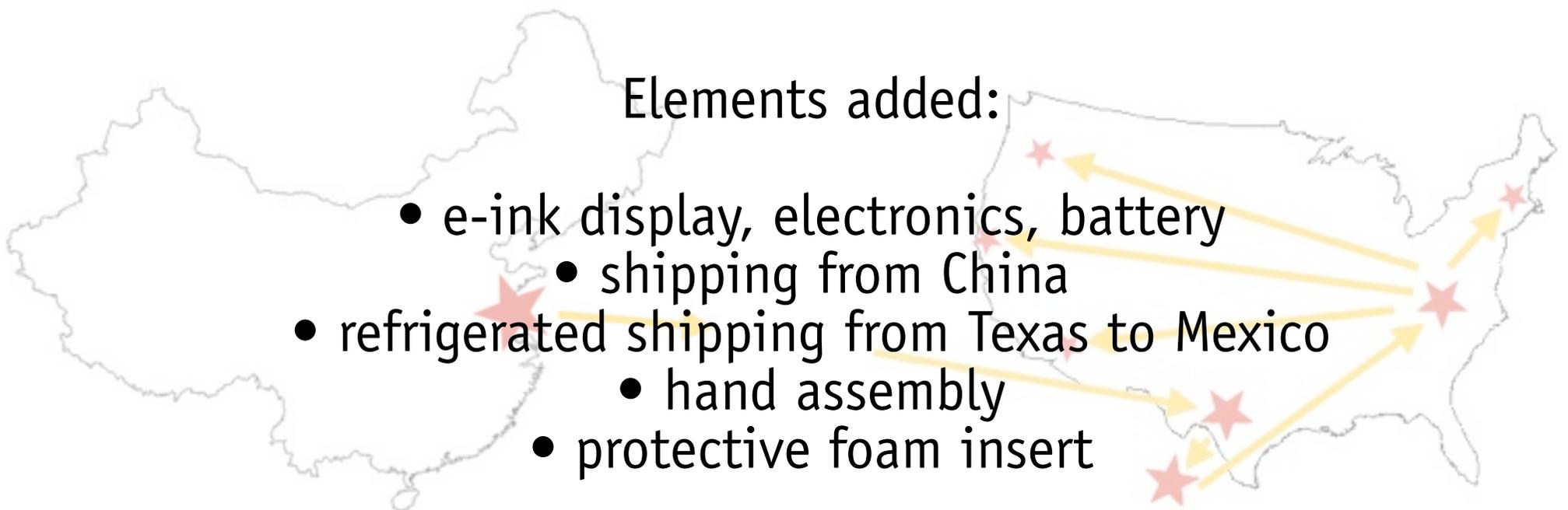
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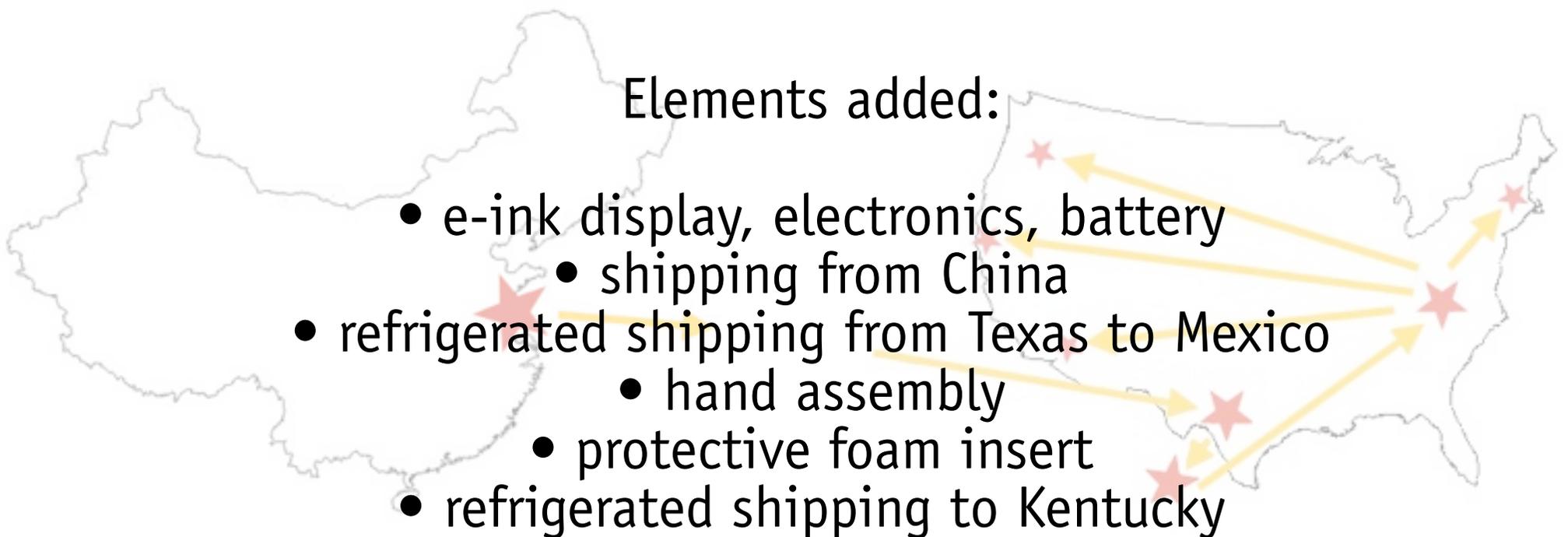
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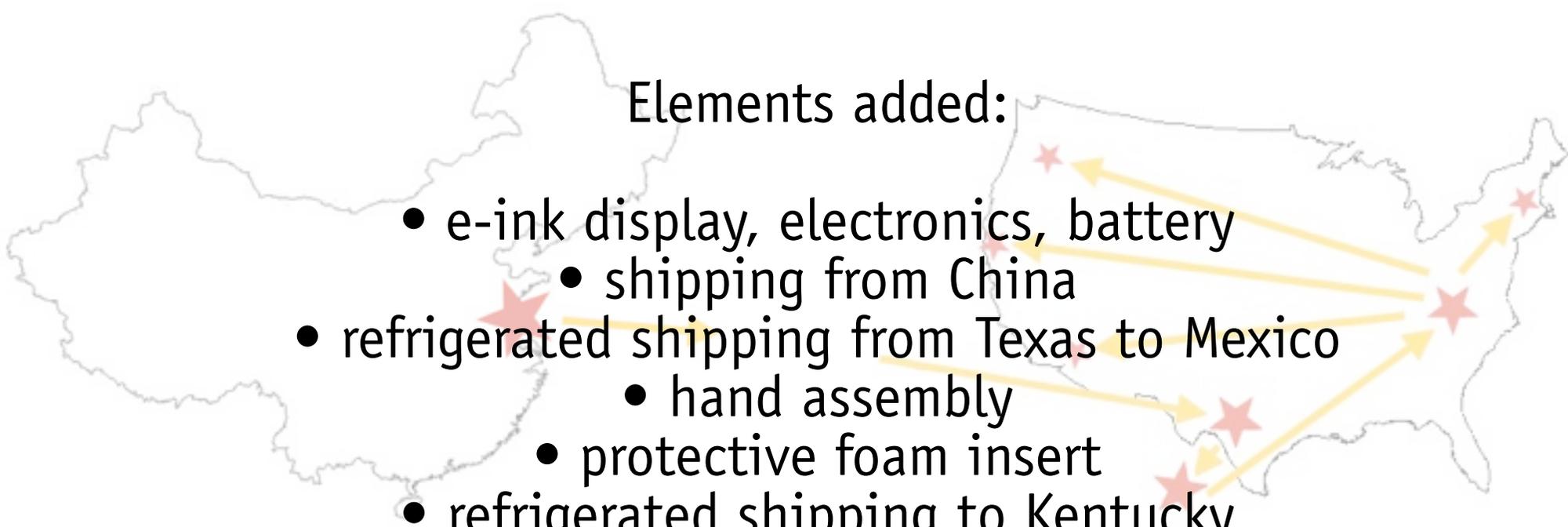
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Next: resource literacy

The Future of Publishing???

Elements added:

- e-ink display, electronics, battery
 - shipping from China
 - refrigerated shipping from Texas to Mexico
 - hand assembly
 - protective foam insert
 - refrigerated shipping to Kentucky
- 

Total increase: 16% increase in carbon footprint
for the issue

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<http://www.fastcompany.com/blog/anya-kamenetz/green-friday/real-cost-e-ink>

Wednesday, June 23, 2010

Then there's the transport costs. The total footprint of this puppy in greenhouse gas emissions, based on loose estimates by Anya Kamenetz of Fast Company, comes to 150 tons of CO₂ equivalent, similar to the output of 15 Hummers or 20 average Americans for an entire year, and a 16% increase over the carbon footprint of a typical print publication. We can't afford this kind of thinking.

Next: resource literacy

The Future of Publishing????



Wednesday, June 23, 2010

Of course now we all know what the future of publishing looks like :). And it's got what's probably an even bigger carbon footprint. So we're not all there yet.

A large-scale open-pit mine is shown, characterized by numerous terraced levels of earth and rock. The mine is set against a backdrop of rugged, brown mountains under a clear blue sky. The foreground shows winding dirt roads and some industrial structures like power line towers. The overall scene depicts a significant industrial mining operation.

Resource Literacy

http://www.flickr.com/photos/library_of_congress/

Wednesday, June 23, 2010

We can think not only about where it comes from the first time, but also the second. “One metric ton of circuit boards can contain ... 40 to 800 times the concentration of gold contained in gold ore mined in the US” according to the USGS (Grossman, p.40). Mining uses 7 – 10% of the world's energy (grossman p.25) Recycling copper uses 15–20% of the energy of mining, per ton. Yet another reason to think about how we un-make things.



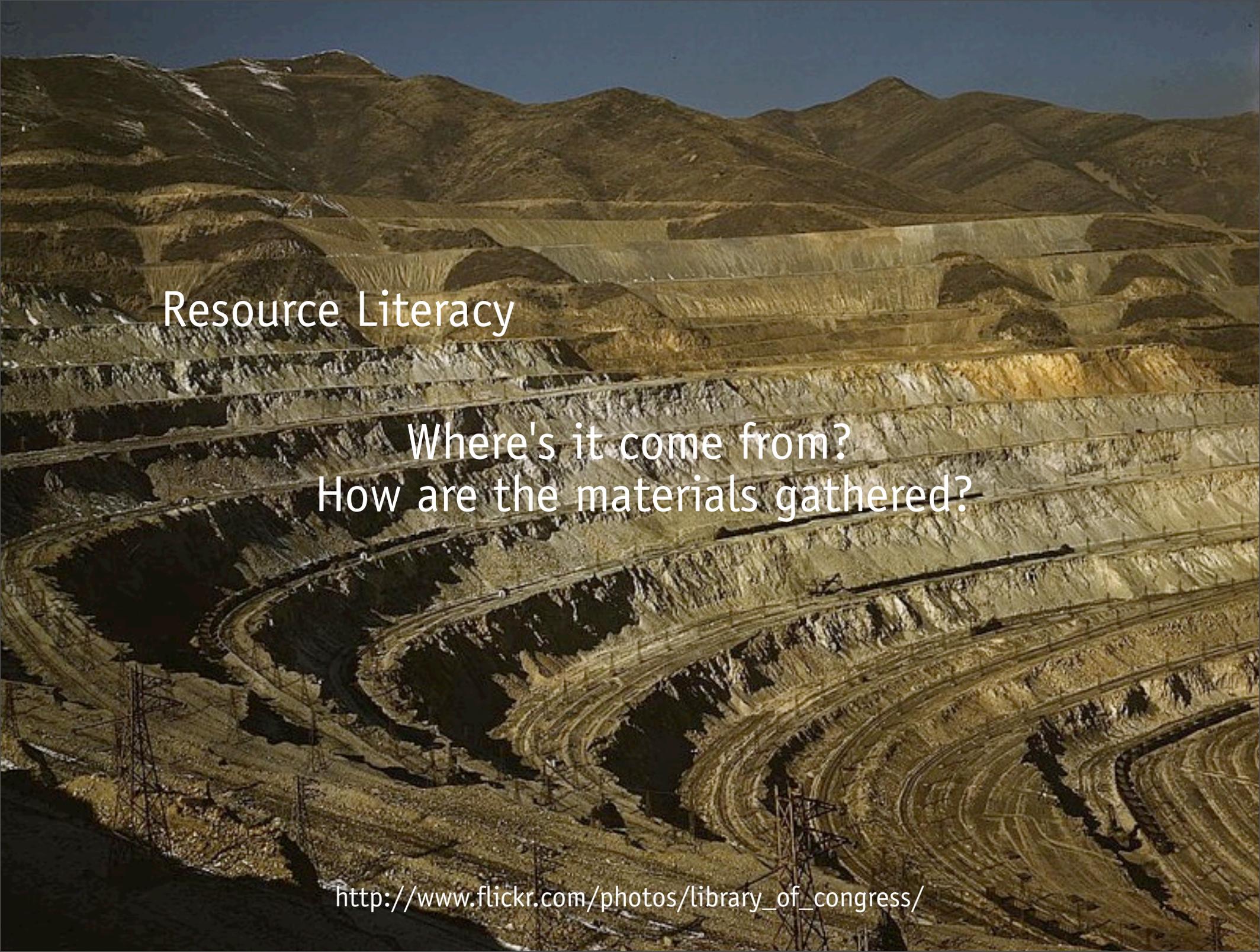
Resource Literacy

Where's it come from?

http://www.flickr.com/photos/library_of_congress/

Wednesday, June 23, 2010

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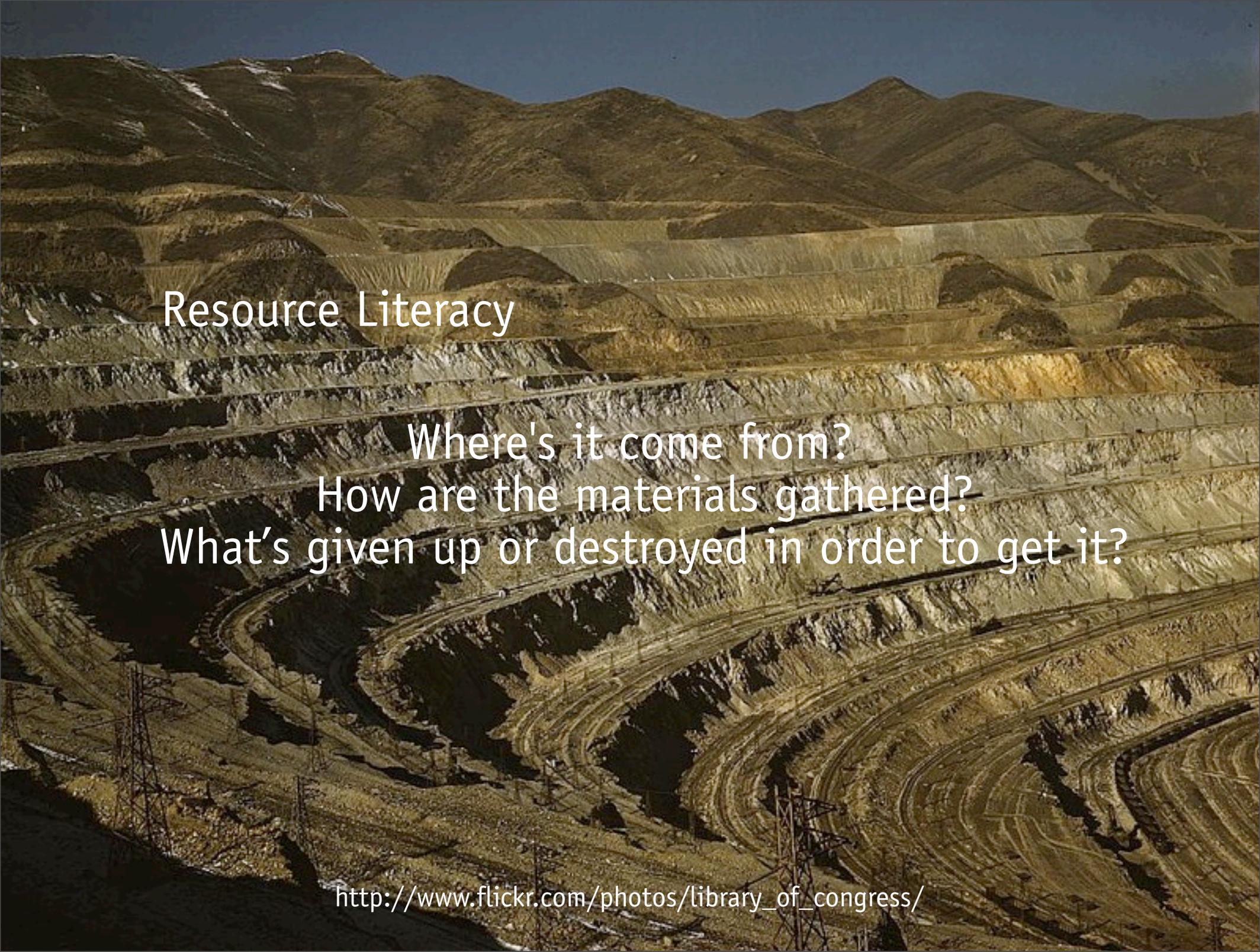
Resource Literacy

Where's it come from?
How are the materials gathered?

http://www.flickr.com/photos/library_of_congress/

Wednesday, June 23, 2010

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Resource Literacy

Where's it come from?
How are the materials gathered?
What's given up or destroyed in order to get it?

http://www.flickr.com/photos/library_of_congress/

Wednesday, June 23, 2010

We can think not only about where it comes from the first time, but also the second. “One metric ton of circuit boards can contain ... 40 to 800 times the concentration of gold contained in gold ore mined in the US” according to the USGS (Grossman, p.40). Mining uses 7 – 10% of the world's energy (grossman p.25) Recycling copper uses 15–20% of the energy of mining, per ton. Yet another reason to think about how we un-make things.

