Adaptive Products

Designing for evolution through use

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User-centered design is **not** future proof.

User-centered design uses an upfront focus on the user to make products that are useful, usable, and desirable, but it’s not enough.

Needs and situations always change.

Too often designers focus only on the present, forgetting that the context they’re designing for will change. Products can become obsolete or worse still create undesirable consequences that were never intended.

Adaptive Products

That’s why products need to be adaptable, to allow for future change. In my research I found that the richest examples of adaptive design....

Adaptive Architecture

come from architecture.

“Form follows function.”

—Louis Sullivan

Let’s go back for a moment to the architect Louis Sullivan who gave designers the guiding maxim: “form follows function”. This phrase has served us well, but offers little insight into the social nature of form.

“We shape our buildings, and afterwards they shape us.”

—Winston Churchill

Here’s a quote about architecture from Winston Churchill, “We shape our buildings, and afterwards they shape us.” He’s referring to the effect that the House of Commons had on how Parliament members interacted with each other. But this isn’t the whole story either.

“First we shape our buildings, then they shape us, then we shape them again—ad infinitum. Function reforms form, perpetually.”

—Stewart Brand

Stewart Brand, author of How Buildings Learn, expands on Churchill’s idea to note that we shape our buildings, then they shape us, then we shape them again. This notion of cyclical influence and change applies not only to buildings, but can relate to products as well.

Product

Understand what is changing.

I am interested in how products can evolve through use and I investigate this idea by exploring three concepts that relate to it: Product, to understand what is changing.

Product

Understand what is changing.

Autonomy

Appreciate people’s individual and collective involvement.

Autonomy, to appreciate people’s individual and collective involvement in the process.

Product

Understand what is changing.

Autonomy

Appreciate people's individual and collective involvement.

Adaptation

Learn how designers can enable and encourage evolution.

Adaptation, to learn how designers can encourage and enable evolution.

Product?

So, what is a product?

What is a product?

physical

discrete

mass produced

A traditional definition of a product would include words like physical, discrete, and mass produced. But today these requirements are no longer requires. Changes include:

