

Das Internet der Dinge

Till Hänisch, DHBW-Heidenheim

Agenda

- Was ist das Internet of Things
- Trend, Hype, Bubble ?
- Was damit anfangen ?

Internet of Things

Things talk

Things talk

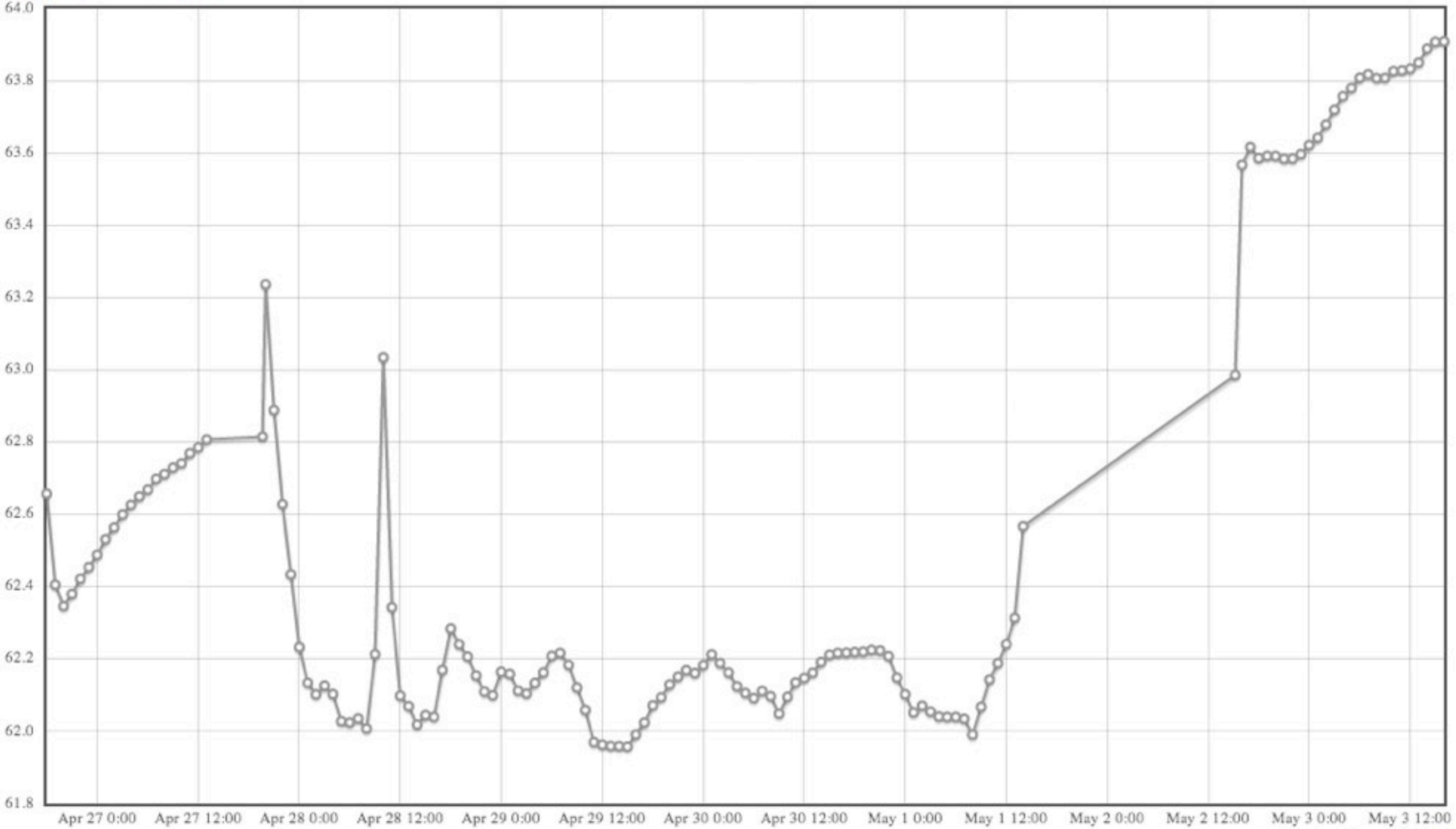