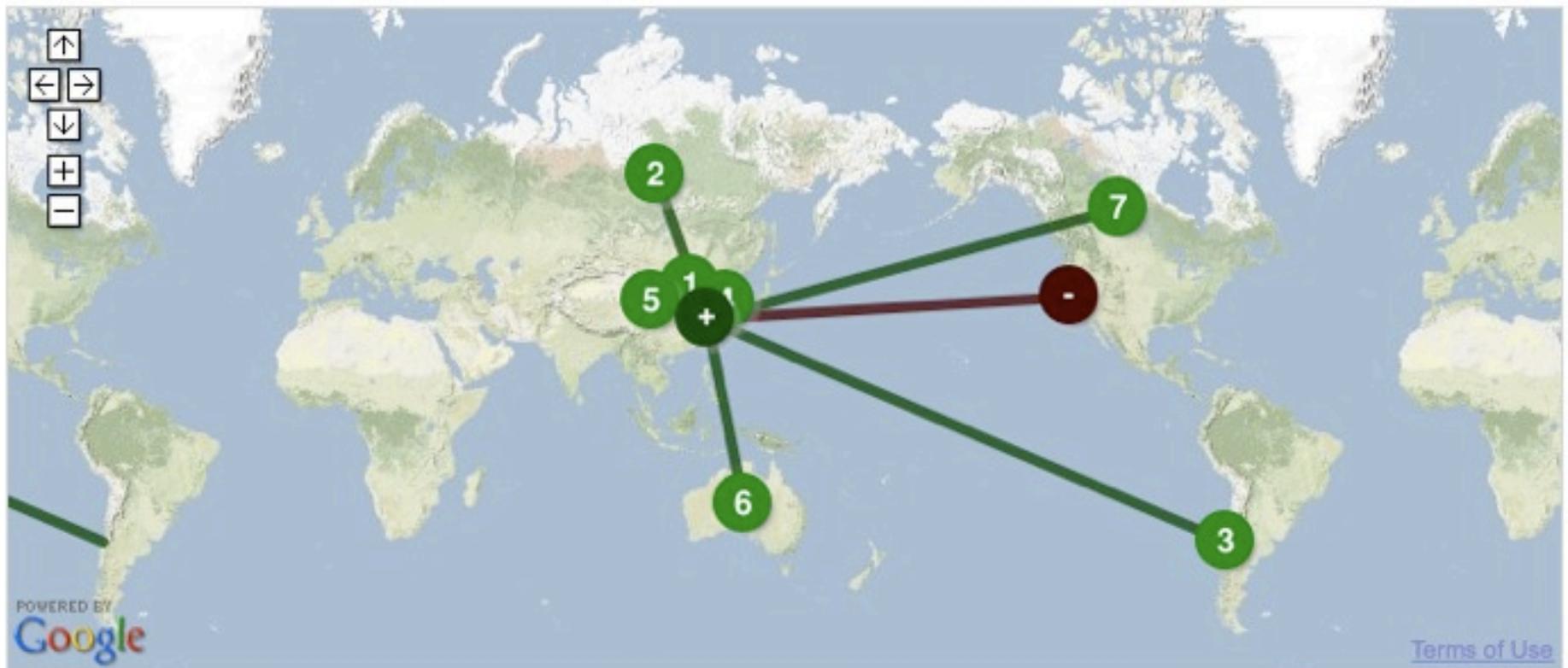
[Objects](#) → Typical Laptop Computer

Typical Laptop Computer (Made in Shanghai)

Added by [leo](#) and modified yesterday around 11pm.

Footprint: 140.58 kg/co2

Weight: 22.87kg
Shipping: 65983.8km
Emissions: 140.58kg/co2



Wednesday, June 23, 2010

Sourcemap.org is a recent project out of MIT to take advantage of geek's love of maps in order to implement some of this. It maps the supply chains of typical products. I like it because I've been trying to assemble a mine-to-customer list of stuff in Arduino and it's not easy.

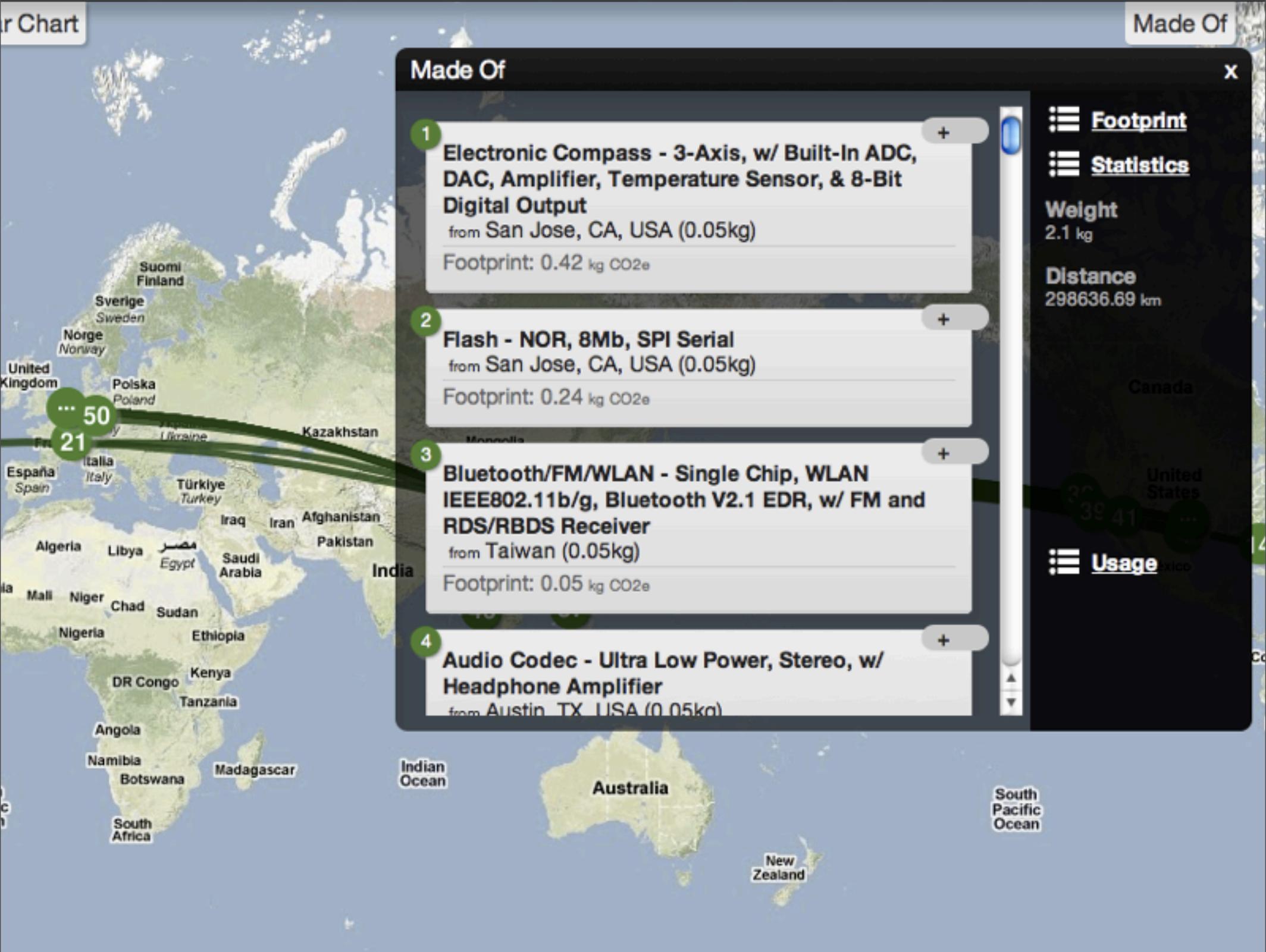
This is a really useful tool in resource literacy, but it's only an academic model.

There needs to be collaboration between industry and academy on this. This is a place where openness can help.

Next: Legacy



Wednesday, June 23, 2010



Legacy



<http://flickr.com/photos/czimmerman/>

Wednesday, June 23, 2010

It's also important to understand the legacy we inherit, perhaps unintentionally, from other fields. As Durrell Bishop says, we're basically product designers. And as such, we've inherited some of the product design legacy. Including the Gillette effect. Gillette had the brilliant idea that you could sell razors at a loss because you then had the customer hooked, and could sell him razor blades at an exorbitant price forever.

Ink cartridge: \$3 to make.
\$30 to buy.



<http://www.flickr.com/photos/timo/>

Wednesday, June 23, 2010

The digital equivalent of this is the inkjet printer. We get inkjet printers for free when we buy a new machine. The manufacturers then sell us \$30 cartridges that they make for \$3. This planned obsolescence is something we need to be conscious of, and seek to work against.

All of this, even sourcemap, is mine-to-landfill thinking. We need to think bigger about how to extend product life.

Ink cartridge: \$3 to make.
\$30 to buy.

Printer: free.

<http://www.flickr.com/photos/timo/>

Wednesday, June 23, 2010

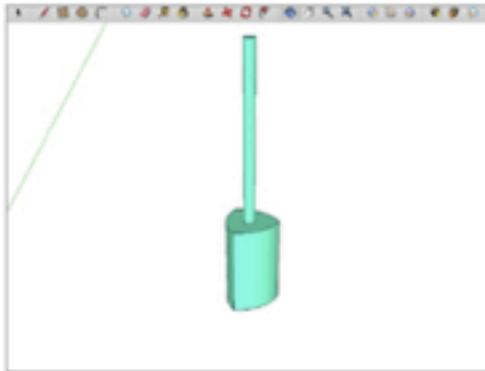
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All of this, even sourcemap, is mine-to-landfill thinking. We need to think bigger about how to extend product life.

Welcome to the Thingiverse.

This is a place to share digital designs that can be made into real, physical objects. Let's create a better universe, together!

Newest Things



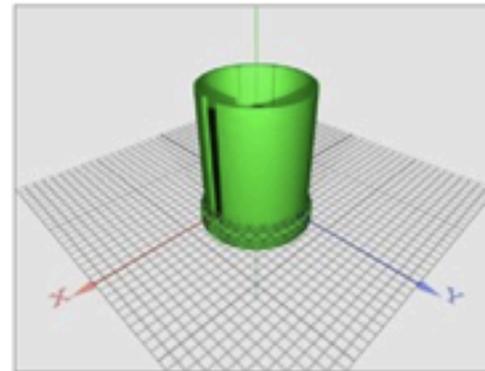
[Reuleaux Triangle Drill](#)

By: [asteroid](#) 3 hours ago



[Headphone bracket](#)

By: [jcw](#) 6 hours ago



[Cryptex v0.1](#)

By: [MarcusWolschon](#) 13 hours ago

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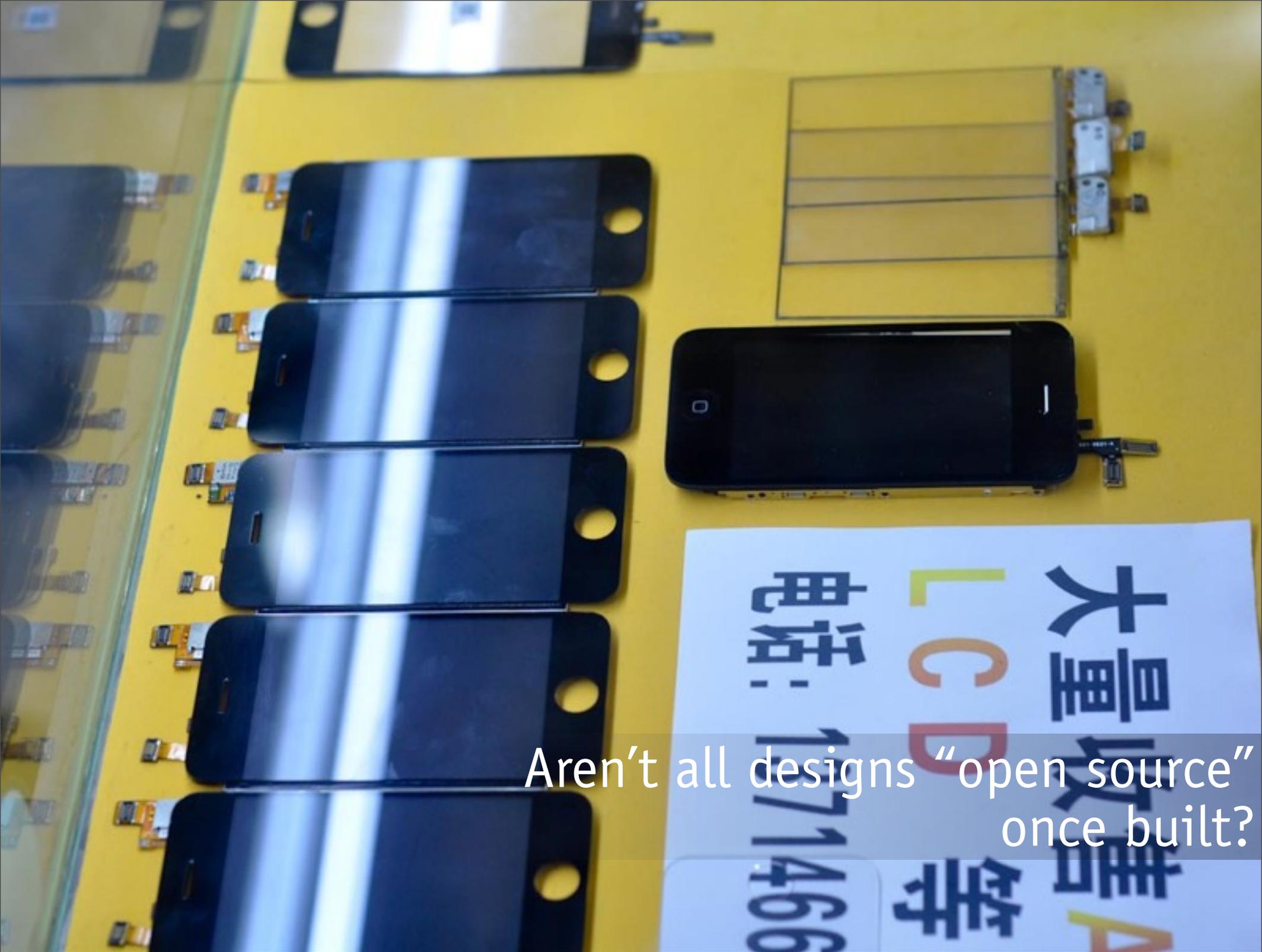
[Thingiverse Blog](#)

[Recent Posts](#)

What is open source design, exactly?

Wednesday, June 23, 2010

An open design is one in which the plans for its realization are published, in a form that the original producer would use. This could include wireframes, CAD drawings, materials specs, construction directions, color swatches, style guides and stylesheets, or any other knowledge that is useful in the reproduction or modification of the work.



Aren't all designs "open source" once built?

Wednesday, June 23, 2010

You could argue that any design is open because it's possible to observe it in action and reverse engineer it. The difference between open development and reverse engineering is that when development process is documented, that document reveals the flow of intellectual effort. With that information, an end user or designer downstream can make different decisions if she so chooses.

Style guides and design manifestoes are a key part of documenting both the thought process and the work process.

Sometimes you can document the thought process without the construction details, and it's actually more useful.



Wednesday, June 23, 2010

So if you open source things, how do you limit copies?

One limit to copying is having the means to do so. But anyone who has access to the means to reproduce a design can probably reverse engineer it as well. On the other hand, many people may not have the means to reproduce a design in full, but may have both means and need to modify the design, or take it apart. By not hiding that information, you at least give them the opportunity to understand it, if not reproduce it.

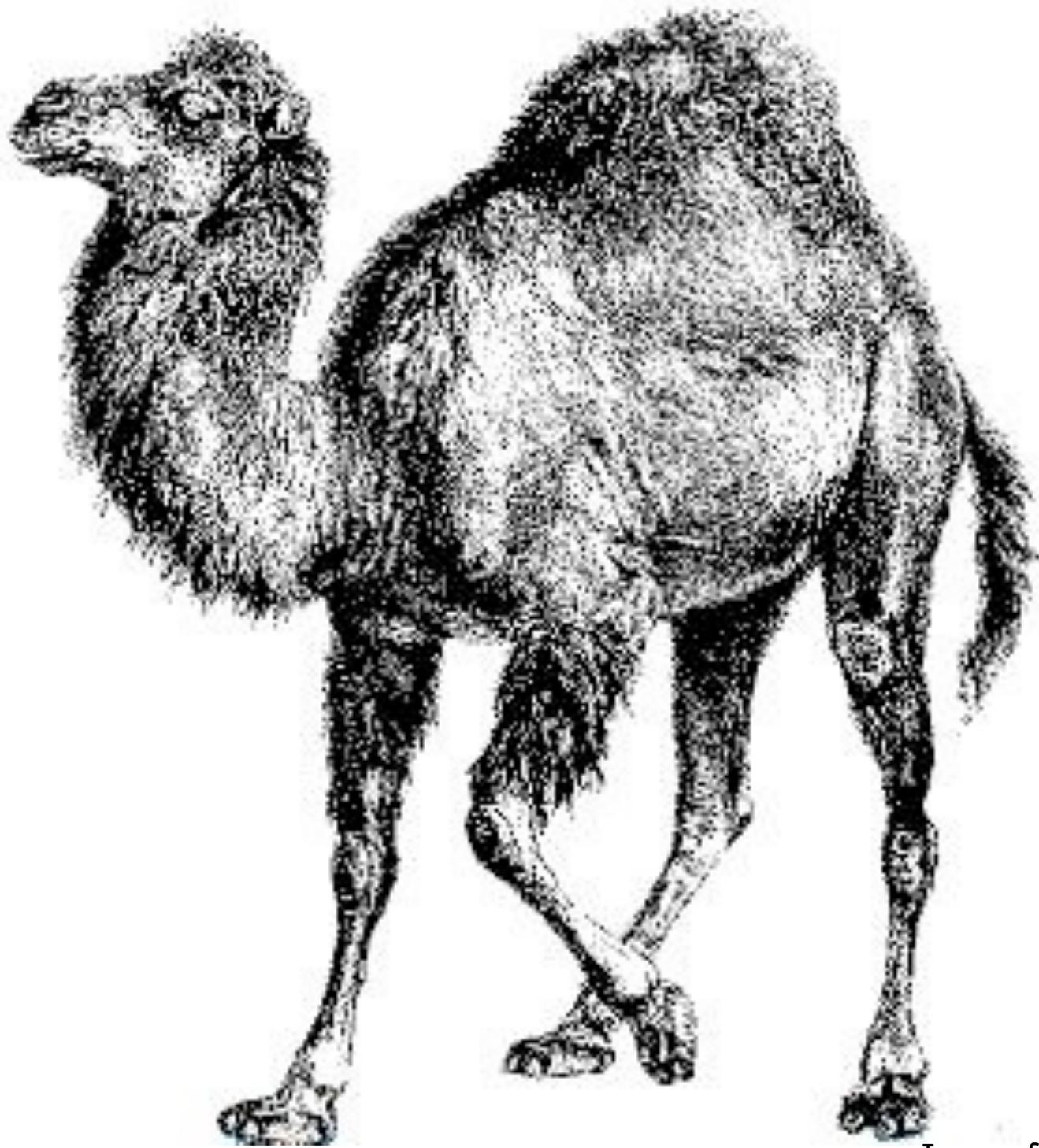


Image from O'Reilly Media

Wednesday, June 23, 2010

Design in open source projects has a reputation as a camel, which is a horse designed by a committee,