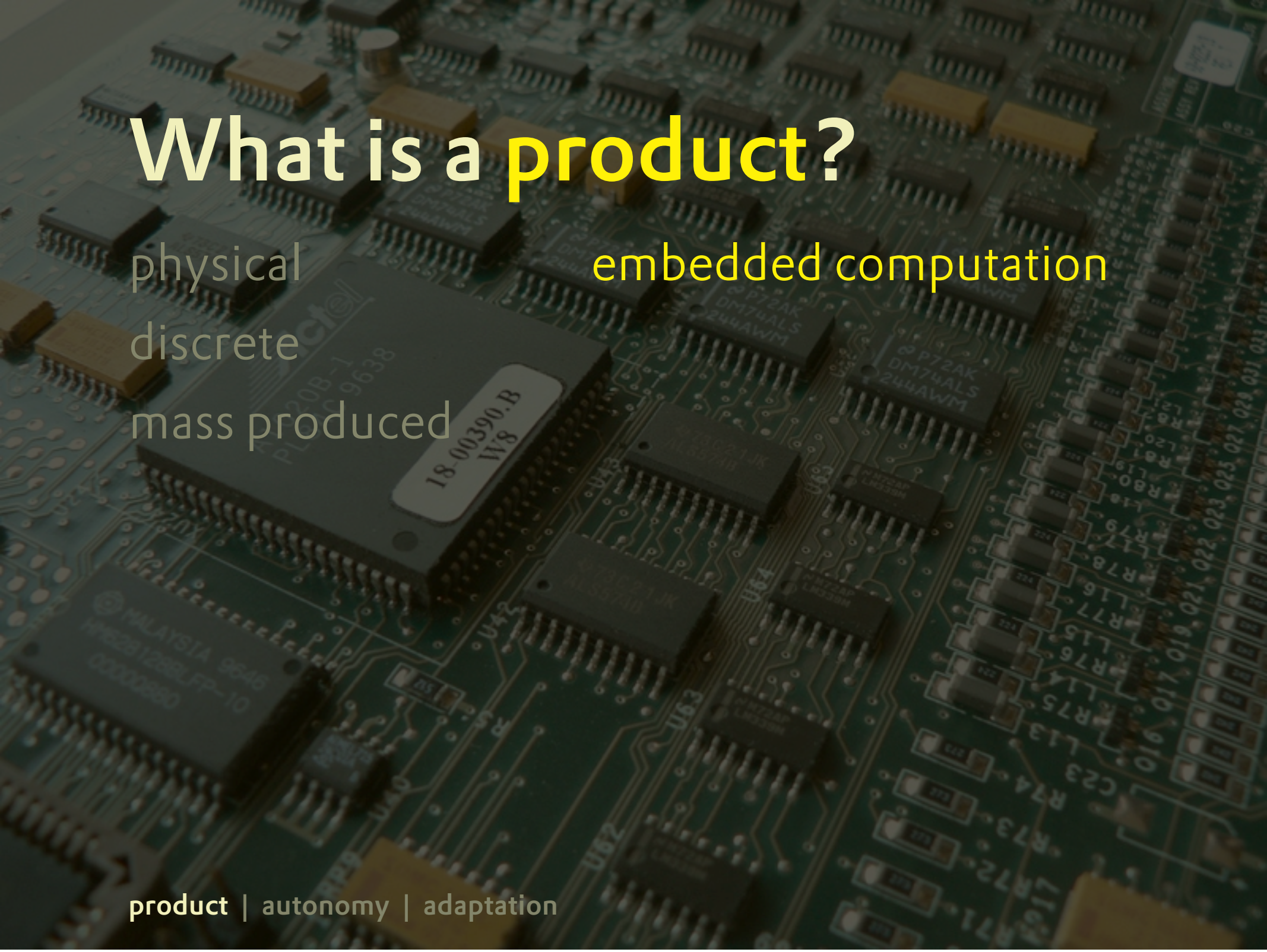
What is a **product**?

physical

discrete

mass produced

embedded computation



Embedded computation: the functional possibilities are decoupled from physical form.

What is a product?