to the Internet

Things act

via the Internet

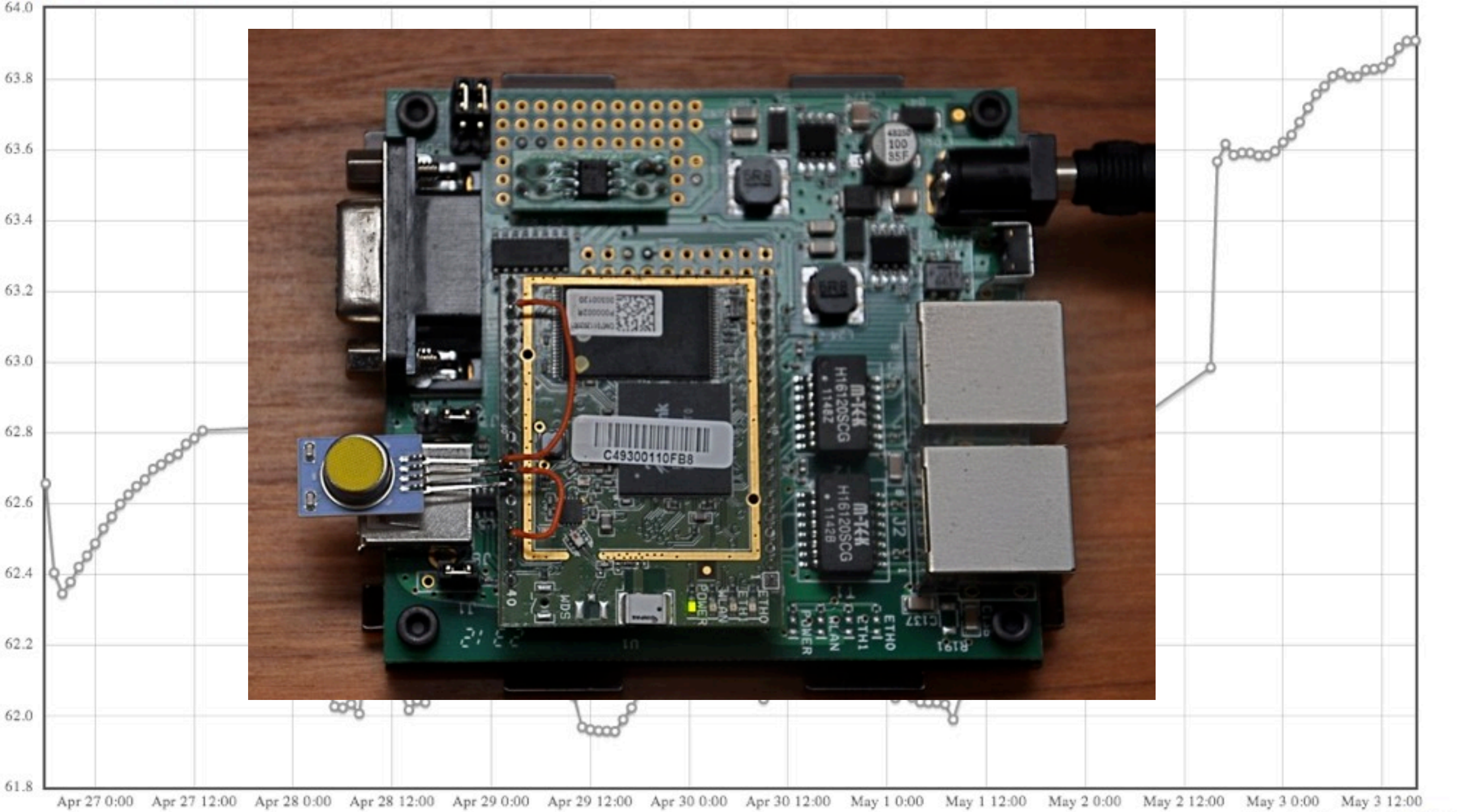


Humidity last week



idea and code partially by fitbit-plot

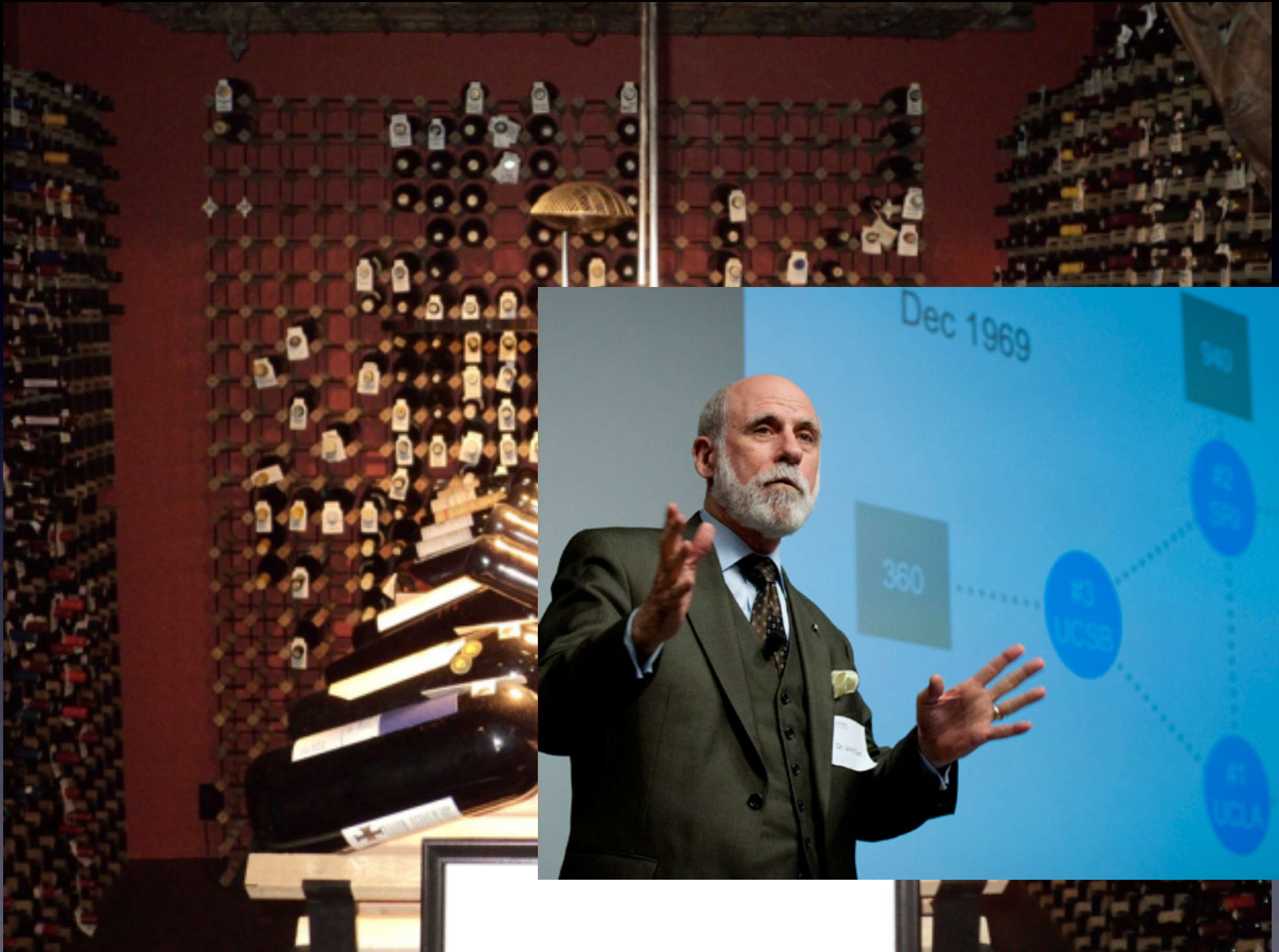
Humidity last week



idea and code partially by fitbit-plot



http://www.cnet.com/2300-33506_1-10010505-3.html, http://news.stanford.edu/news/2011/february/images/cerf_news.jpg



http://www.cnet.com/2300-33506_1-10010505-3.html, http://news.stanford.edu/news/2011/february/images/cerf_news.jpg