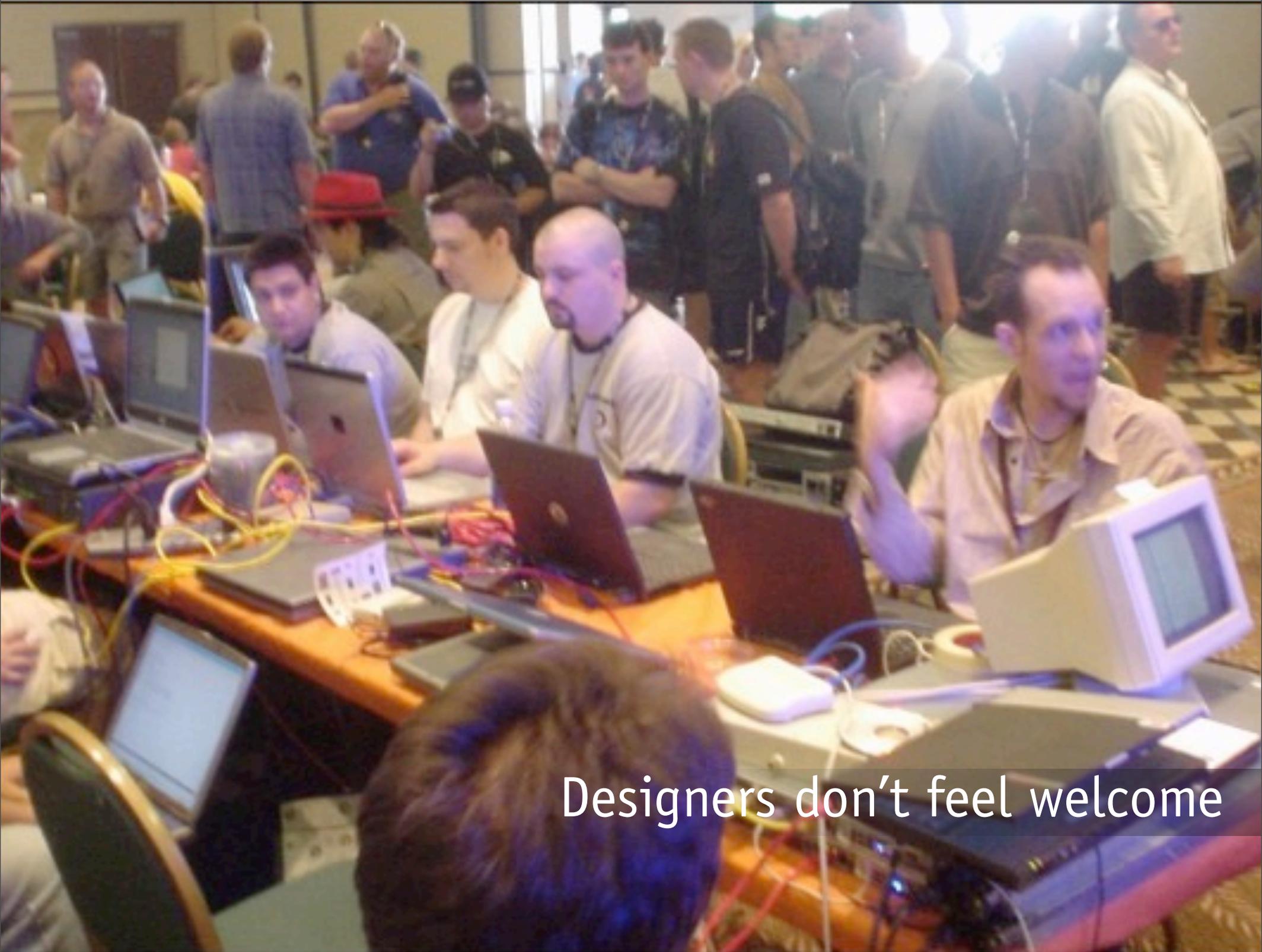
Wednesday, June 23, 2010

but I'm a polyanna, so I prefer the unicorn and rainbows perspective. Even if you believe in unicorns,



Wednesday, June 23, 2010

the pursuit of them is a messy business. I want to look at a few of the dynamics of open source in practice, in hopes of seeing where design practices can improve it. Matthew Thomas did a great analysis of the usability of free and open source software in 2002 called "Why Free Software Usability Tends to Suck." He focused on the culture of open source development.



Designers don't feel welcome

Wednesday, June 23, 2010

Open source development discussions tend to be "brutal technical meritocracies" where those with less programming ability feel less welcome. Design suggestions aren't invited or welcomed. We have to change that.

WordPress Blog

2010 Open Source Design Plans

Posted January 13, 2010 by [Jane Wells](#). Filed under [Community](#), [User Interface](#).

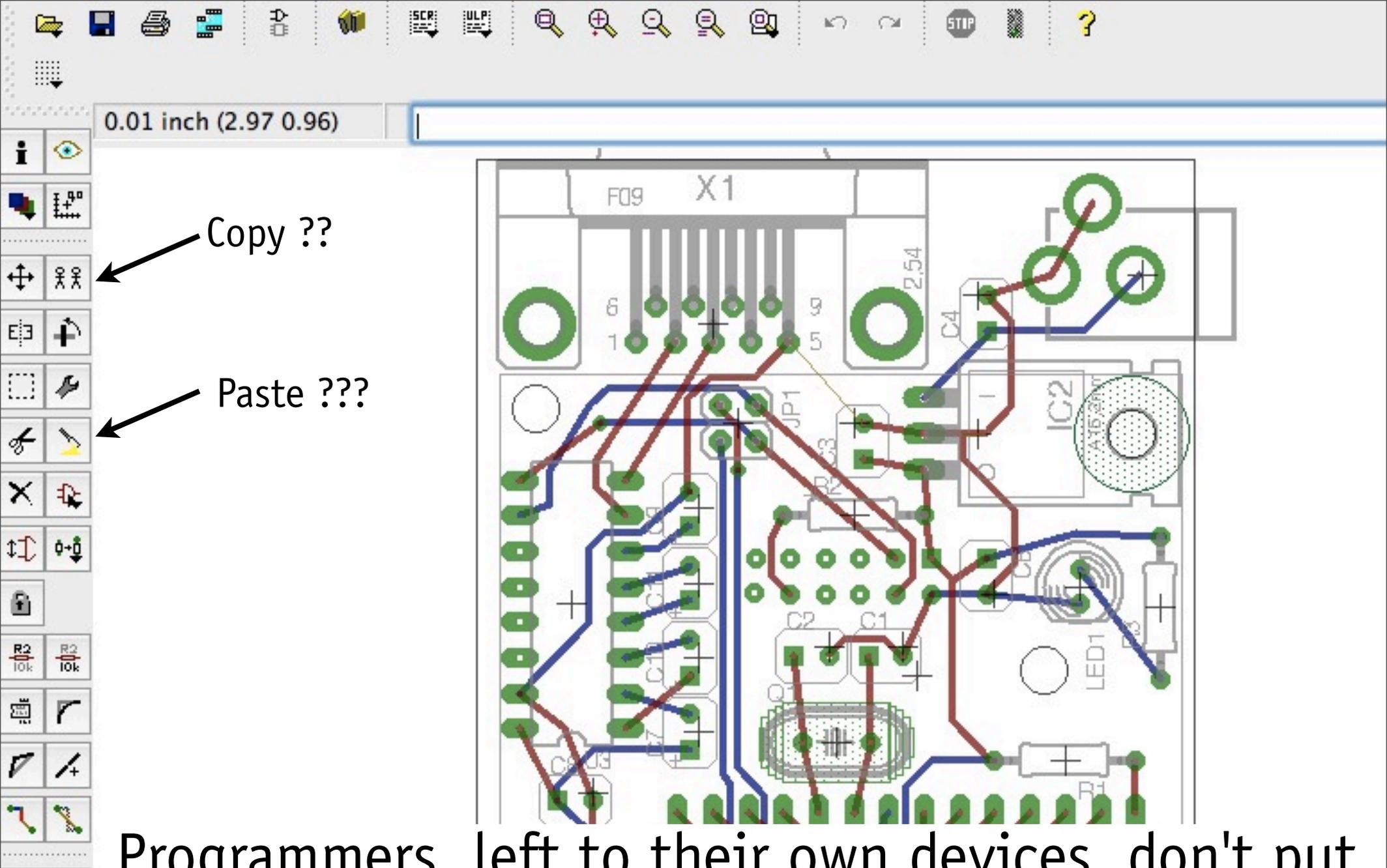
2010 is the year we dive into open source design. We've dipped our toes in this pool before (icon contest, graphic design component for Trac tickets, header refresh contest, etc.), but this year we're going to cannonball and make a big splash. Here's what you need to know if you want to get involved.

A list for all seasons. Developers have the [wp-hackers mailing list](#) to discuss core and plugin code. Sometimes UI/UX stuff comes up and gets discussed there, but there is a whole universe of discussion around navigation labels, gradients, button styling, layouts, alignment, etc. that would be clutter on wp-hackers. Designers need a list to call their own, and now we have one. You can sign up for the [wp-ui list](#) to discuss ways to improve the interface or user experience of WordPress, and to discuss progress on design-related projects for the open source project, like the design challenges we're going to have.

Design Challenges. We learned a lot from the icon design and header refresh contests, and we want to do these kind of open design challenges on a regular basis to give UI/UX designers who want to contribute to the WordPress open source project more opportunities to do so. If we could do one per month, that would be ideal, keeping the challenges relatively bite-sized to allow potential contributors an easy way to get involved at first. As each challenge is posted, people can use the list to bounce ideas off each other and work toward optimal solutions. I'm

Wednesday, June 23, 2010

WordPress's UI list is a nice counterexample. I hope it works out. We have a teachers' list for Arduino for similar reasons. However, I'd personally like it to be more integrated with the developers' list once it's been around long enough to have a voice. It's useful to both sides to hear the crosstalk.

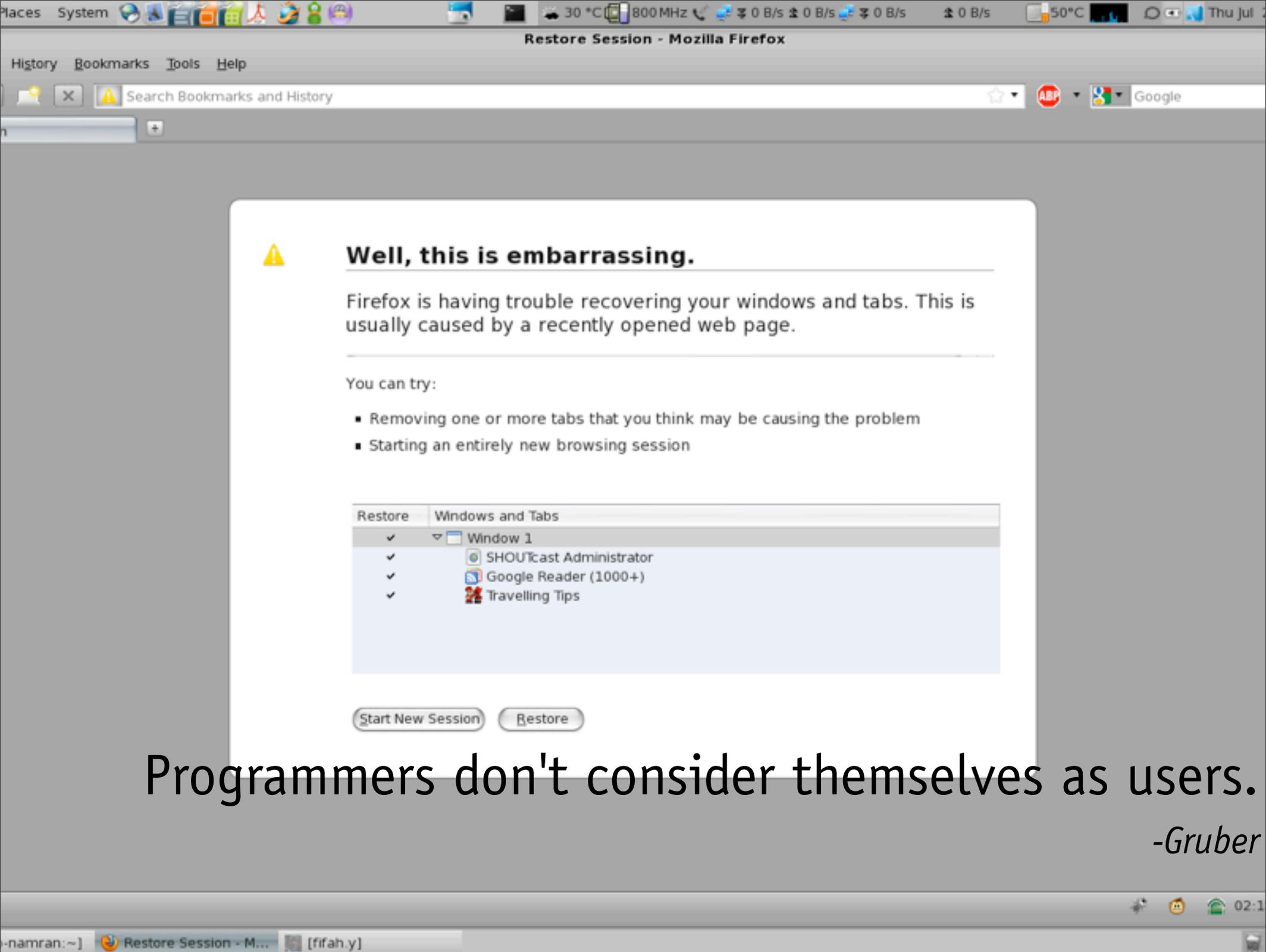


Programmers, left to their own devices, don't put a priority on interface.

-John Gruber

Wednesday, June 23, 2010

John Gruber did a great analysis of the "Spray-on Usability" attitude of most programmers and now it affects usability. He pointed out that their general assumption is that the hard work lies in building the computational engine, and that getting interface right is just the last 10%. Programmers often start with the "engine" of the application, and build the interface once the engine is set. You wouldn't build a car by starting with the engine. You'd plan the whole machine, informed by how it's going to be used. The engine, the chassis, and the body are all equally important. This is a flaw of education in computer science, I believe.



Wednesday, June 23, 2010

Gruber tells the story of open source guru Steve Raymond not being able to configure his printer, then saying that it should be something "Aunt Tillie" should be able to do. Yet he and his fellow programmers have similar problems. What Raymond and others overlook is that they are having the same problems Aunt Tillie does. So perhaps the problem is deeper than they think.



Programmers are trained to solve the general case.

Wednesday, June 23, 2010

Good programming habit is to write code that can be re-used by avoiding the specific. This is where design thinking and programming thinking diverge. You need both.

Design can help. Design at its best tends to be all about applying general principles to come up with a specific solution to meet a specific need.



features

DIY: Threat or Opportunity -- IDSA's 2010 International Conference

REGISTRATION NOW OPEN!! August 4-7, 2010. Portland, OR. Join in the dialogue and be inspired.

IDSA President Talks State of Society

Eric Anderson asks, answers questions about ongoing turnaround.

Plastics News' By Design Video Series

Watch the 'By Design' video series, brought to you by Plastics News and IDSA

2009 IDEA Award Winners

IDSA, BusinessWeek, Target and Autodesk proudly present this year's winners.

designBytes

The latest electronic newsletter of IDSA.

IDSA Master Calendar

A look at what's happening in our community. Powered by Google Calendars.

Employment

Find a job, post a job.

Wednesday, June 23, 2010

Designers have to open themselves up too. When we come up with design innovations, we need to release them, not hoard them. Is amateurization really a threat? Or is this the same kind of thinking that's driving the journalism industry to panic about bloggers?

DIY DESIGN:
**THREAT OR
OPPORTUNITY?**

**WEBSITE
NOW LIVE!**

IDSA.
INTERNATIONAL
CONFERENCE
AUG 4-7, 2010
PORTLAND, OR

...ed, cross-craft DIY debate at the 2010 IDSA International Conference.
...ation from designers, entrepreneurs, musicians, chefs, artists, and more.

The graphic features a black background with white and yellow text. A pink skull icon is on the left. The main title is in large, bold, white letters. A yellow starburst contains the text 'WEBSITE NOW LIVE!'. On the right, a blue box contains the IDSA logo and conference details. At the bottom, a blue banner contains additional text.

With the advance of technology and globalization, anyone can design, customize and build almost anything. Whether it is catering to one or catering to the masses, the DIY movement has created a multi-billion dollar market. DIY is a means of self-expressions, and has inspired companies like Nike, T-Mobile and Apple to empower and engage customers.

What is DIY design? How does it affect industrial design? Is it a threat or an opportunity? Who is a DIY designer? Can you be sure? Learn the answer to these questions and more by attending a cross-craft conversation at IDSA 2010. Draw inspiration from designers, musicians, chefs, artists and more. Harness the energy and passion of the DIY movement.

Wednesday, June 23, 2010

Isn't the language in bold a little "1984" ish? Do we have to seek out these "DIY" interlopers and hunt them down to preserve our industry? I doubt IDSA intended this tone, but it comes across that way, to one who they might perceive as a "threat"



Wednesday, June 23, 2010

Another thing we're going to have to change is that we're going to have to get a little less reactionary. I'm all for openness (and I own one of these and wear it proudly), but it's not going to get to the mainstream through revolution. We're going to have to be tolerant of partial openness. Here are a few examples.



<http://www.flickr.com/photos/gaetanlee>

Wednesday, June 23, 2010

What's interesting about spimes, though, and about service design as a model for wrangling spimes is that it's making equipment companies talk about taking their stuff back, even before WEEE (Waste Electrical and Electronic Equipment directive).

Mobile carriers are already there. At CES in Las Vegas, Verizon commented that they have, they want to get to 70-80% reclaimed handsets by 2010.