physical

discrete

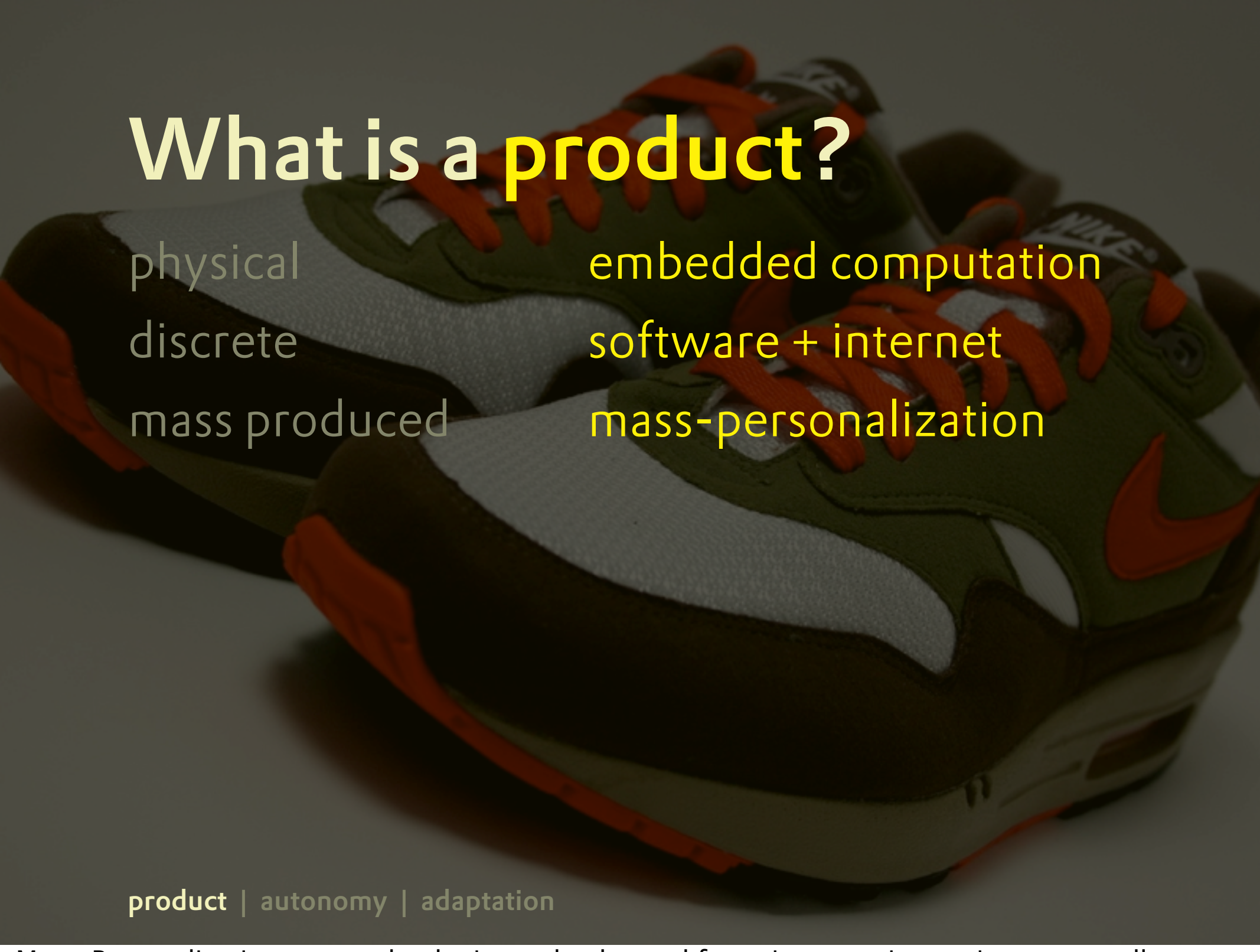
mass produced

embedded computation

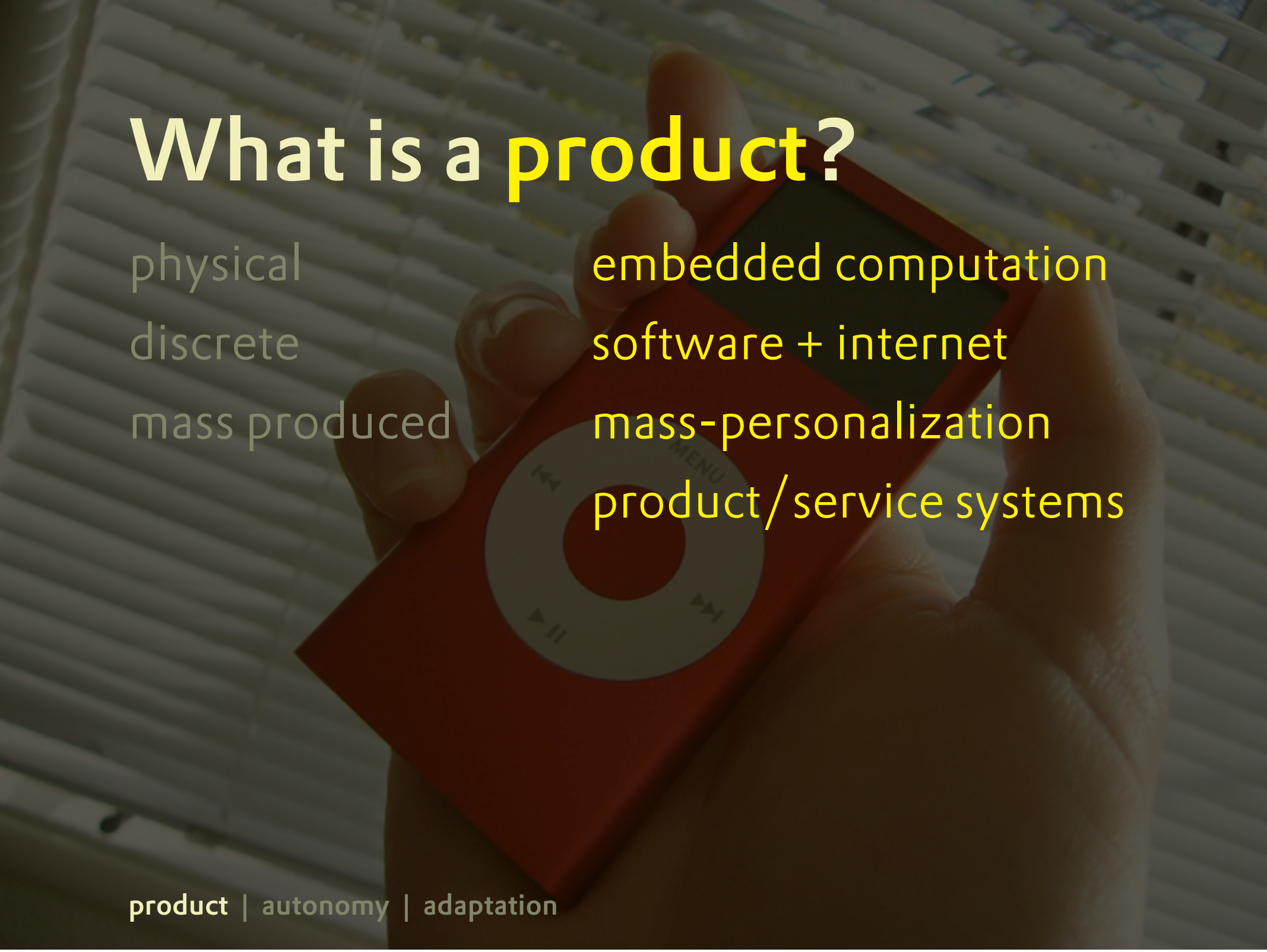
software + internet

product | autonomy | adaptation

Software + Internet: where products can be modified and updated constantly.



Mass-Personalization: new technologies and a demand for uniqueness is creating ever smaller market segments.



and increasingly products are really components in a larger product-service system.

So, what is a product?

product | autonomy | adaptation

So, what is a product? Is it defined by physical or virtual form? Our personalization of those forms? Or it is all about use, about the interactions and experiences that people have through it.

Building.

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Going back to architecture, the world “building” refers to the action of the verb BUILD and that which is built. We don’t have such an elegant combination of meanings in the definition of “product” but we can say that use form and irrevocably combined.

People & Products

Regardless of the how a product is defined, as designers we’re interested in the relationships that people have with them.

Products change people's behavior.

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You may have noticed that using a new product changes the way you do things, not only the functional capabilities but the other things that happen because of it.

Cell phones are a good example. They change how you communicate with somehow, when you talk, and how much attention you give them.

“What humans do is in many cases **co-shaped** by the things they use.”

—Bruno Latour

Sociologist Bruno Latour has pointed out that “what humans do is in many cases co-shaped by the things they use.” The cell phone isn’t forcing me to make those changes, but it is influencing me.

Products have **scripts** that prescribe particular **actions**.

He calls this influence the “script” of a product, and like the script for a play it prescribes particular actions for the people who use it.

product | **autonomy** | adaptation

He gives the example of a bulky key ring at a hotel. The heavy attachment to the ring influences people to return it to the front desk instead of taking it with them. The hotel manager could remind guests verbally, or make a sign that asks them to return the key, but this request is instead delegated to the key ring itself – it's script make sure that guests return it because it's simply too inconvenient not to.