Begriffe: Verwirrung

Internet of things

Integrated Industry

Industrial Internet

Smart Factory

Mobile Computing

Industrie 4.0

Physical Computing

Ubiquitous Computing

Pervasive Computing

RFID

RFIE

Smart Home

RFID 2.0

Quantified Self

Smart Grid

Smart Car

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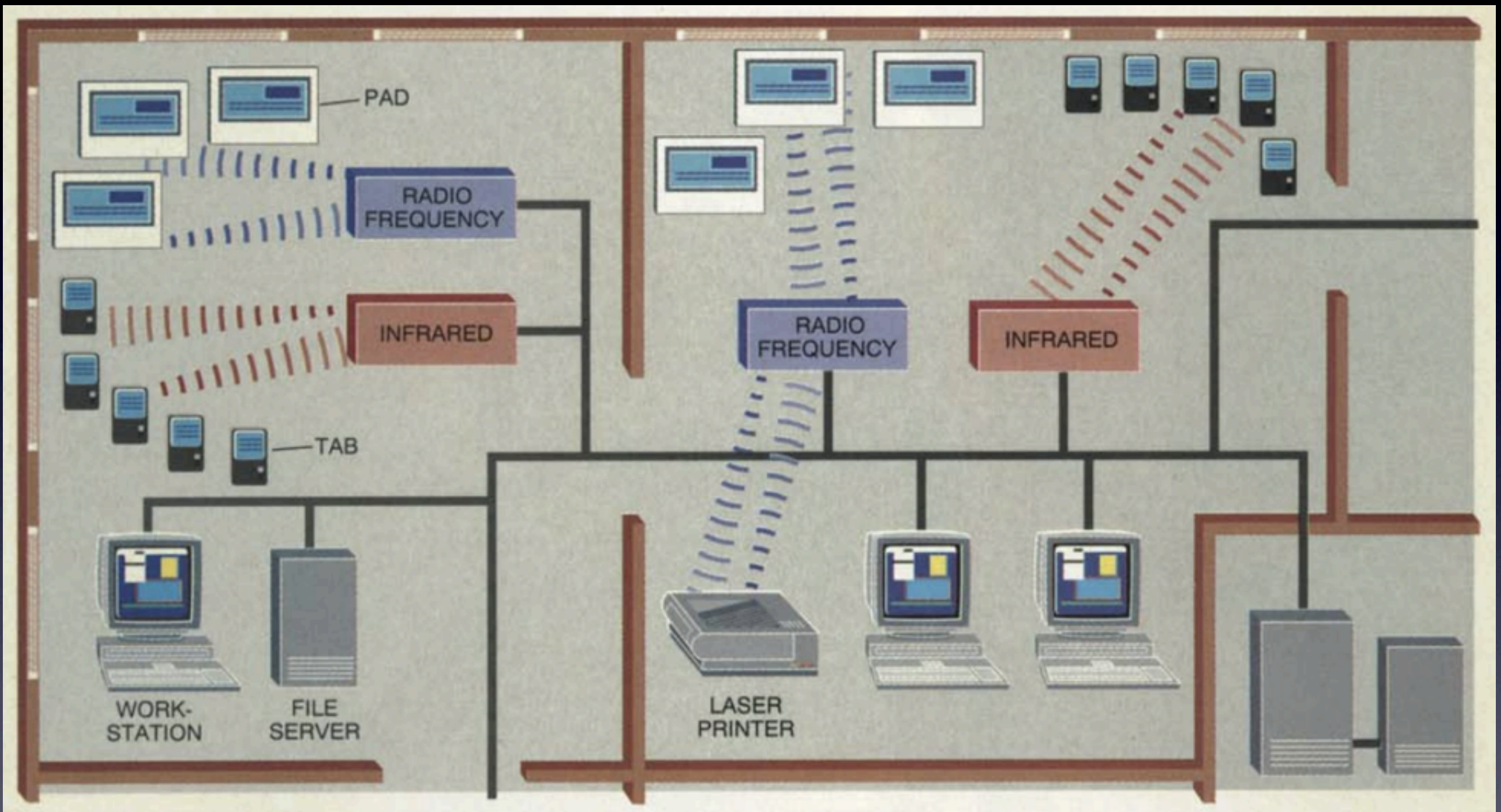
RFID 2.0