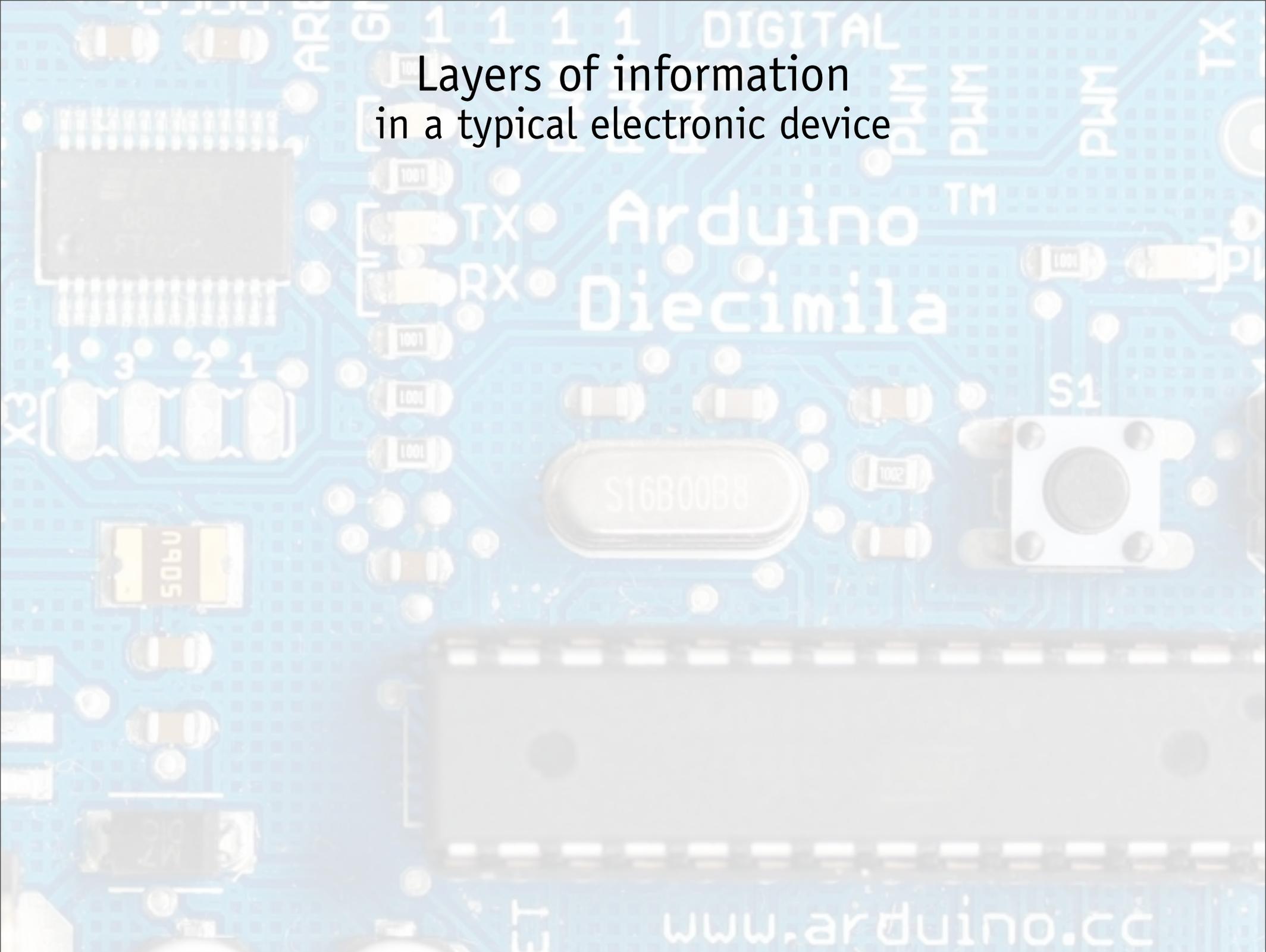


What If?

<http://www.flickr.com/photos/gaetanlee>

Wednesday, June 23, 2010

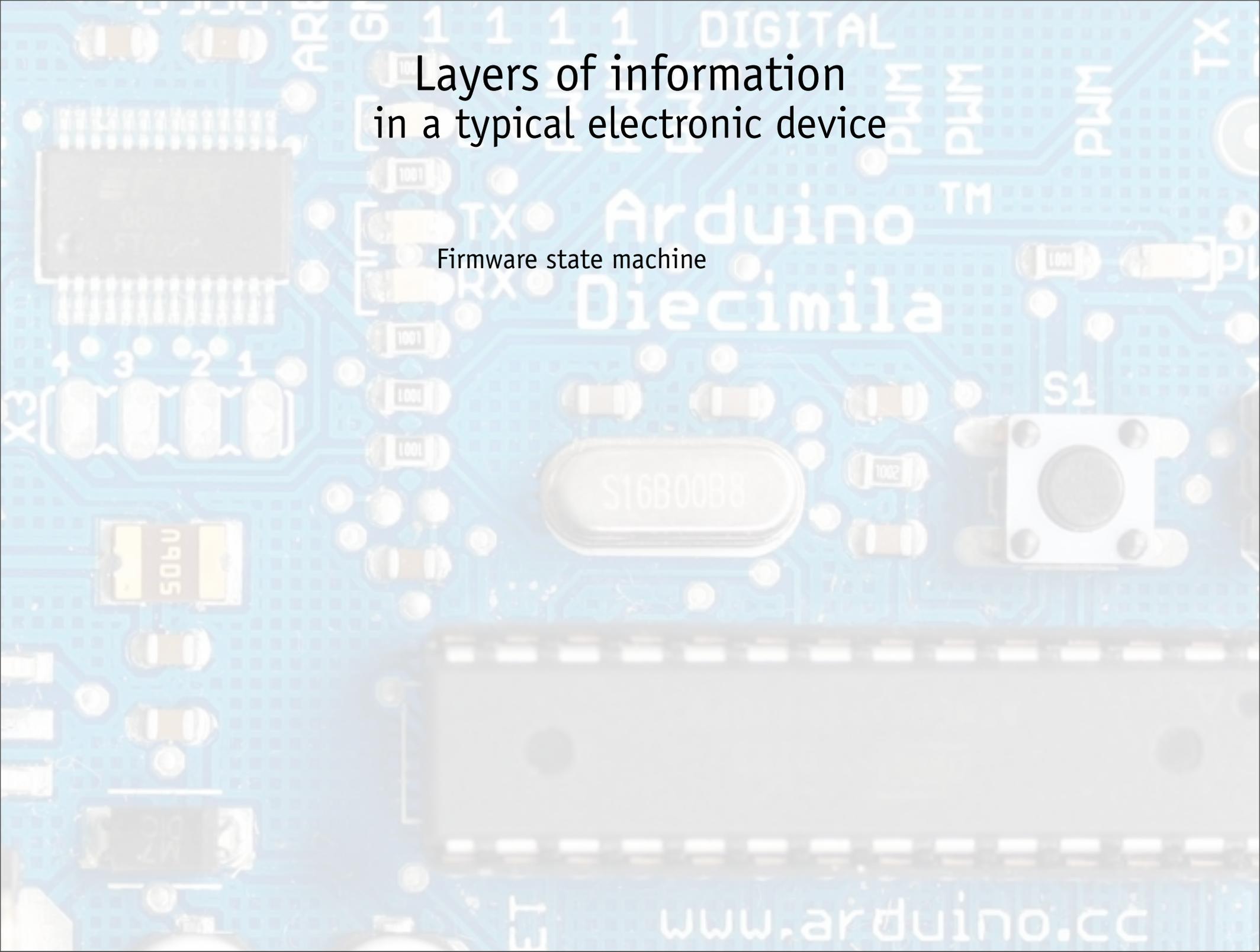
Part of the problem, however, is that recyclers have no way of knowing what goes into a product, because OEMs don't publish that. It's protected intellectual property. What if there were a way to protect that property while still giving recyclers the information they need? What if you published a list of ingredients?



Layers of information
in a typical electronic device

Wednesday, June 23, 2010

This is adapted from Phil Torrone and Limor Fried's layers of open source hardware.

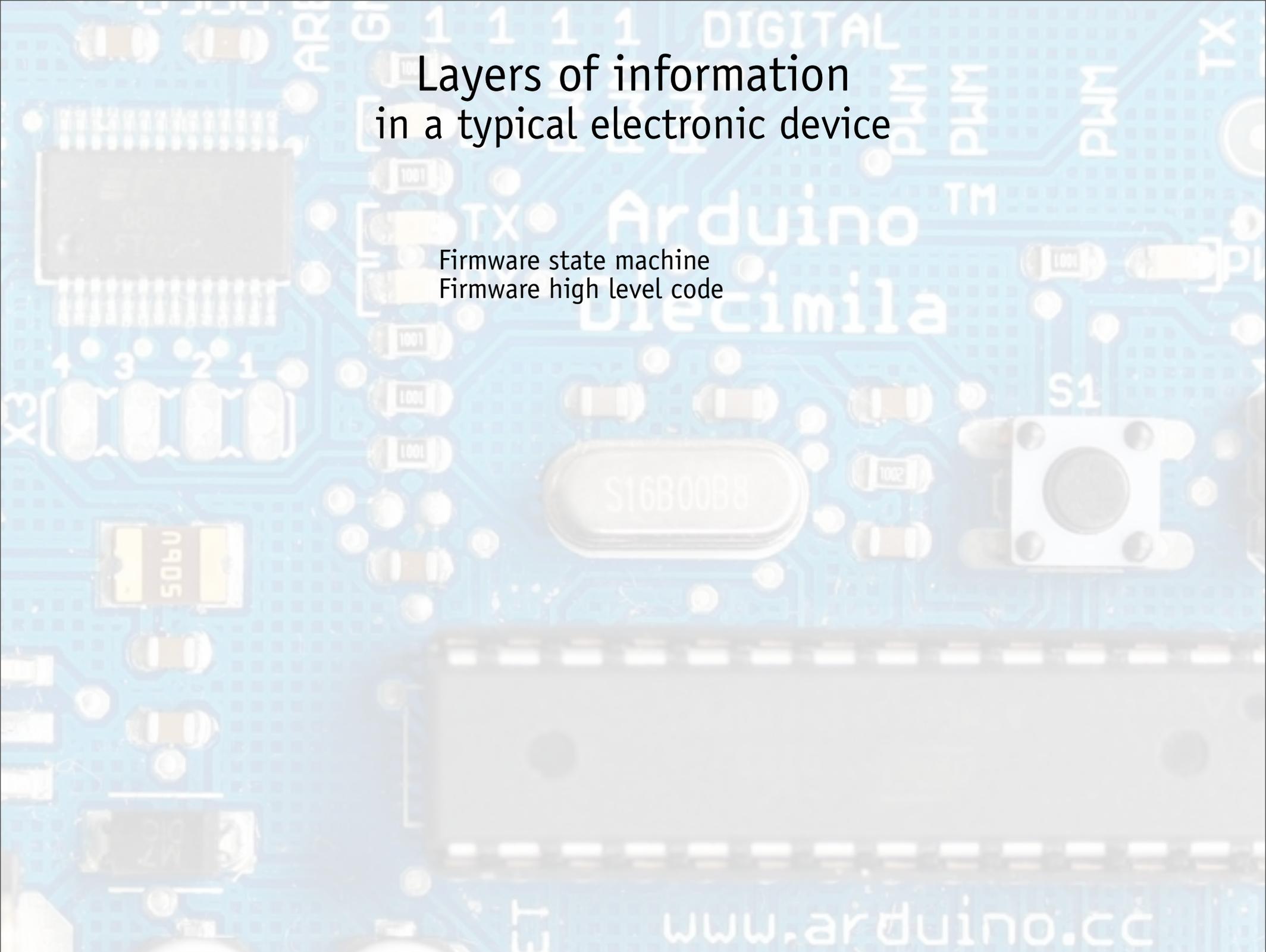


Layers of information in a typical electronic device

Firmware state machine

Wednesday, June 23, 2010

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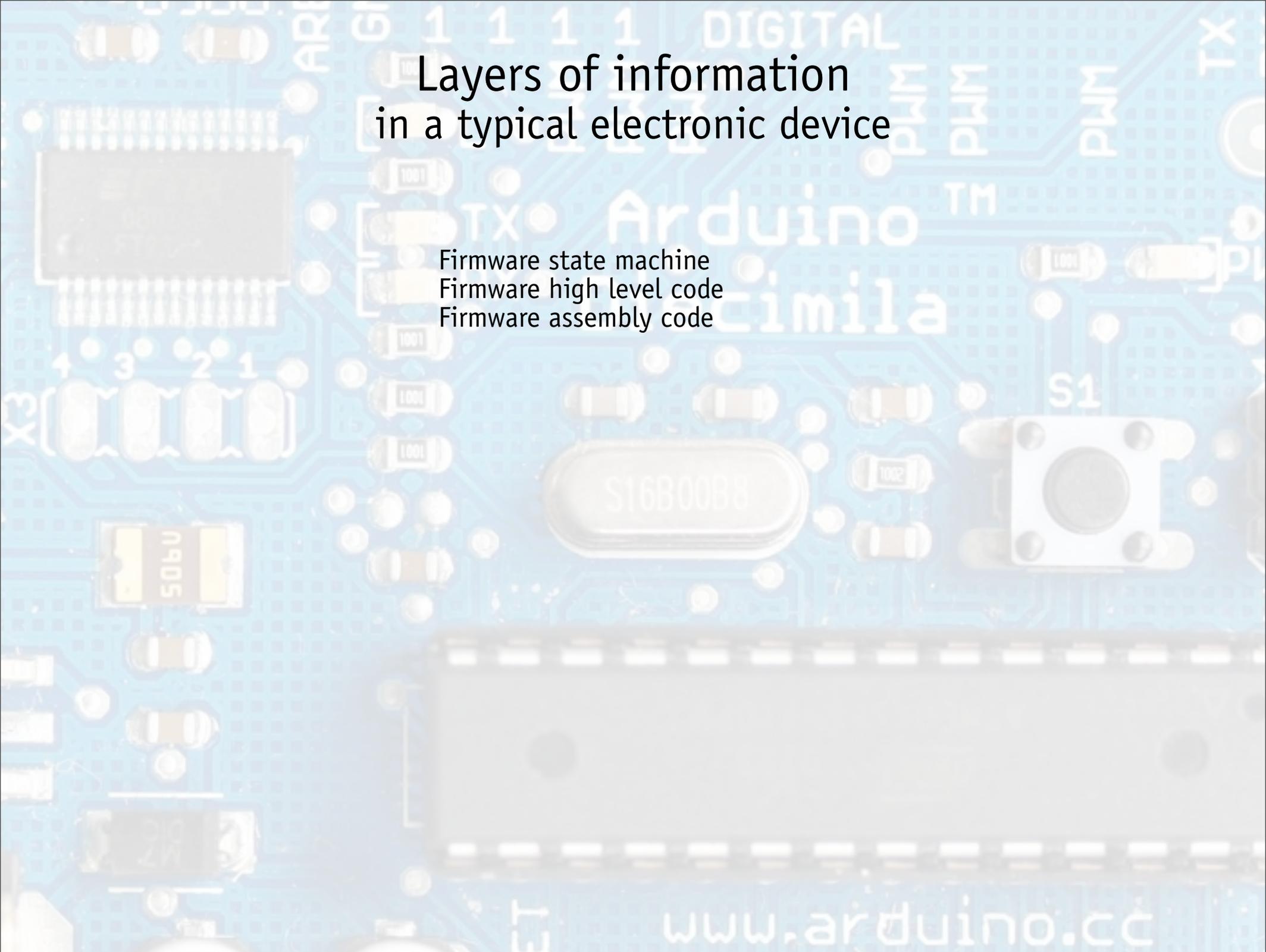


Layers of information in a typical electronic device

Firmware state machine
Firmware high level code

Wednesday, June 23, 2010

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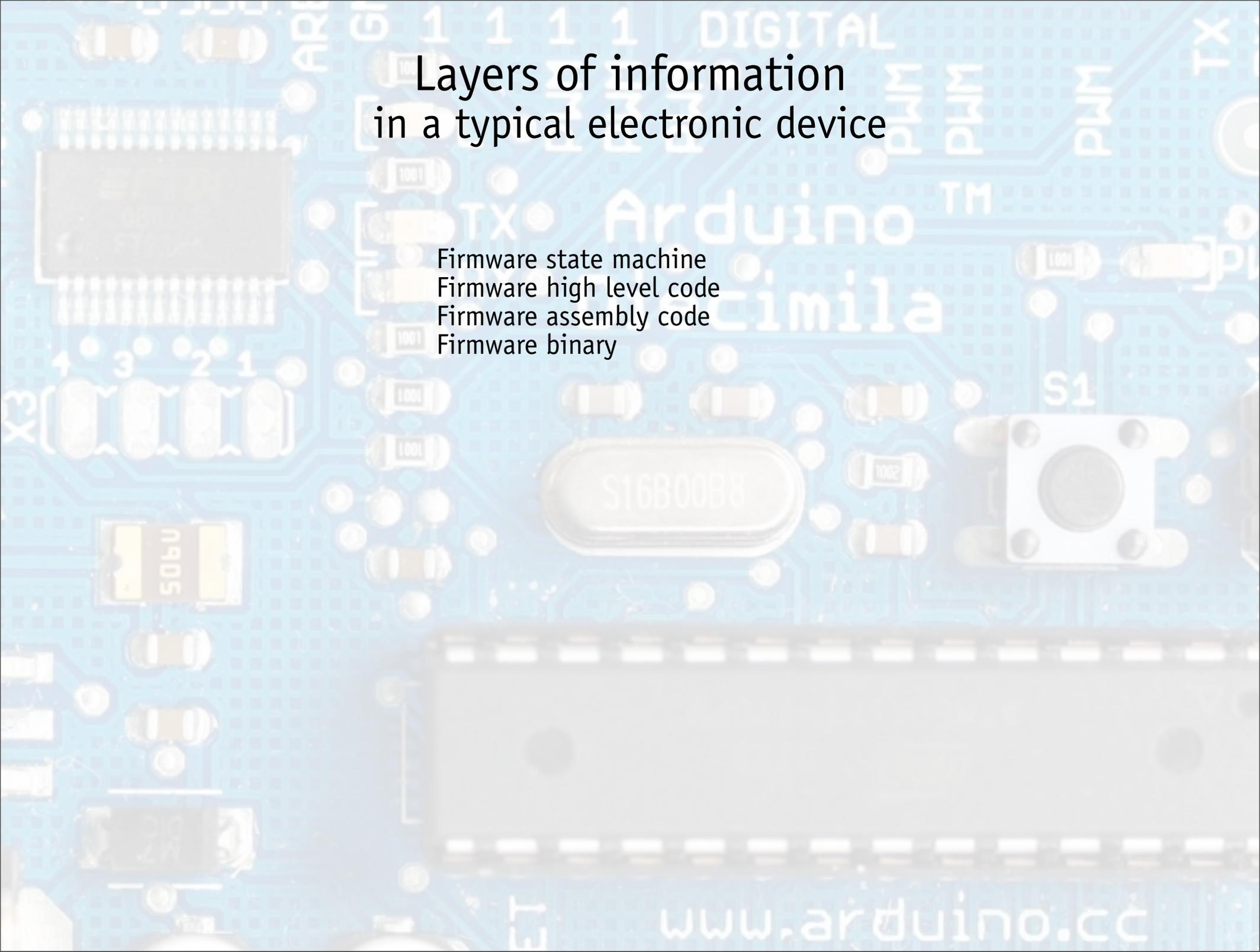