Products transform how the world is perceived.

product | autonomy | adaptation

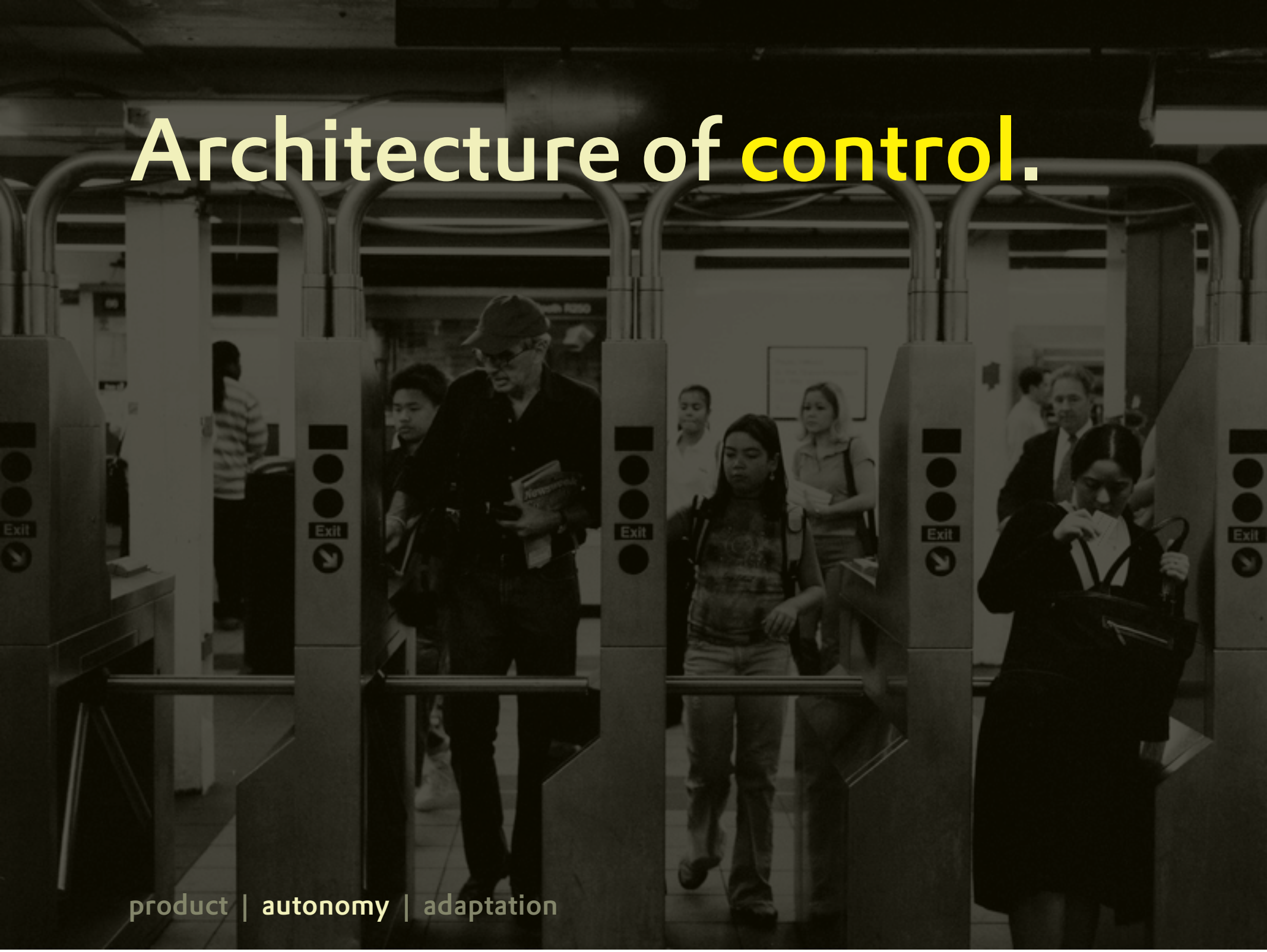
Products not only influence the actions of people, they can also transform the way the world is perceived. Consider a thermometer that converts direct experience of temperature into an abstract value, or an MRI machine that gives us new ways of seeing the body.

“Mediating technologies **amplify** specific aspects of reality while **reducing** other aspects.”