Quantified Self

Smart Grid

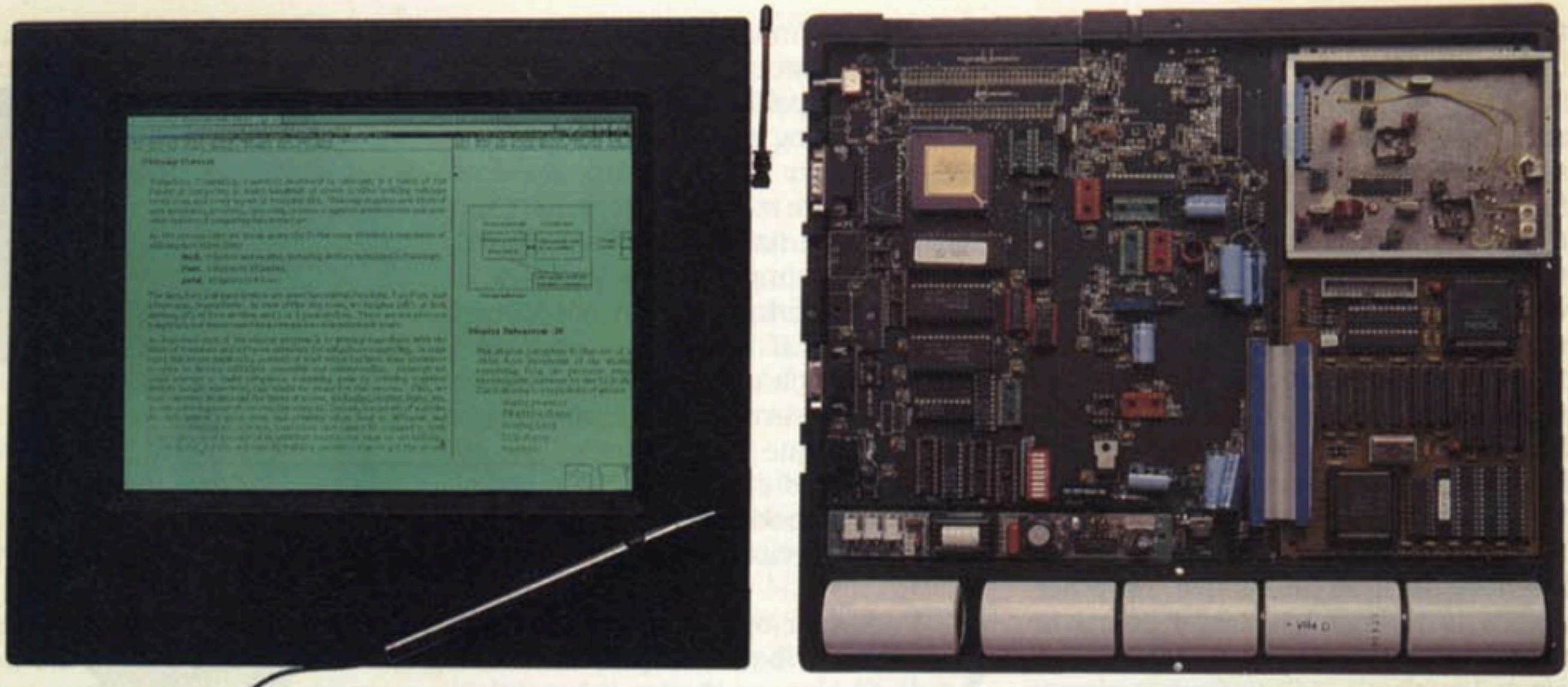
Smart Car

Architektur