Layers of information in a typical electronic device

- Firmware state machine
- Firmware high level code
- Firmware assembly code

Wednesday, June 23, 2010

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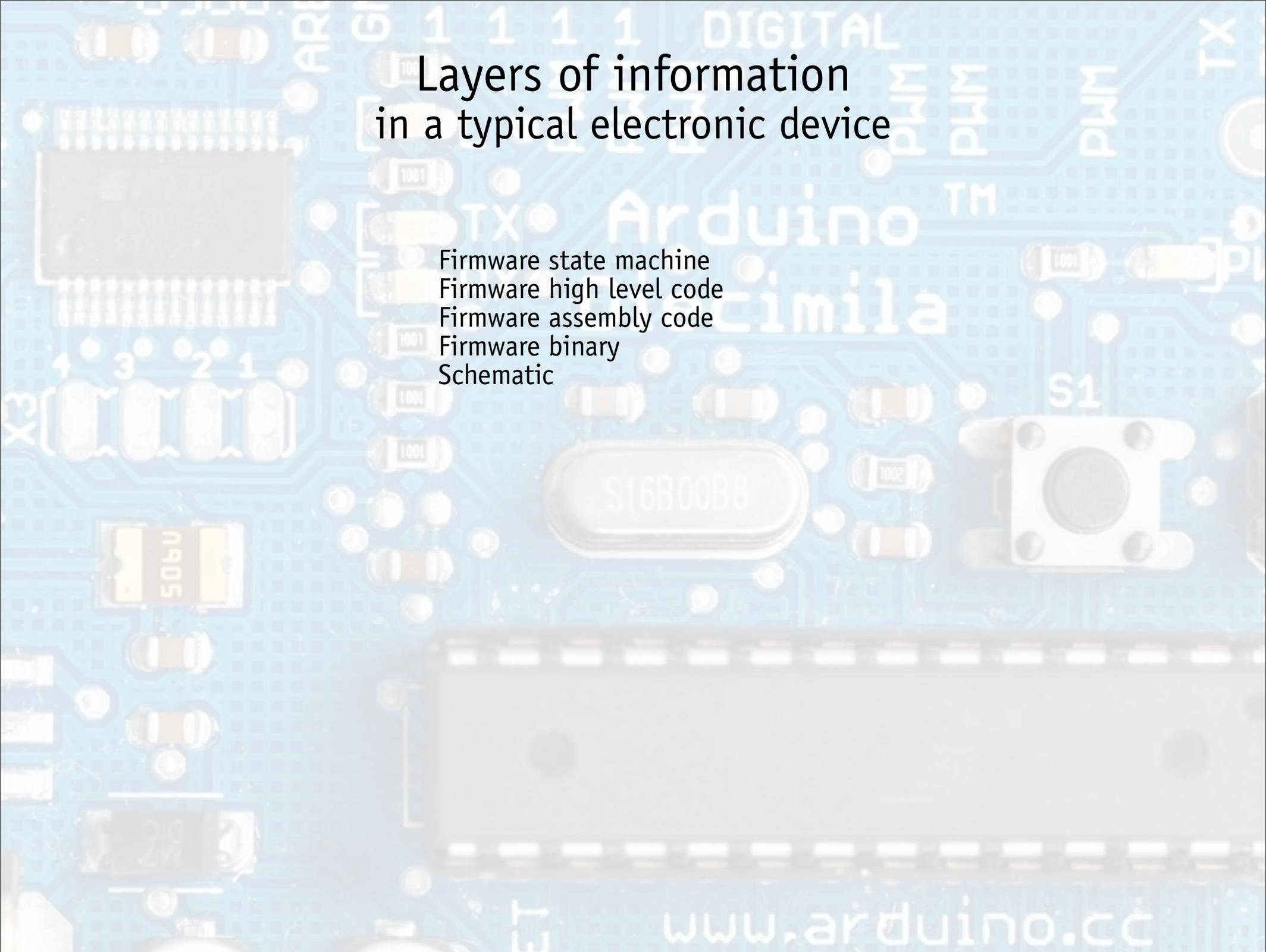


Layers of information in a typical electronic device

- Firmware state machine
- Firmware high level code
- Firmware assembly code
- Firmware binary

Wednesday, June 23, 2010

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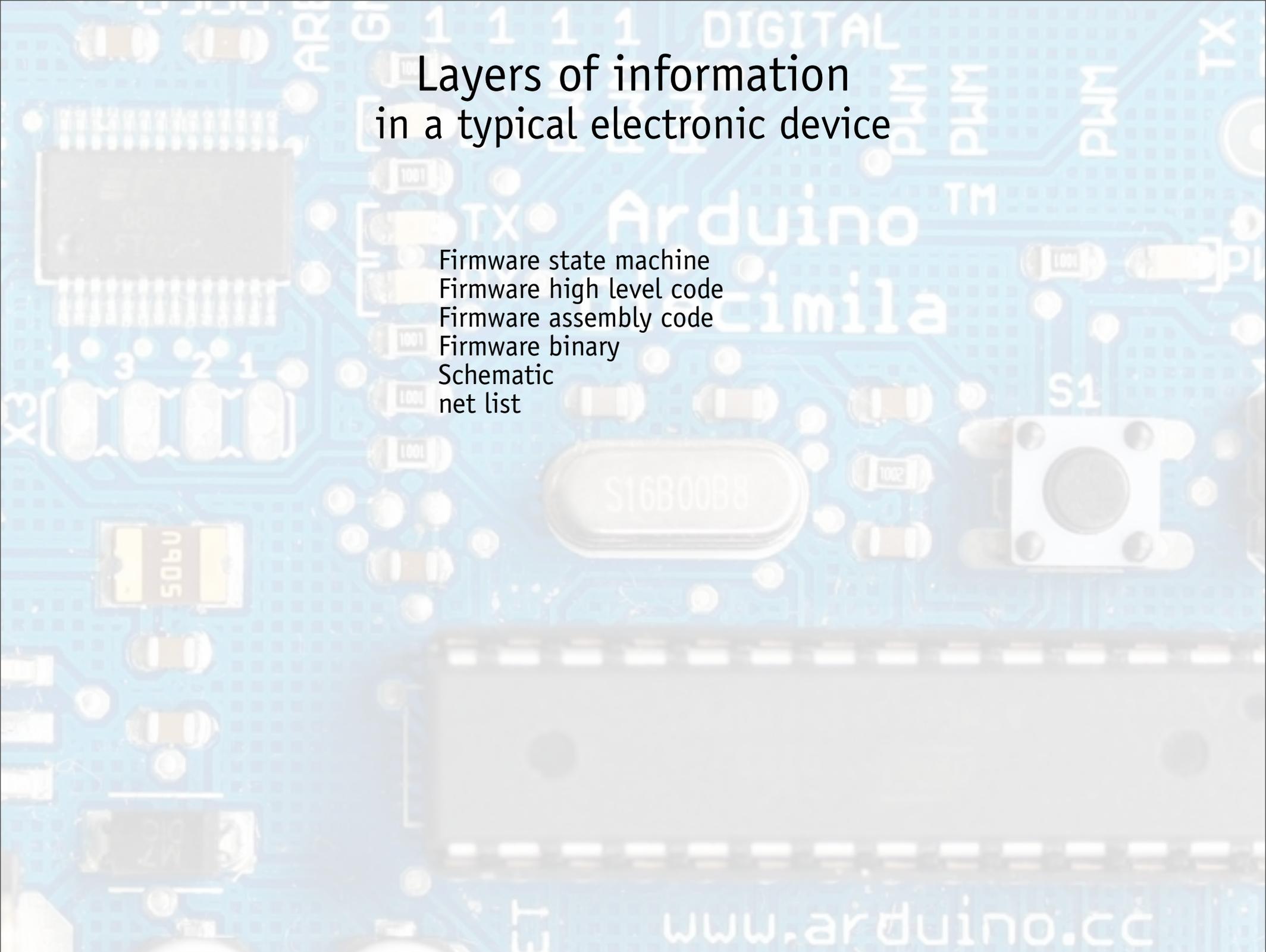


Layers of information in a typical electronic device

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- Firmware high level code
- Firmware assembly code
- Firmware binary
- Schematic

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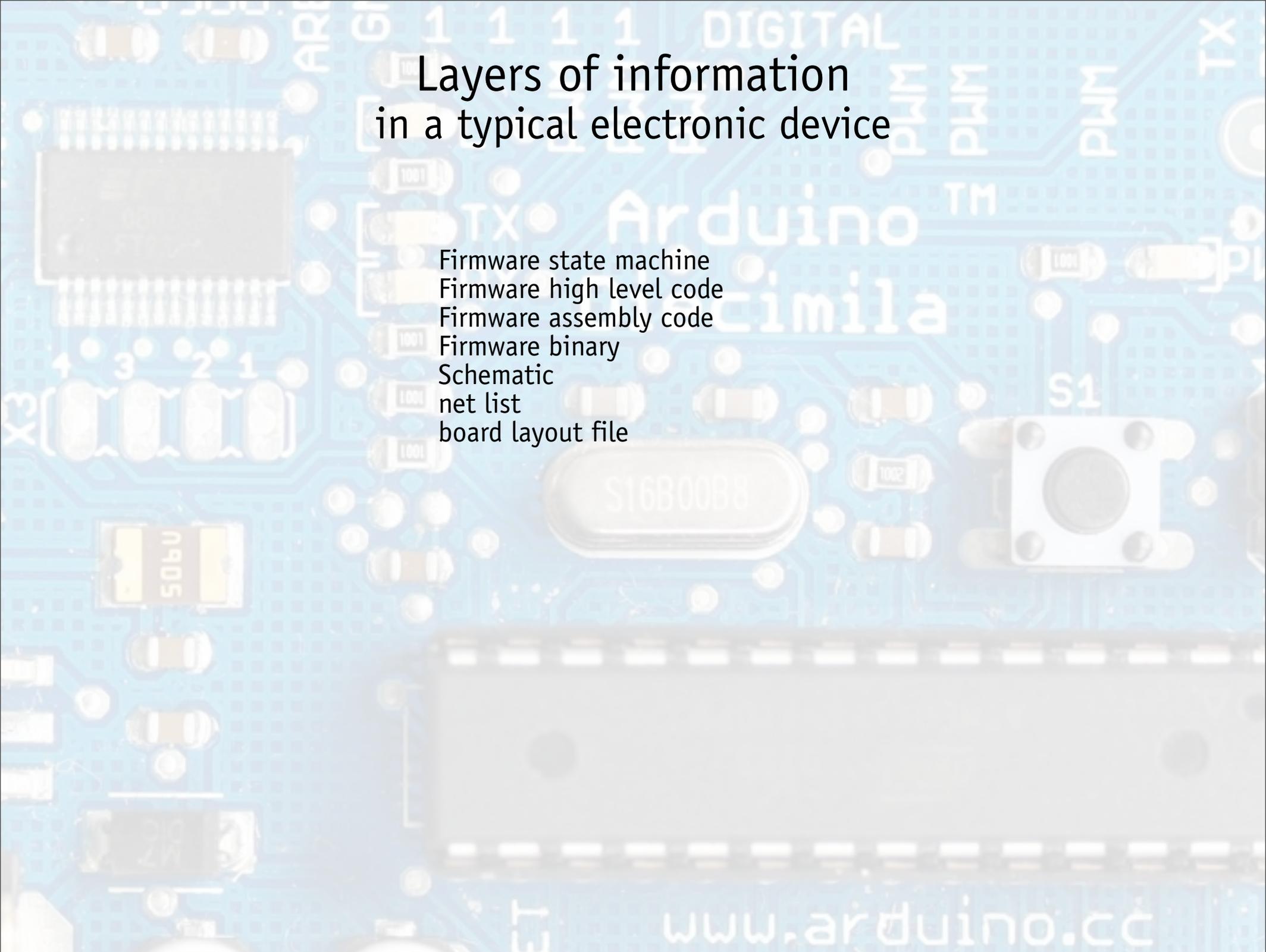


Layers of information in a typical electronic device

- Firmware state machine
- Firmware high level code
- Firmware assembly code
- Firmware binary
- Schematic
- net list

Wednesday, June 23, 2010

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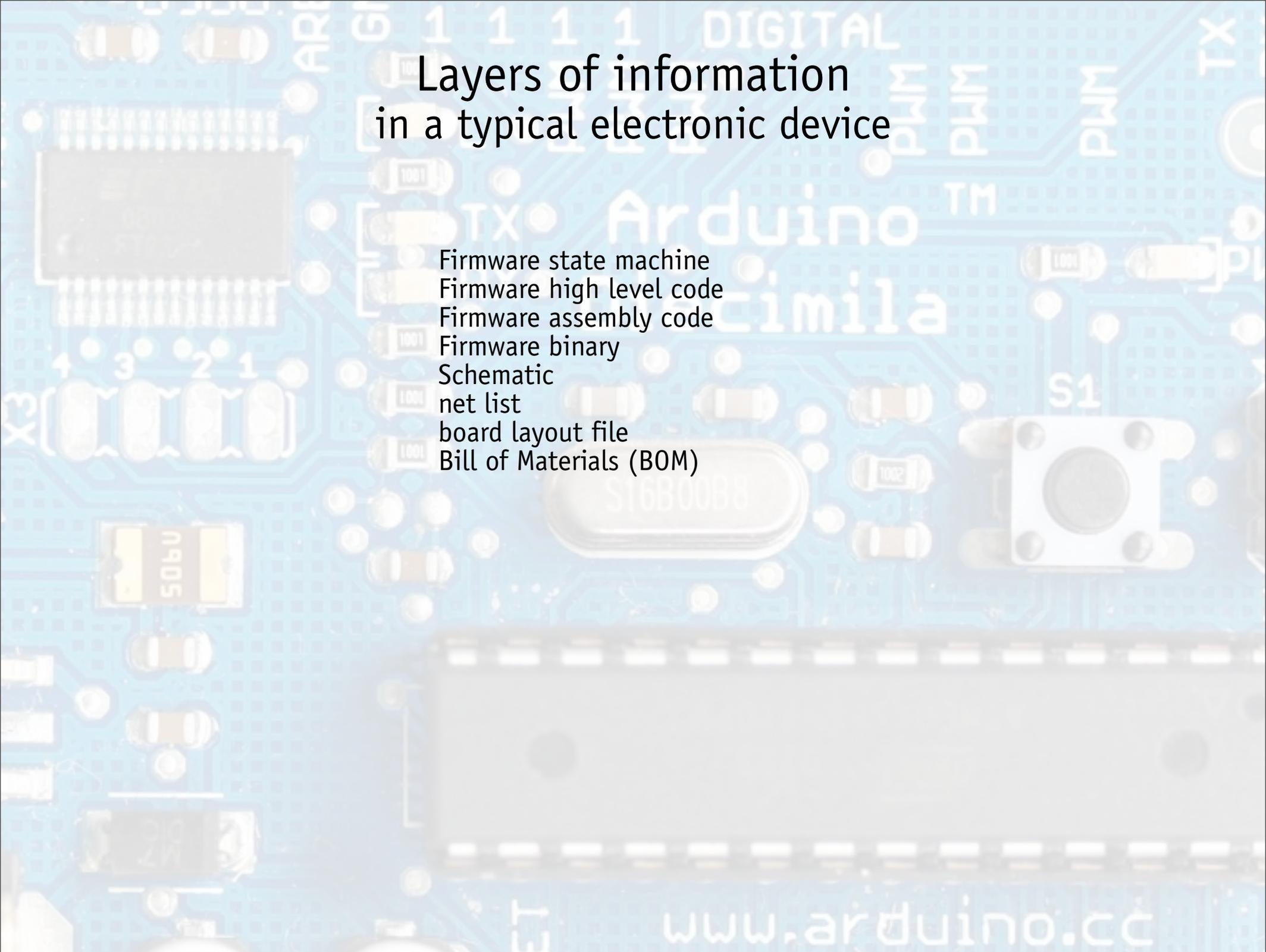


Layers of information in a typical electronic device

- Firmware state machine
- Firmware high level code
- Firmware assembly code
- Firmware binary
- Schematic
- net list
- board layout file

Wednesday, June 23, 2010

This is adapted from Phil Torrone and Limor Fried's layers of open source hardware.



Layers of information in a typical electronic device

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- Firmware high level code
- Firmware assembly code
- Firmware binary
- Schematic
- net list
- board layout file
- Bill of Materials (BOM)

Wednesday, June 23, 2010

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- components materials list

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- chemicals list
- assembly order

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- chemicals list
- assembly order
- drill files

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- assembly order
- drill files
- pick & place data

Wednesday, June 23, 2010

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- chemicals list
- assembly order
- drill files
- pick & place data
- assembly tool list

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- pick & place data
- assembly tool list
- supporting materials used in assembly

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- supporting chemicals used in assembly

Wednesday, June 23, 2010

This is adapted from Phil Torrone and Limor Fried's layers of open source hardware.

Layers of information in a typical open source hardware project

- Firmware state machine
- Firmware high level code
- Firmware assembly code
- Firmware binary
- Schematic
- net list
- board layout file
- Bill of Materials (BOM)
- components materials list
- chemicals list
- assembly order
- drill files
- pick & place data
- assembly tool list
- supporting materials used in assembly
- supporting chemicals used in assembly

Wednesday, June 23, 2010

Here's what usually goes into an open source hardware documentation package

Layers of information needed to aid recycling

~~Firmware state machine~~
~~Firmware high level code~~
~~Firmware assembly code~~
~~Firmware binary~~
Schematic
net list
board layout file
Bill of Materials (BOM)
components materials list
chemicals list
assembly order
drill files
~~pick & place data~~
~~assembly tool list~~
supporting materials used in assembly
supporting chemicals used in assembly

Wednesday, June 23, 2010

And here's what goes into recycling it safely.