—Don Ihde

Philosopher Don Ihde talks about this in terms of amplification and reduction, that “mediating technologies amplify specific aspects of reality while reducing other aspects.”

Architecture of control.



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These mediating influences of products are not natural occurrences, they are inscribed by designers. There is an architecture of control built into product influences, delegated from designer to user.

Designers “materialize morality.”

—Peter-Paul Verbeek

product | **autonomy** | adaptation

Philosopher Peter-Paul Verbeek believes that designers “materialize morality” in products, and should be held accountable for their influences. This is a challenging ethical position because products can be used in multiple ways, by unexpected people, and cause unforeseen influences.

Multistability is the concept that products can have multiple stable states – multiple identities depending on use and audience. This may be seen as a cause of the ethical problem, but it might also point to a solution.

Allow people to to edit a product's script.

product | autonomy | adaptation

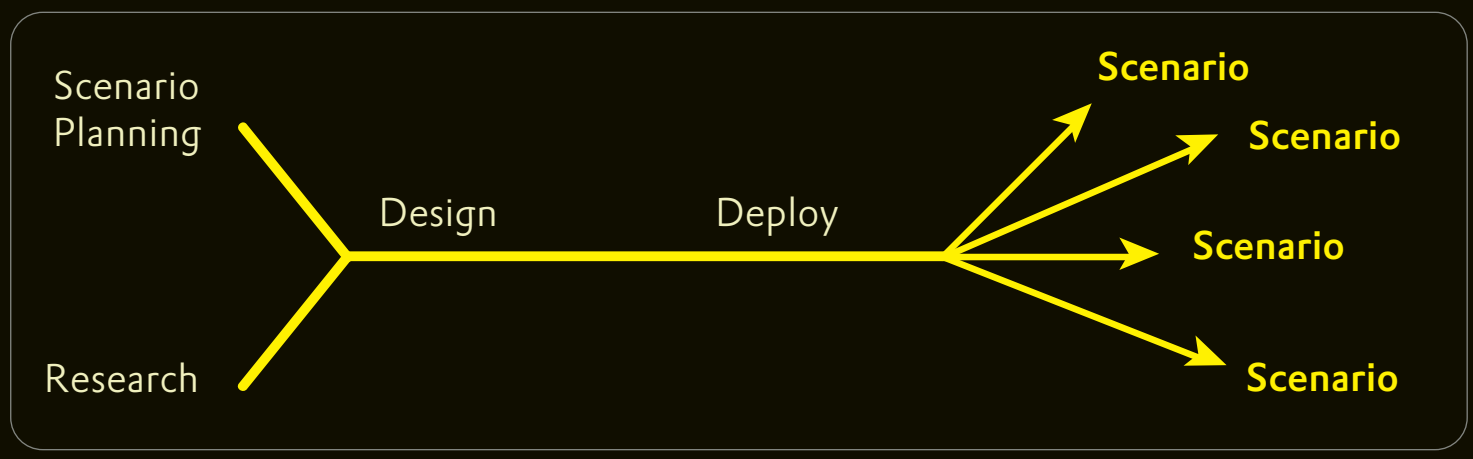
Typically designers try to anticipate and control how a product is used. What if they actually encouraged multistability? By allowing people to edit or rewrite a product's script designers can give them more autonomy over how a it mediates their actions and perceptions in the world.

Designing for adaptation.

How can designers give people the freedom to adapt products as need.

Scenario Planning

VS.



product | autonomy | **adaptation**

One tool is scenario planning. Designers use scenarios all the time to demonstrate products features, but usually in an idealistic way. Instead, scenario planning asks “what if” at various points in an imaginary future. The product is treated as a strategy rather than a plan.