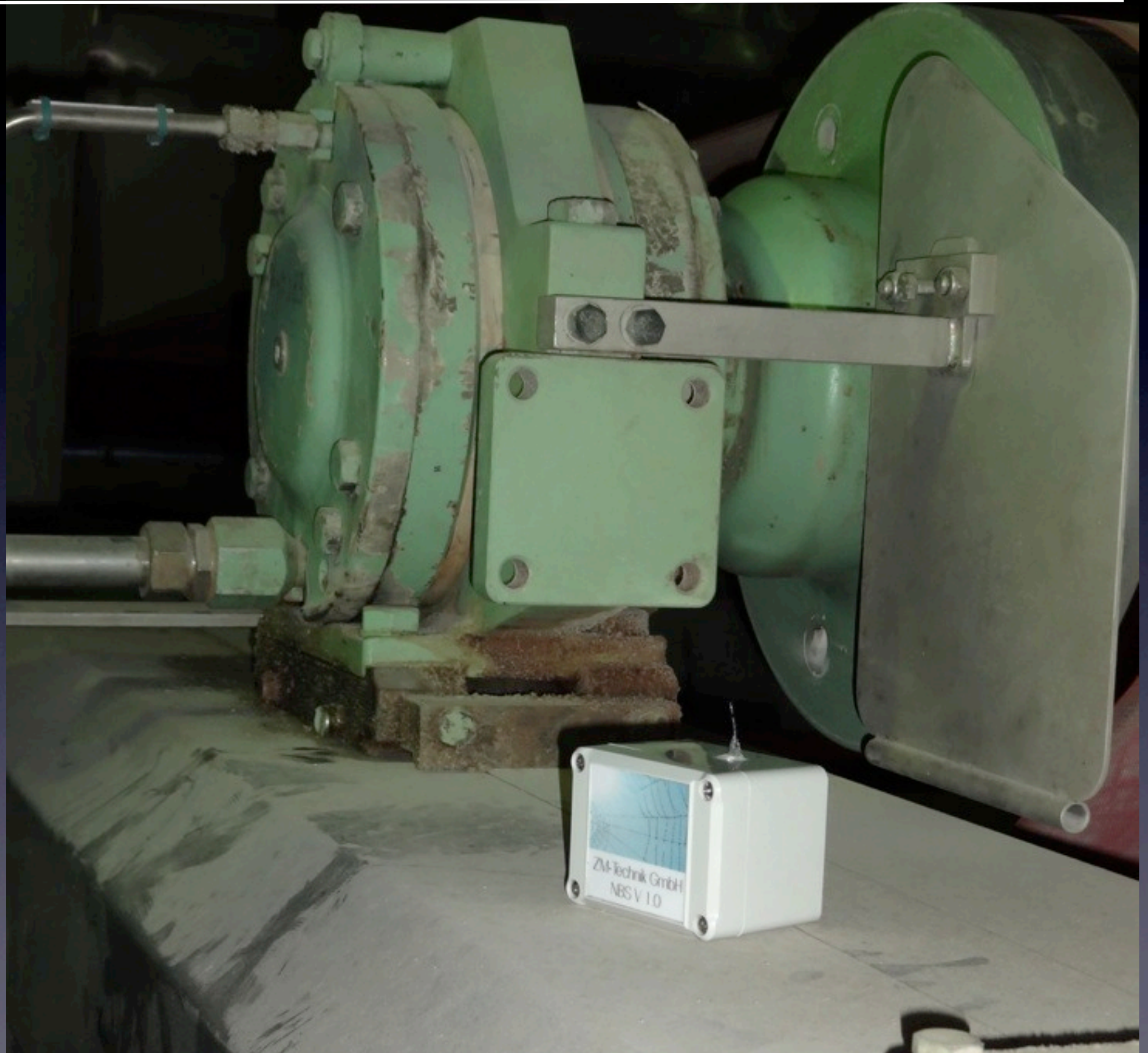
Mark Weiser, The Computer for the 21 Century, Scientific American, September 1991, p 102ff.