You'd need very little data to make disassembly a whole lot easier. And much of this is mandated by RoHS now, and encouraged by EPEAT. That means that recycling electronics starts to look like a more viable business. And to that end, there's Clover.

Leading the industry in
sustainable environmental solutions



Superior Product
Quality and Value



Innovative
Environmental Solutions



Relentless Customer
Commitment

■ WHO WE ARE

Founded in 1996 and with annual revenue of over \$300 million, Clover is the global leader in providing businesses with total environmental solutions, including the recycling and remanufacturing of imaging supplies. Clover is the world's largest collector and recycler of cell phones, inkjets and laser cartridges. The complete line of Clover's quality toner and ink is available through leading office products distributors and resellers and marketed under a variety of private label brands.

[Learn more.](#)

■ STAY IN THE LOOP!

Want to be the first to learn about product announcements, releases and news? Gain access to marketing materials and business intelligence, when you register on Clover's website.

[Register Now!](#)



[Print
Brands &
Programs](#)



[Recycling](#)



[Remanufacturing
Process](#)

Wednesday, June 23, 2010

Clover just completed a several-month long pilot program with the US postal service in which they gave away prepaid mailing pouches for people to ship them used electronics items: phones, cameras, clocks, and so forth, which they then recycled. I spoke to Eric Martin, the president of the North America Division, who told me they were very happy with the trial. So was the USPS. But that yes, working with OEMs would make his life a lot easier.



Electronic Product Environmental Assessment Tool

Green Electronics Made Easy

Search
Product
Registry

DETAILS

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Consumers](#)

Welcome to EPEAT®

EPEAT is a system to help purchasers in the public and private sectors evaluate, compare and select desktop computers, notebooks and monitors based on their environmental attributes. EPEAT also provides a clear and consistent set of performance criteria for the design of products, and provides an opportunity for manufacturers to secure market recognition for efforts to reduce the environmental impact of its products.

The EPEAT Registry on this web site includes products that have been declared by their manufacturers to be in conformance with the environmental performance standard for electronic products - IEEE 1680- 2006. The standard is summarized [here](#), and may be purchased from the [Institute of Electrical and Electronics Engineers](#). EPEAT operates a [verification program](#) to assure the credibility of the Registry.

Verification Round Three Completed

Round Three [details](#) include two findings of nonconformance and recommendations to improve consistency across the IEEE 1680 standard, the EPEAT Registry, and ENERGY STAR compliance processes. More on verification results and other product verification information can be found [here](#).

[Conformity Assessment Protocols](#)
Guidance for IEEE 1680 Environmental
Performance Verification

Federal EPEAT purchasing rule finalized

The Federal Acquisition Regulations' EPEAT purchasing requirement was [finalized January 15](#). Under the rule, all Federal agencies must purchase 95% or higher EPEAT registered products in all relevant product categories.

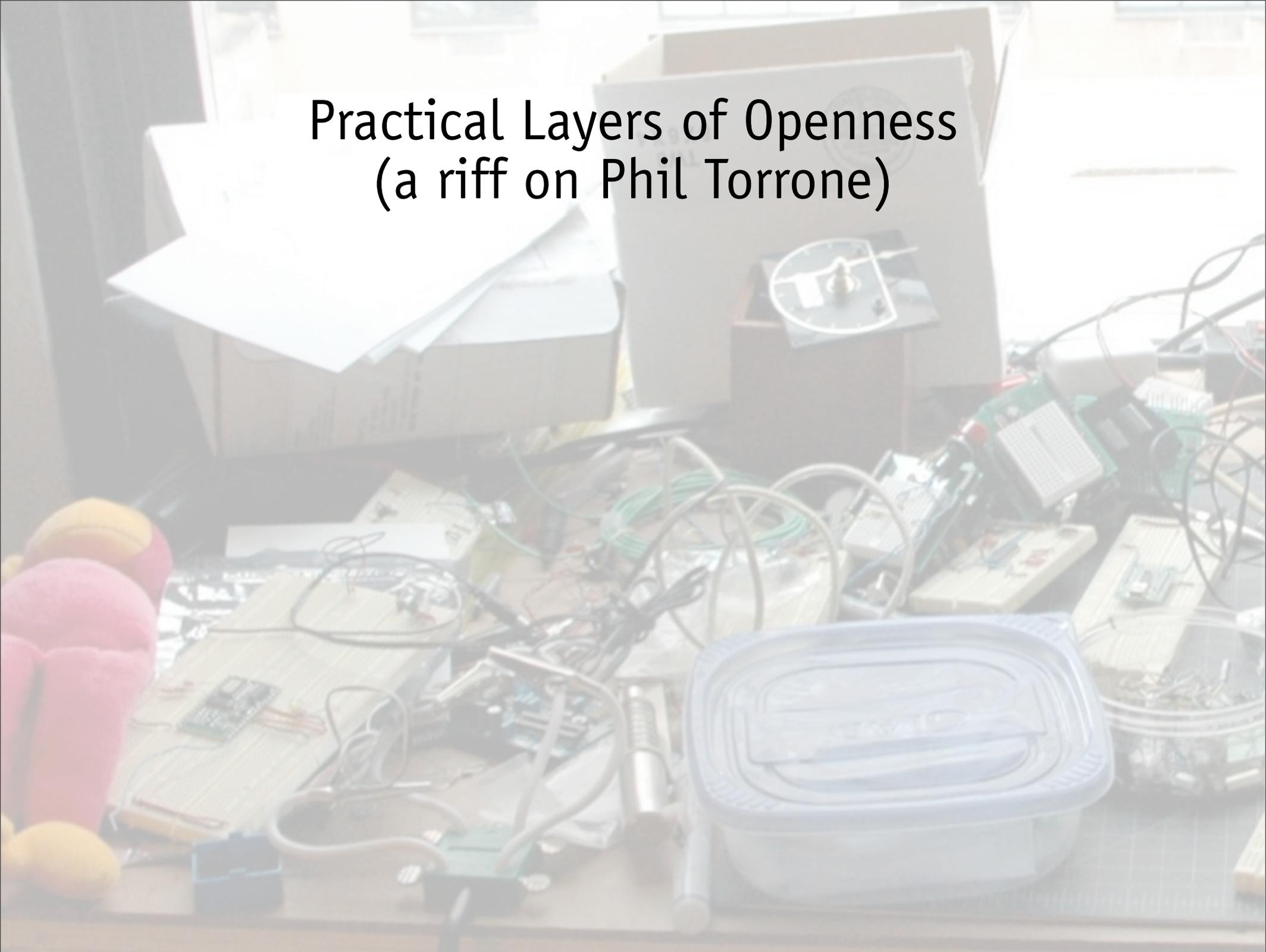
Latest News

[EPEAT, Ecologo Partner to Support Green Computer Purchasing](#)

EPEAT and Ecologo have joined forces to expand EPEAT's product registration and verification capacity

Wednesday, June 23, 2010

EPEAT (IEEE 1680) is to electronics what LEED is to architecture. It sets environmental standards for manufacturing, design, materials, and performance, and has a rating system similar to LEED as well. It is to manufacturing what Energy Star is to energy. And China recently signed a MOU to see to it that everything manufactured there would follow EPEAT guidelines.

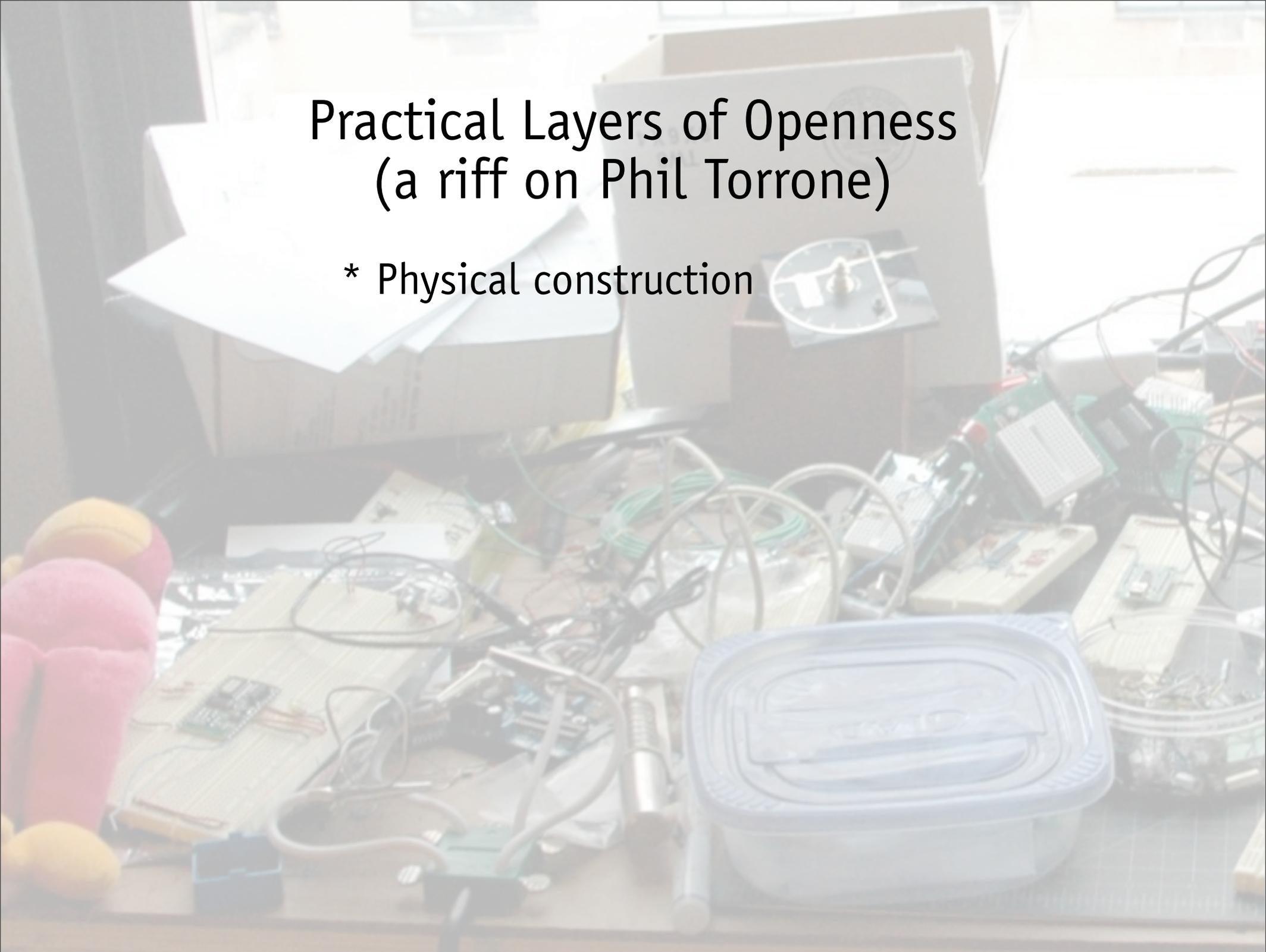
A photograph of a cluttered desk filled with electronic components, breadboards, wires, and a blue container. The scene is dimly lit, with a window in the background. The text is overlaid on the top half of the image.

Practical Layers of Openness (a riff on Phil Torrone)

Wednesday, June 23, 2010

Many open source enthusiasts will argue that a project is either open source or it isn't, and there's no in between. I don't necessarily agree. Since my reasons for preferring openness are about spurring innovation and closing the loop on product lifecycle, I think there can be many approaches to openness.

Phil Torrone laid out the layers of an open source hardware project a few years ago, and in that spirit, I suggest the following practical layers of openness:

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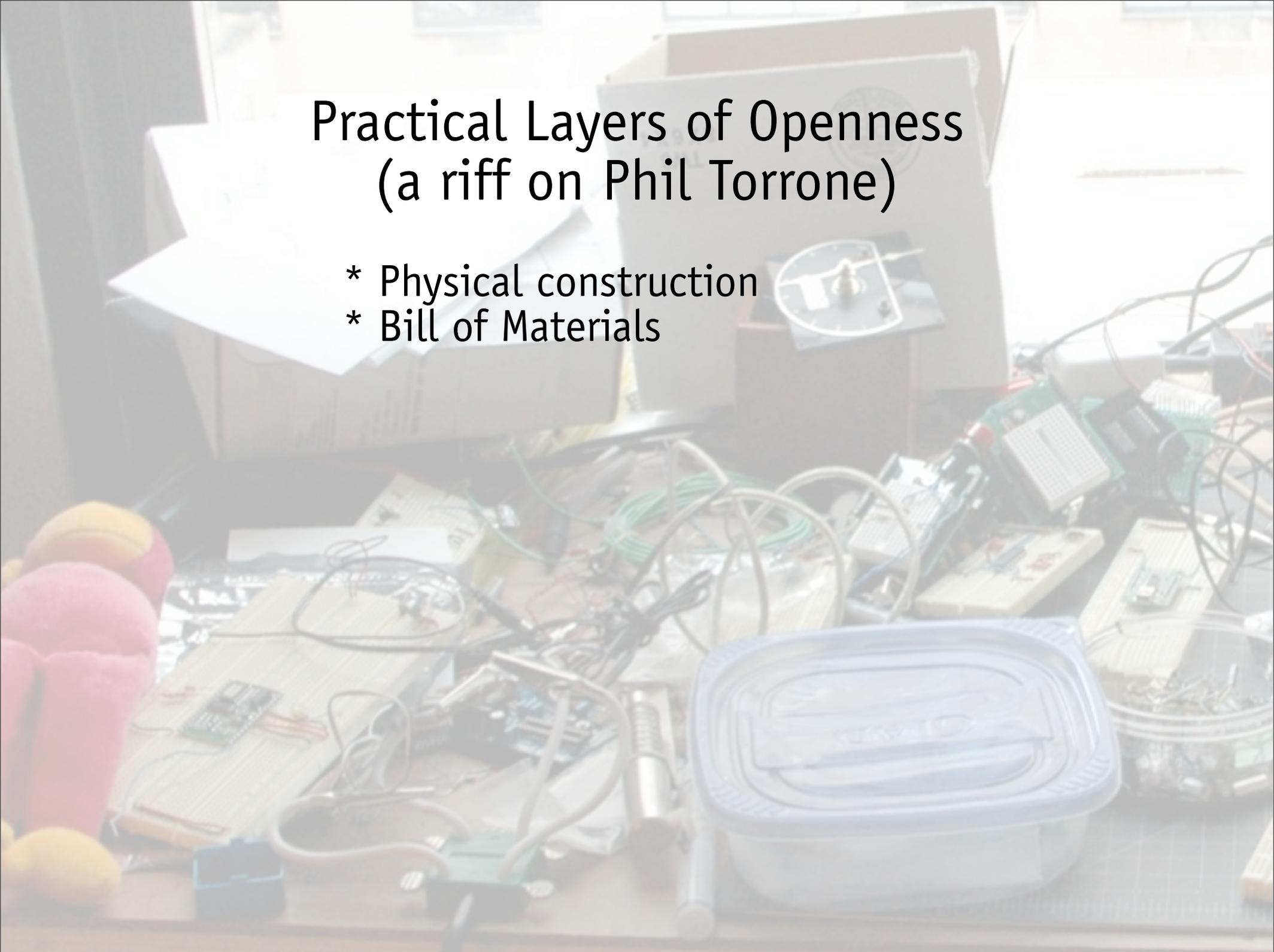
Practical Layers of Openness (a riff on Phil Torrone)

* Physical construction

Wednesday, June 23, 2010

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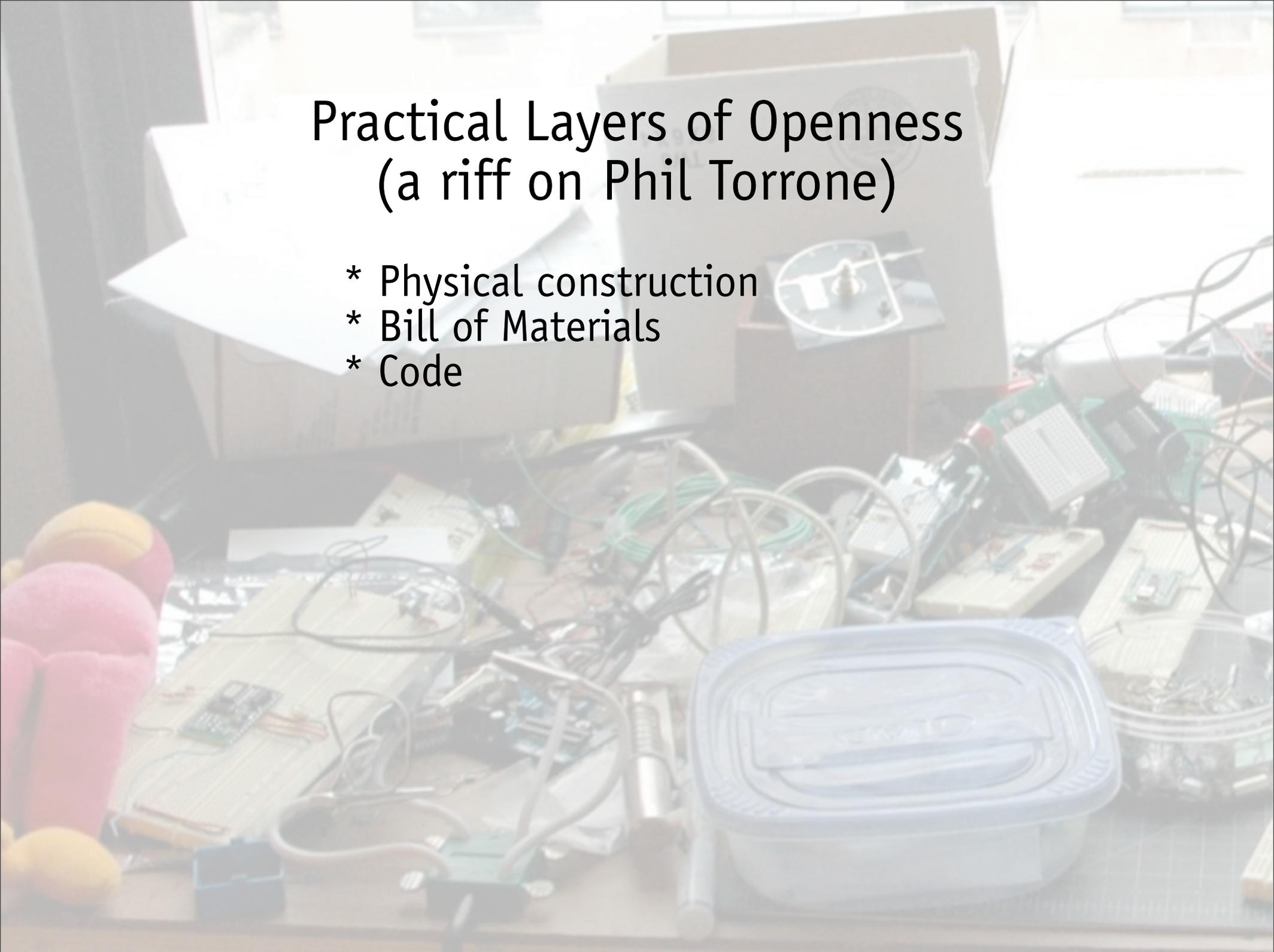
Practical Layers of Openness (a riff on Phil Torrone)