Layers of change

slow

Site

Structure

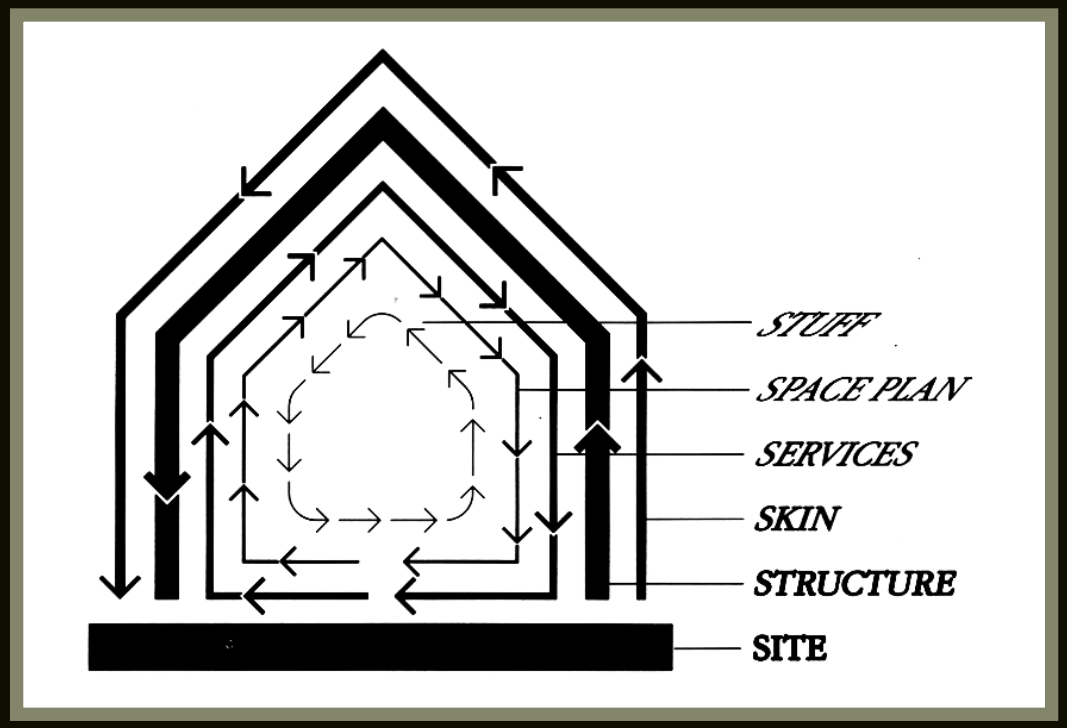
Skin

Services

Space Plan

fast

Stuff



product | autonomy | **adaptation**

Along with an evolutionary strategy the product itself must be flexible enough to allow for adaptation, yet formed enough to work “out of the box.” Stewart Brand has considered this and created the “layers of change” a way of looking at buildings, or in our case products, where different components change at different speeds without losing a cohesive whole.

Here are Brand’s layers of change, from slowest to fastest: site, structure, services, skin, space plan stuff. His list of layers originally applied to architecture but let’s see how they can map to a product.

Layers of change (iPod/iTunes)

slow	Site	Computer integration, URL
	Structure	Docking port, headphone jack, scroll wheel
	Skin	Color, materials, headphones, GUI
	Services	Cabling, song formats, software architecture
	Space Plan	Menus, song information, display windows
fast	Stuff	Music, photos, videos

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Take for example the iPod/iTunes product-service system:

Site: Computer integration, URL
Structure: Docking port, headphone jack, scroll wheel
Skin: Color, materials, headphones, GUI
Services: Cabling, song formats, software architecture
Space Plan: Navigational menus, song information, display windows
Stuff: Music, photos, videos

This simple analysis shows that most products can be broken down into slower or faster layers – but it that alone doesn't make it adaptable.

Slippage between layers.

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The slower layers tend to constrain the faster ones, so there needs to be slippage between them. They need to be modular, so the faster ones can evolve without tearing apart the slower ones.

This slippage happens at the “seams” between layers. These seams need to be visible so users know how they fit together. Also, good documentation of how layers fit together is invaluable.

Adaptation moves products from conventional to personal.

Adaptation tends to moves products from conventional to the personal because people make changes that are important or personally beneficial to them.