Ubiquitous computing: Tablets



Mark Weiser, The Computer for the 21 Century, Scientific American, September 1991, p 102ff.

Sensornetze: Big Data



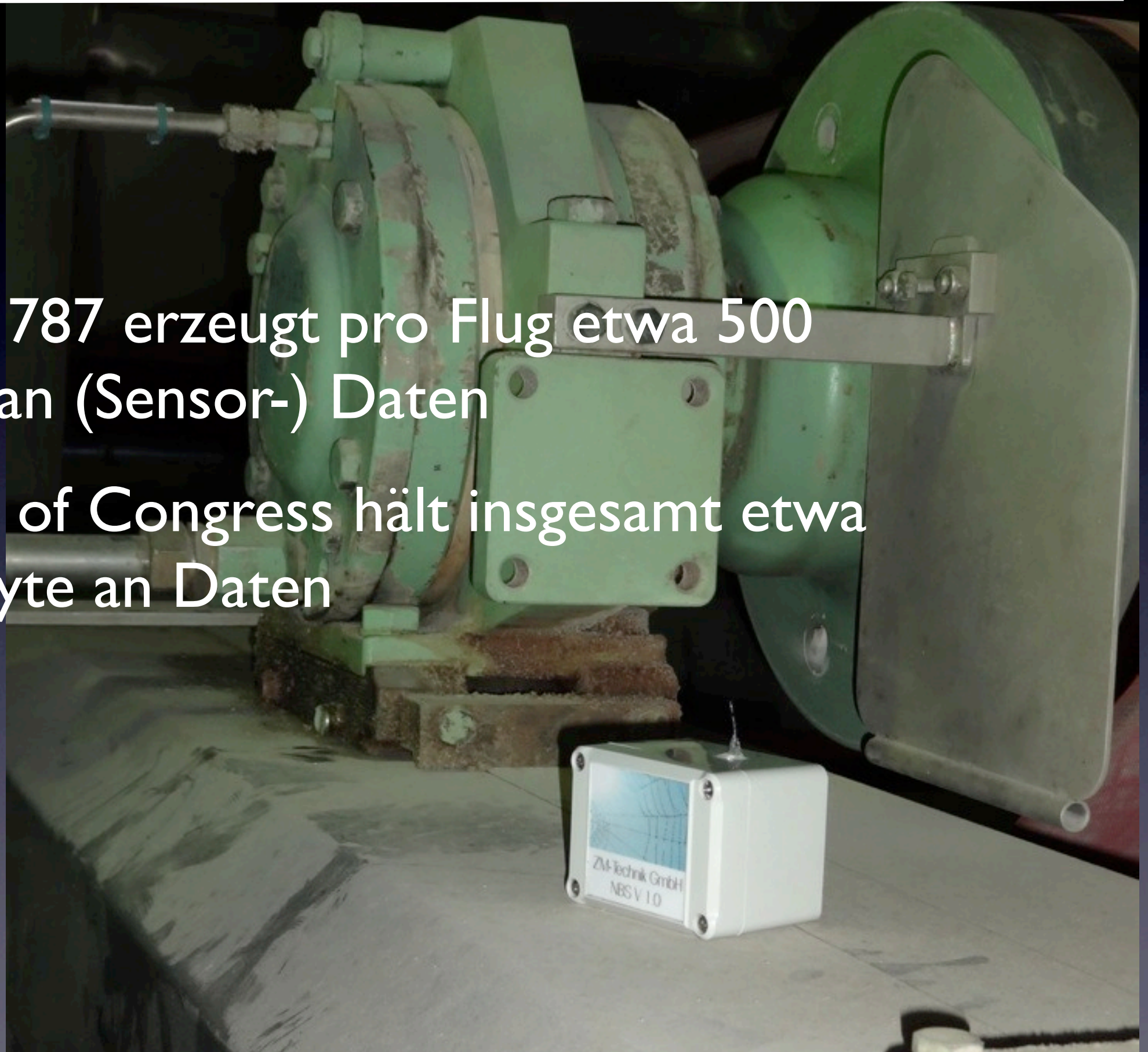