- * Physical construction
- * Bill of Materials

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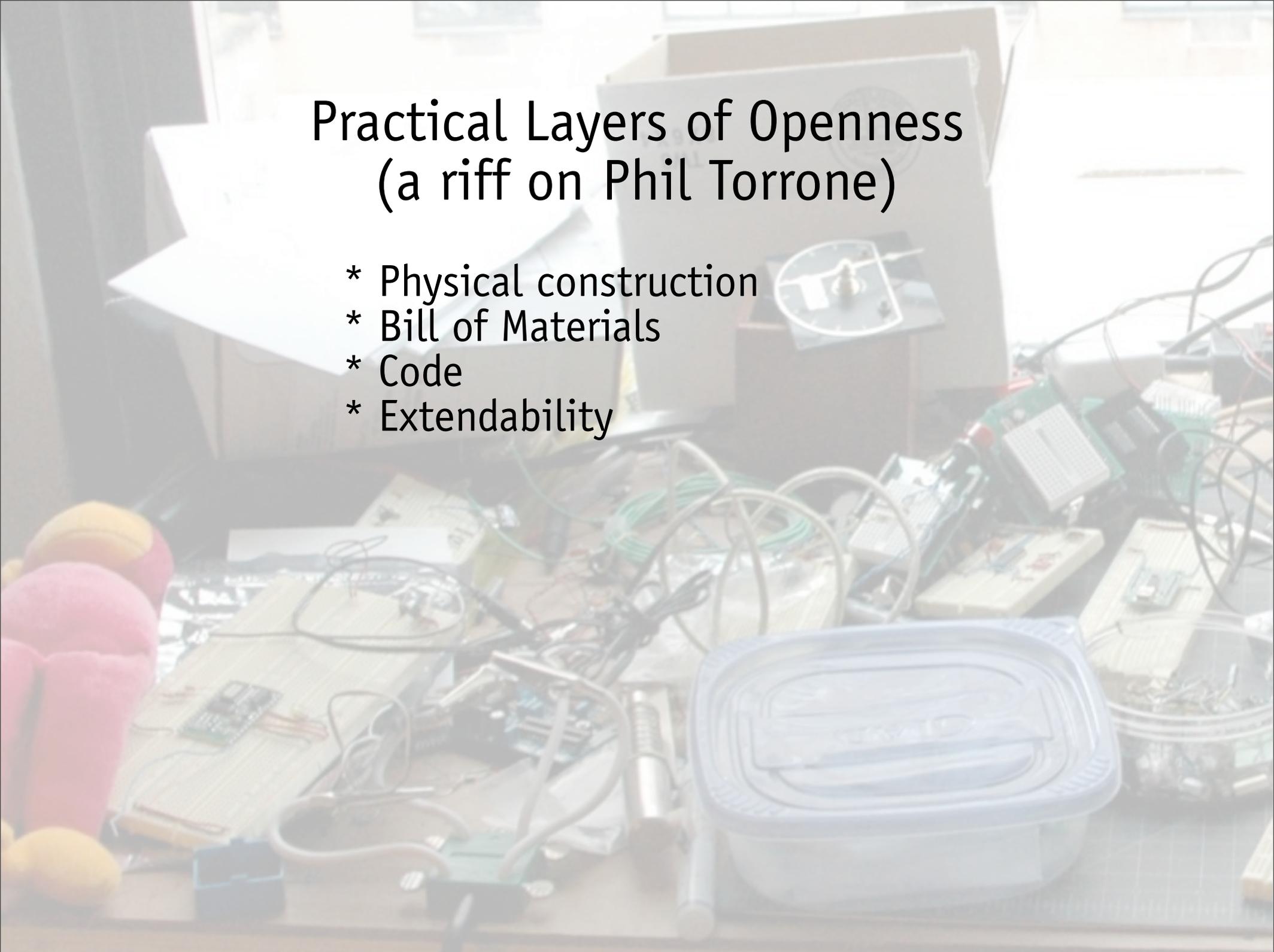
Practical Layers of Openness (a riff on Phil Torrone)

- * Physical construction
- * Bill of Materials
- * Code

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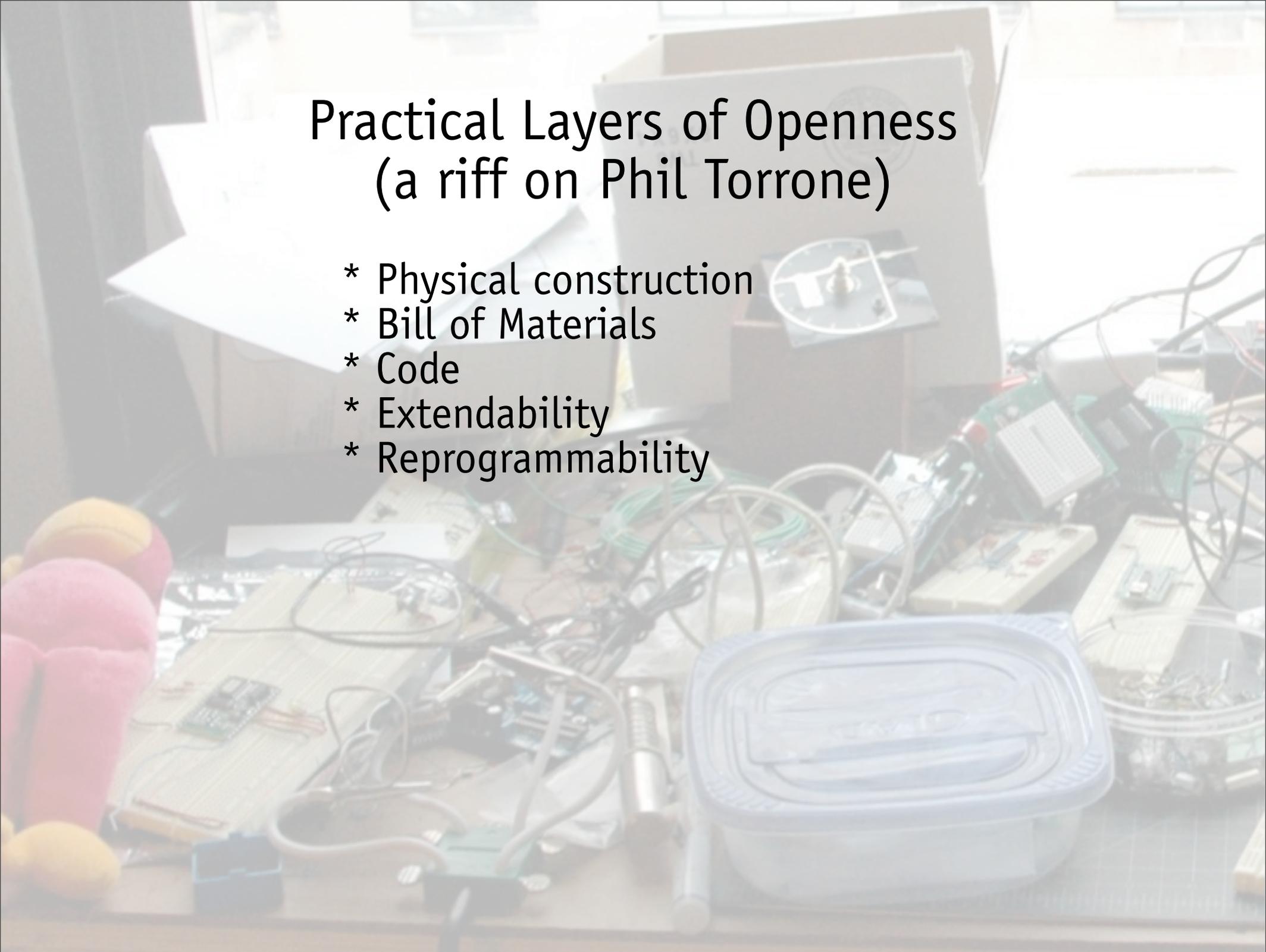
Practical Layers of Openness (a riff on Phil Torrone)

- * Physical construction
- * Bill of Materials
- * Code
- * Extendability

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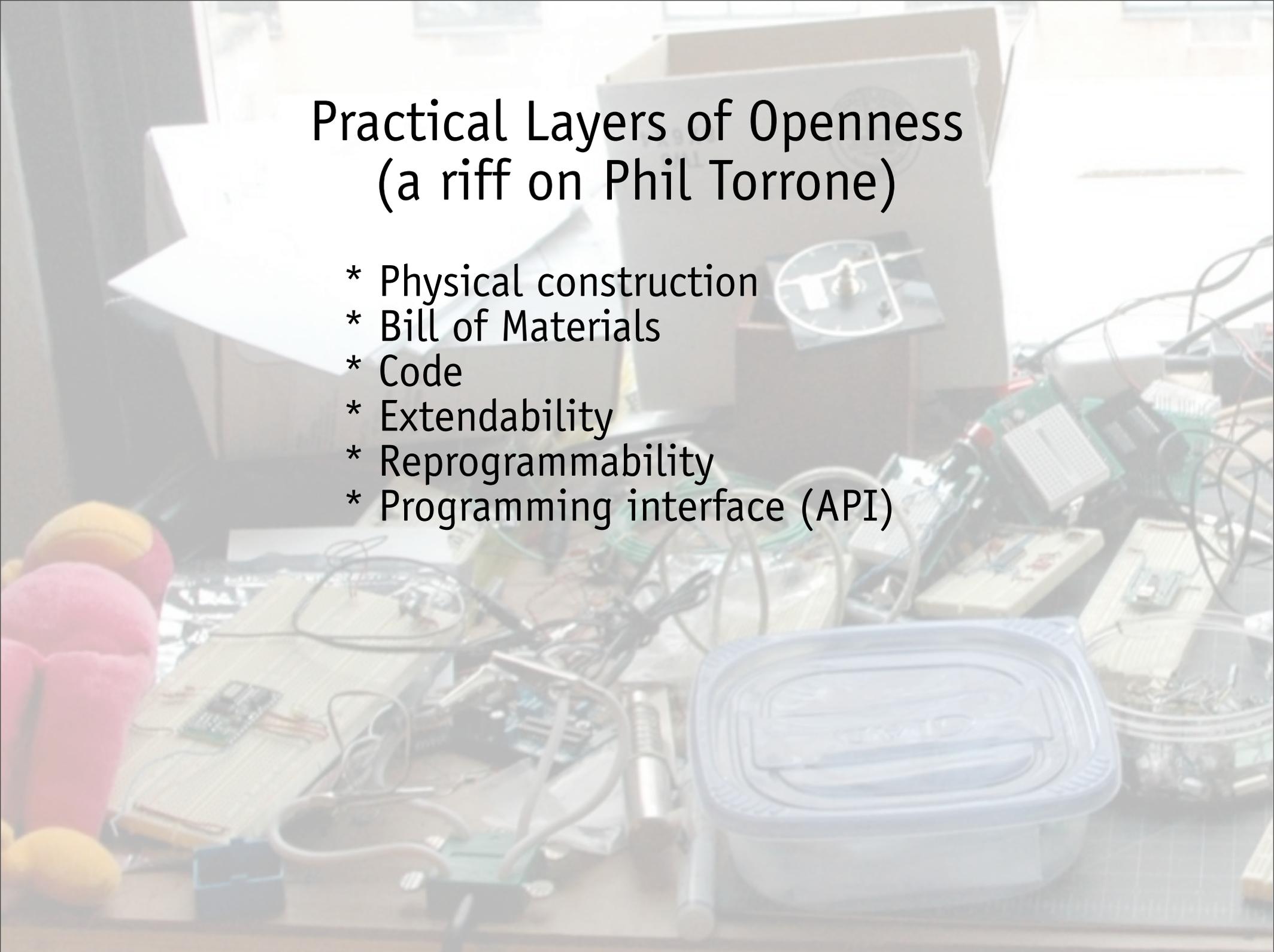
Practical Layers of Openness (a riff on Phil Torrone)

- * Physical construction
- * Bill of Materials
- * Code
- * Extendability
- * Reprogrammability

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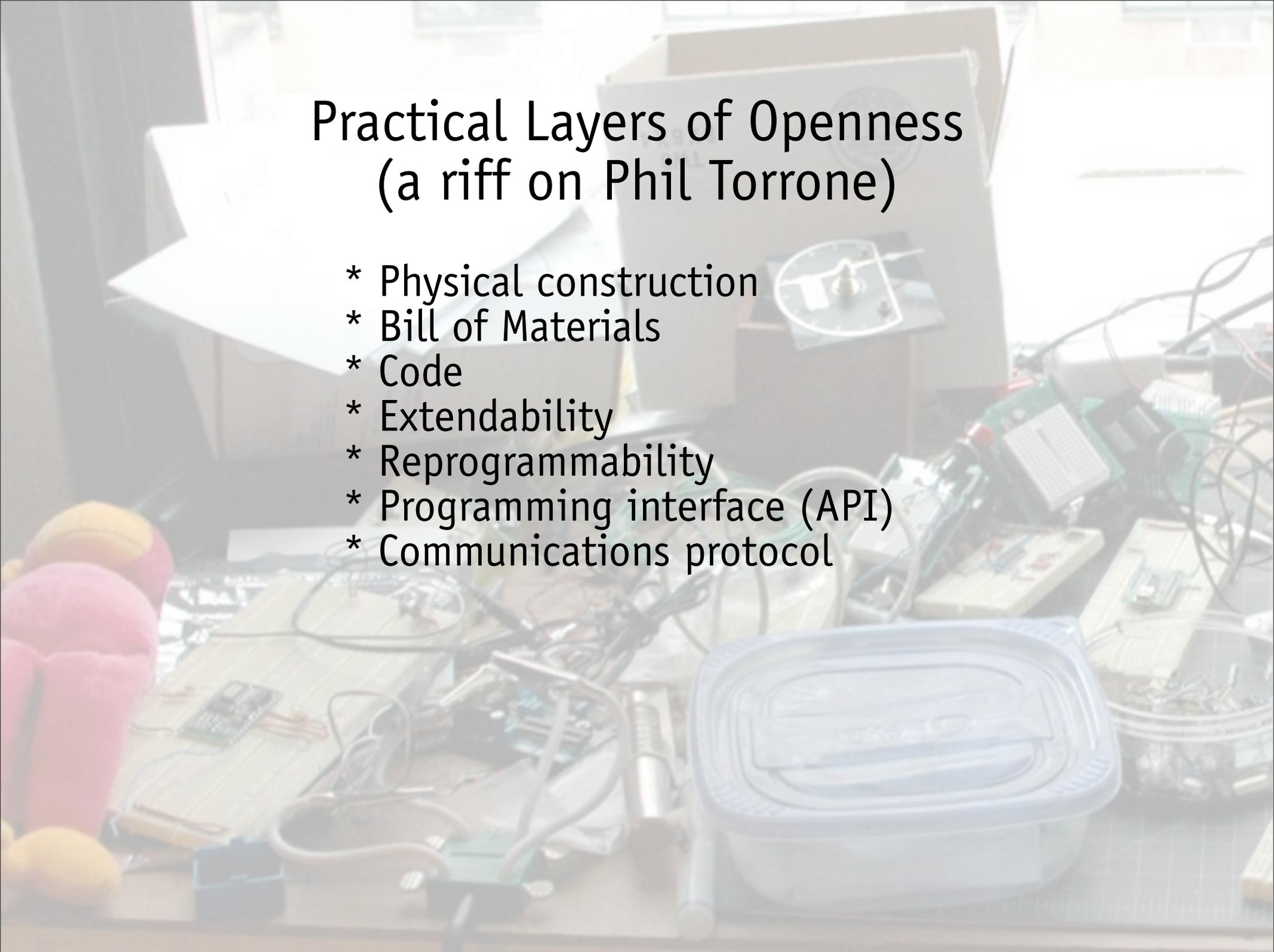
Practical Layers of Openness (a riff on Phil Torrone)

- * Physical construction
- * Bill of Materials
- * Code
- * Extendability
- * Reprogrammability
- * Programming interface (API)