Sticky Information: people know what they need, but it's hard for others to find that out.

product | autonomy | **adaptation**

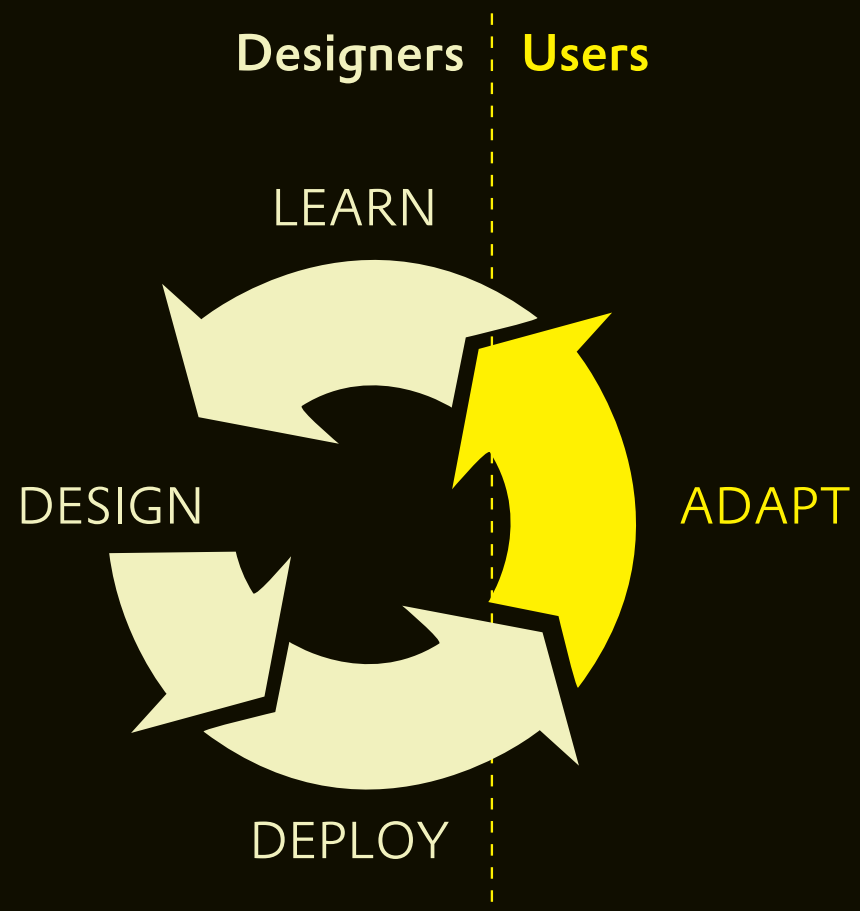
Because people adapt products "scratch their own itch" they possess what MIT economist Eric Von Hipple calls "sticky information". Meaning, they know what they need, but it's hard for others to find that out.

"As information about what users want and need to do becomes more fine-grained . . . the incentives grow to shift the locus of innovation closer to them by **empowering** them."

—Eric Von Hipple

He notes that "as information about what users want and need to do becomes more fine-grained . . . the incentives grow to shift the locus of innovation closer to them by empowering them."

Learning from users.



product | autonomy | **adaptation**

Adaptive products don’t rely on knowing all possible needs ahead of time. Designers can empower people to adapt products and then learn from their changes to further evolve the “official” version of the product.

User communities.

product | autonomy | **adaptation**

One way to do this is by engaging with user communities where people share their adaptations and solution techniques. Designing adaptive products is a start, but an open business model that encourages user communities is what helps companies reap the benefits of user-led adaptation.

Useful, usable, desirable,
today & tomorrow.

To conclude, design must look beyond creating products that are useful, usable, and desirable for today and consider how these qualities can be maintained long term. To do this, designers are still needed, but their role does shift, from inscribing only a particular use to facilitating many; from acting as delegators to being enablers.

Thank you.

Adaptive Products: Designing for evolution through use

http://www.currentform.com/thesis.pdf

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