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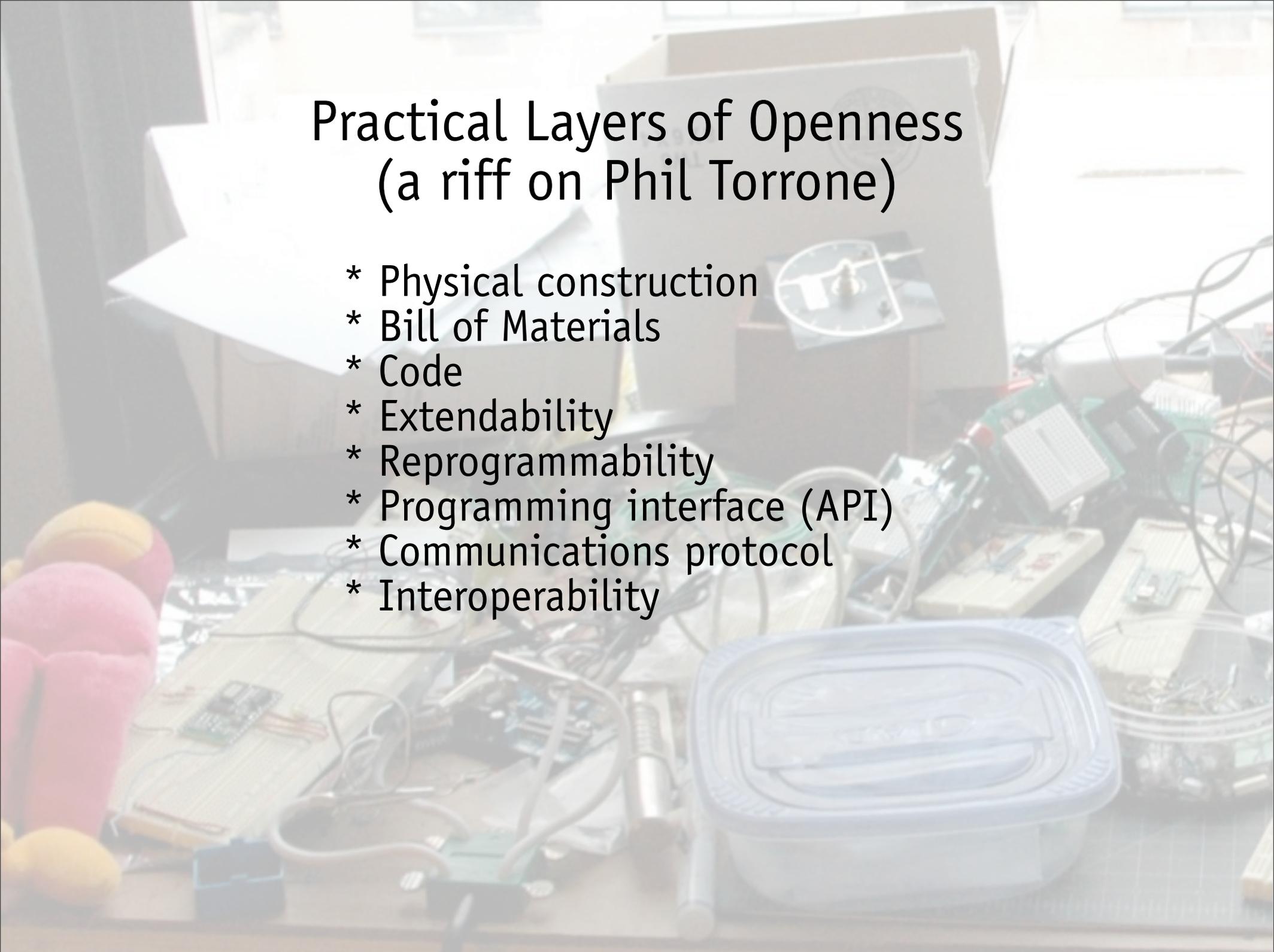
Practical Layers of Openness (a riff on Phil Torrone)

- * Physical construction
- * Bill of Materials
- * Code
- * Extendability
- * Reprogrammability
- * Programming interface (API)
- * Communications protocol

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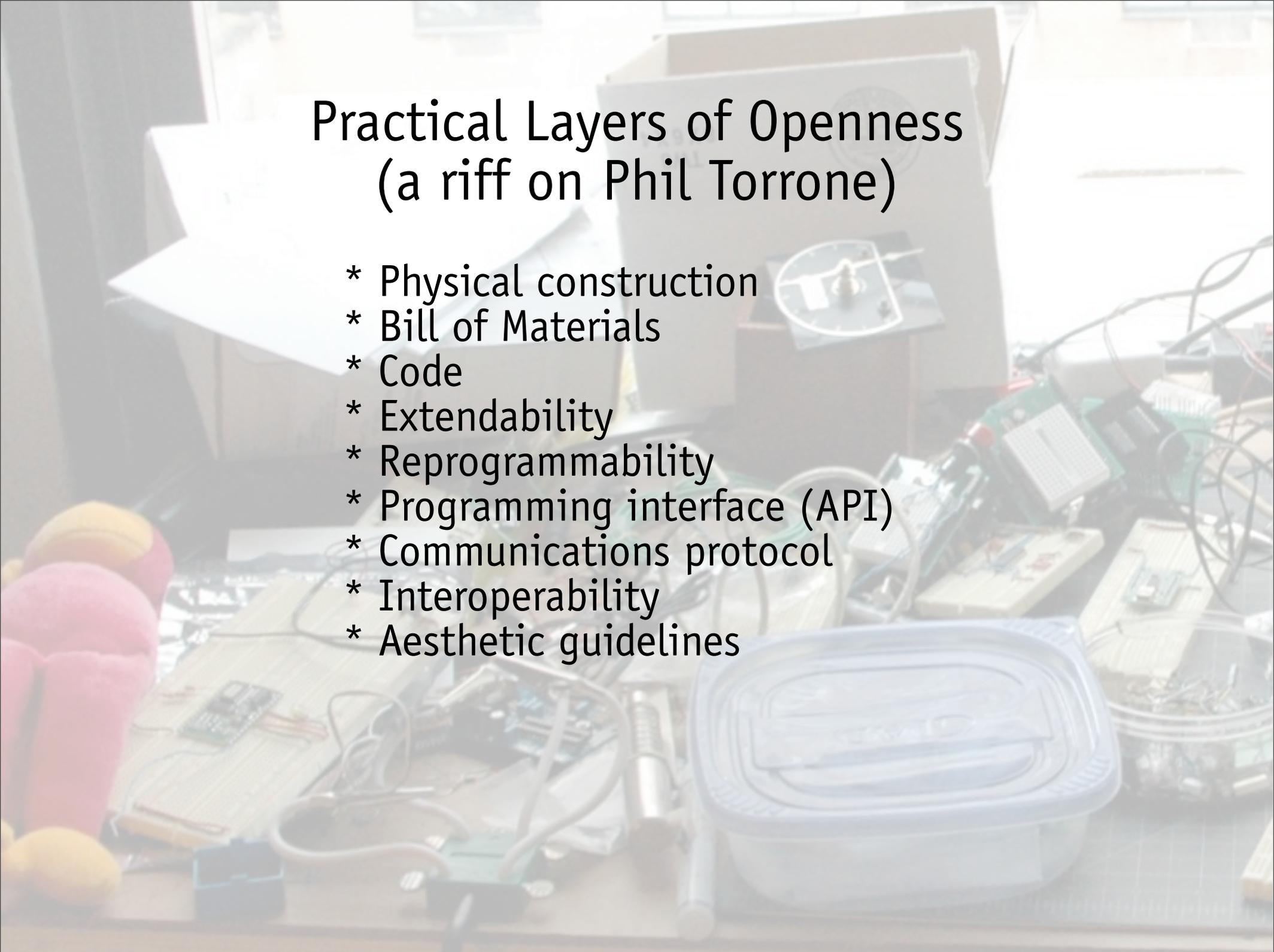
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- * Physical construction
- * Bill of Materials
- * Code
- * Extendability
- * Reprogrammability
- * Programming interface (API)
- * Communications protocol
- * Interoperability

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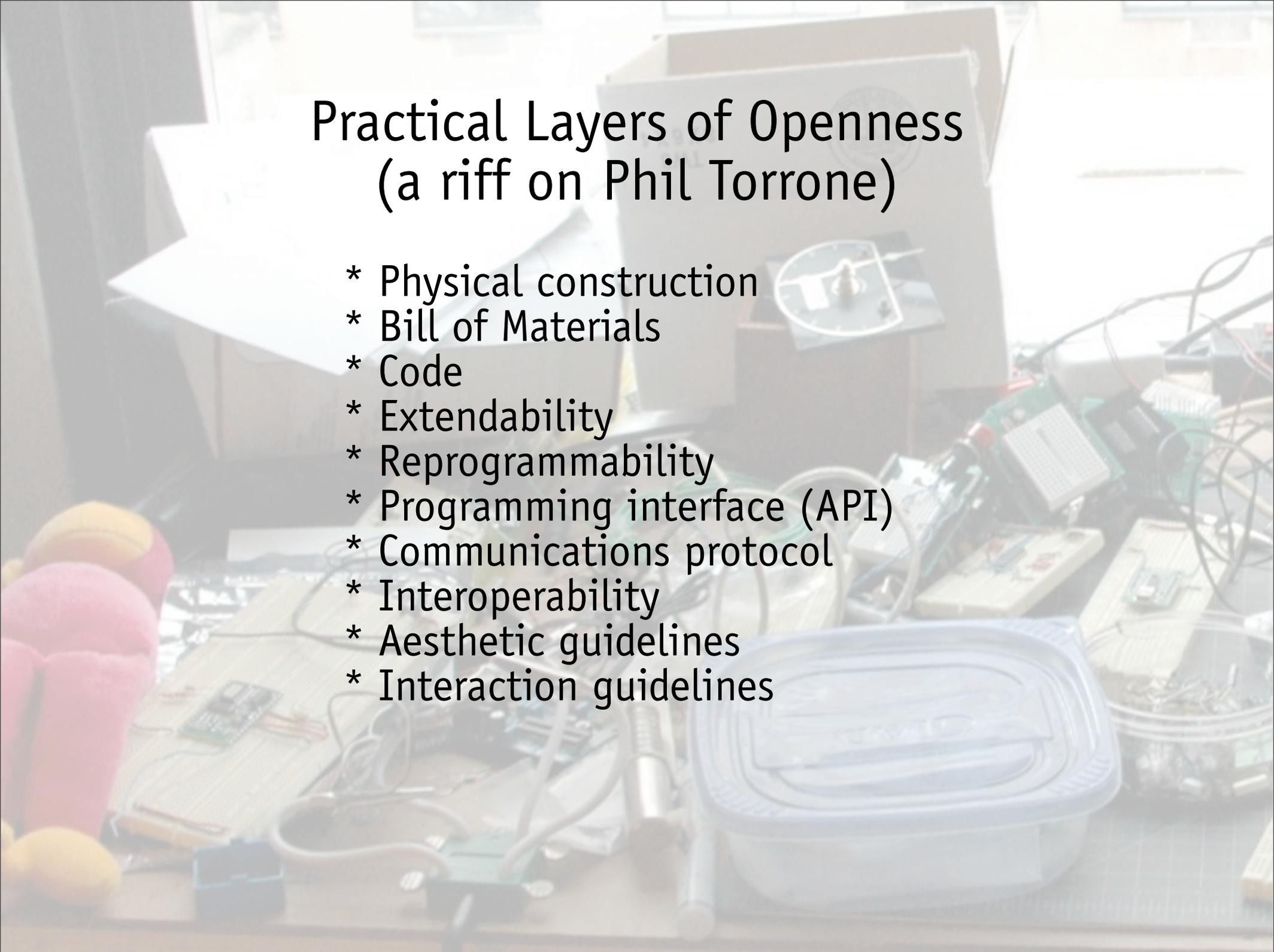
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- * Physical construction
- * Bill of Materials
- * Code
- * Extendability
- * Reprogrammability
- * Programming interface (API)
- * Communications protocol
- * Interoperability
- * Aesthetic guidelines

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- * Physical construction
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- * Communications protocol
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- * Interaction guidelines

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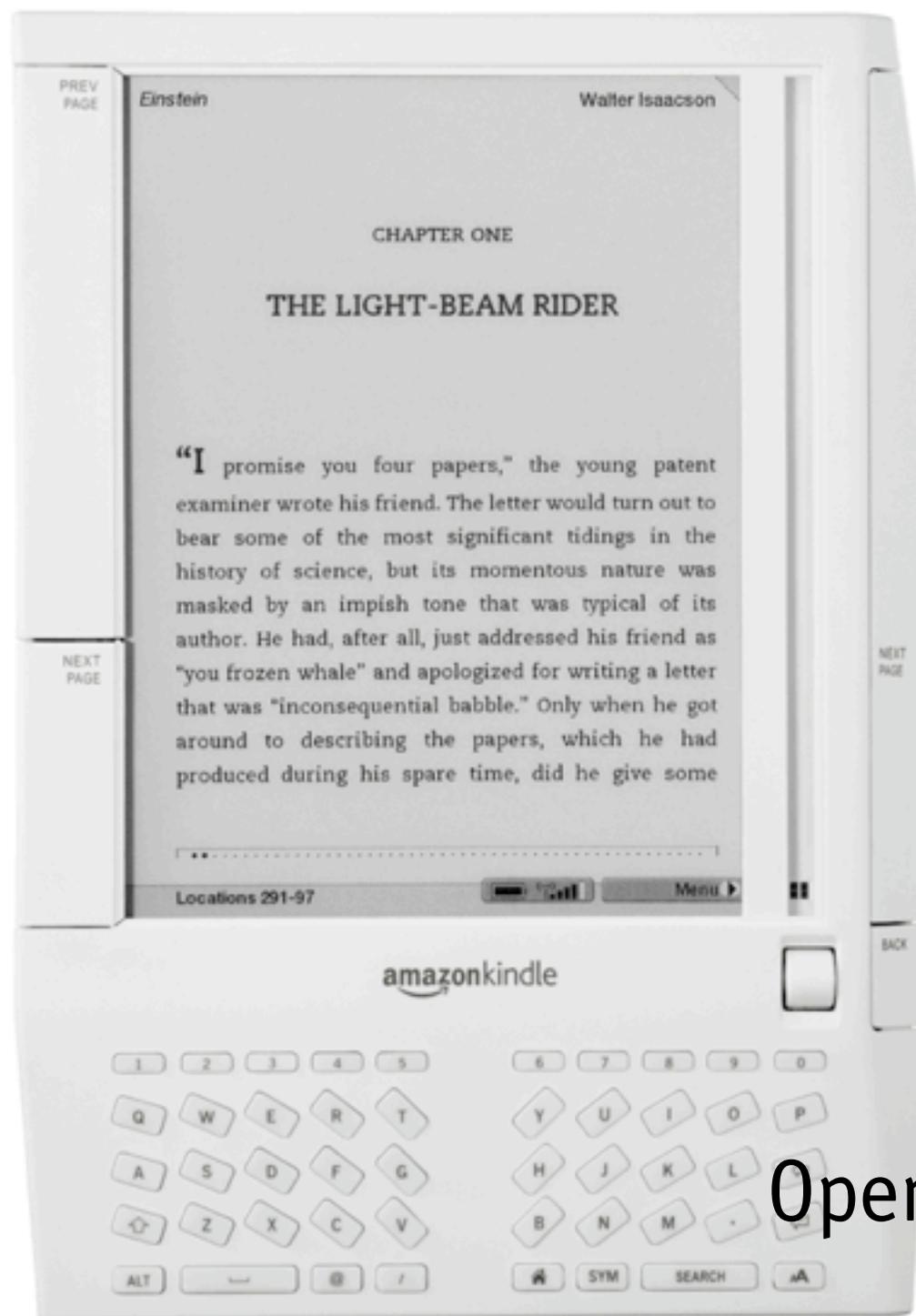
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- * Physical construction
- * Bill of Materials
- * Code
- * Extendability
- * Reprogrammability
- * Programming interface (API)
- * Communications protocol
- * Interoperability
- * Aesthetic guidelines
- * Interaction guidelines
- * Warranty

Wednesday, June 23, 2010

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Open control API

Wednesday, June 23, 2010

John Schimmel wants to hack the Kindle for physically disabled client, but he doesn't want to physically destroy it. How's he going about it? The Kindle is hackable. But it's missing an open API to the physical controls. There clearly is a set of functions in the firmware that responds to the controls. So why not expose that to the world, even if you keep the rest closed? For example:



Open control API

Wednesday, June 23, 2010

The iPod remote control API is exposed, so anything you can do from the buttons, you can do from a remote control. Good for business, because it makes more third party remotes, and good for John and his clients.



Standard (or accessible) Protocols

Wednesday, June 23, 2010

The Wiimote and Wii Nunchuk are great examples of this. Because it behaves like a Bluetooth HID device, it's possible to read and control it



Appliances with operating systems

Wednesday, June 23, 2010

We're entering a time when appliances have operating systems. It suggests new warranties. Rather than looking at device warranties, companies might want to look at laptop and PC warranties.



Extendable Firmwares

Wednesday, June 23, 2010

The Canon Hack Developers Kit is a good example.

Welcome to the CHDK Wiki
A wiki dedicated to the CHDK firmware add-on for Canon's *Digic II*,
Digic III and *Digic IV* cameras!

**Unleash the *POWER* in your
"PowerShot!"**

*We are currently supporting over 45 Canon Cameras and about 83 different
Firmware Versions in total!*

We are currently editing over 347 articles, and you can help!

If you have any questions that are not answered in the **FAQ** section, please visit
the **Forum** or visit us in **IRC**. New: Follow CHDK News on **TWITTER**.
Got a bug? Visit the **Bugtracker**.

If you feel the need to express your thanks and gratitude to all CHDK
contributors, please click here → **THANKS!**

 This wiki is under heavy **DEVELOPMENT**, and many
sections are out of date. If you find something wrong or want
to add information - go ahead and do it, after all - it's a wiki !

Extendable Firmwares

Wednesday, June 23, 2010

Extensible firmwares have interesting implications for warranties. For example:

Dear Cet Senol:

Thank you for your reply. After researching this software on the internet it appears that CHDK doesn't make any actual changes to your camera. If you delete the CHDK software from your memory card, or if you choose not to activate the CHDK software on the card (or remove and replace the batteries), then the camera will behave absolutely normally - nothing has been (or ever is) changed, so the warranty is not affected.

We hope this information is helpful to you. Please let us know if we can be of any further assistance with your A720 IS camera.

Thank you for choosing Canon.

Sincerely,

Joann
Technical Support Representative

Extendable Firmwares

Wednesday, June 23, 2010

So what we're talking about here is a world where small consumer electronic device warranties look more like personal computer warranties. These vary, however. Dell doesn't void your warranty if you put a new application on your machine, but they do if you put a new operating system on there. And if you actually replace the BIOS, forget about it. So there is a level of modification to computers that is within the scope of the warranty. Hopefully device warranties can benefit from this precedent. A few possible levels:

You Brick it, we'll restore it:

Company warrants to return your device to factory defaults by making **best efforts** to restore original firmware and functionality, subject to any mechanical or electrical damage due to modifications.

Flexible Warranties

Wednesday, June 23, 2010

The Firmware warranty, according to me. This isn't that far from the typical laptop warranty today, if you read them.

THE PEER TO PATENT PROJECT:
COMMUNITY PATENT REVIEW

PEER TO PATENT

About Community Patent	Press	Prototypes & Proposals	Participants	Community Patent Blog	Workshops & Events
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THE PEER TO PATENT PROJECT:
Community Patent Review

SKIP INTRO

Open Patents

Wednesday, June 23, 2010

There are two issues I see that need change with regard to patent: First, the review process, and second, what we do with them once we get them. With regard to the review process, there are some attempts at solutions to the problem. We need a CC for patents as well.



Take pride in
compatibility.

Wednesday, June 23, 2010

Finally, here's an ideal that'll make all our work easier to interoperate, and to take apart. Encourage your clients to do this.