Sensornetze: Big Data

- Boeing 787 erzeugt pro Flug etwa 500 GByte an (Sensor-) Daten



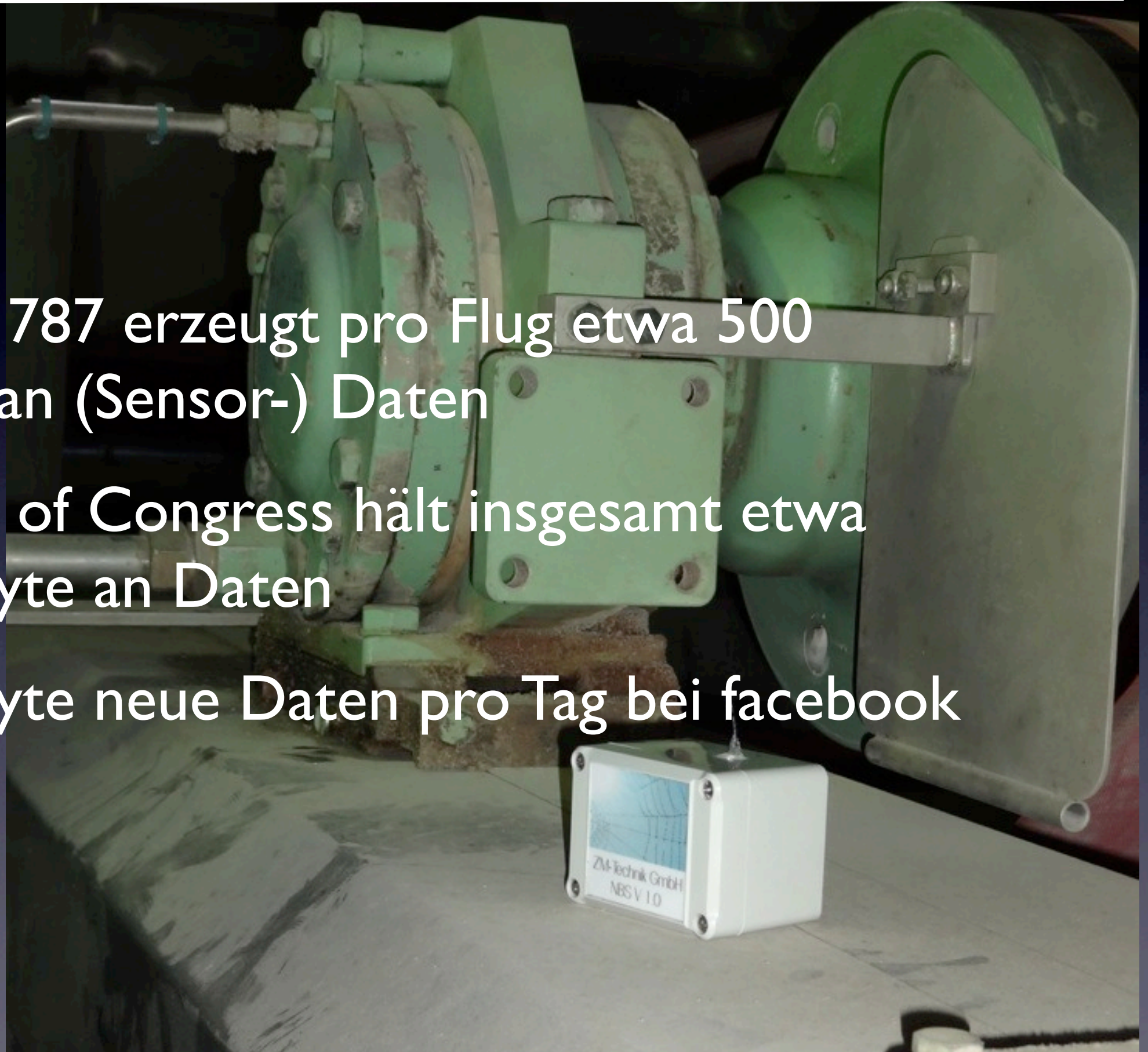
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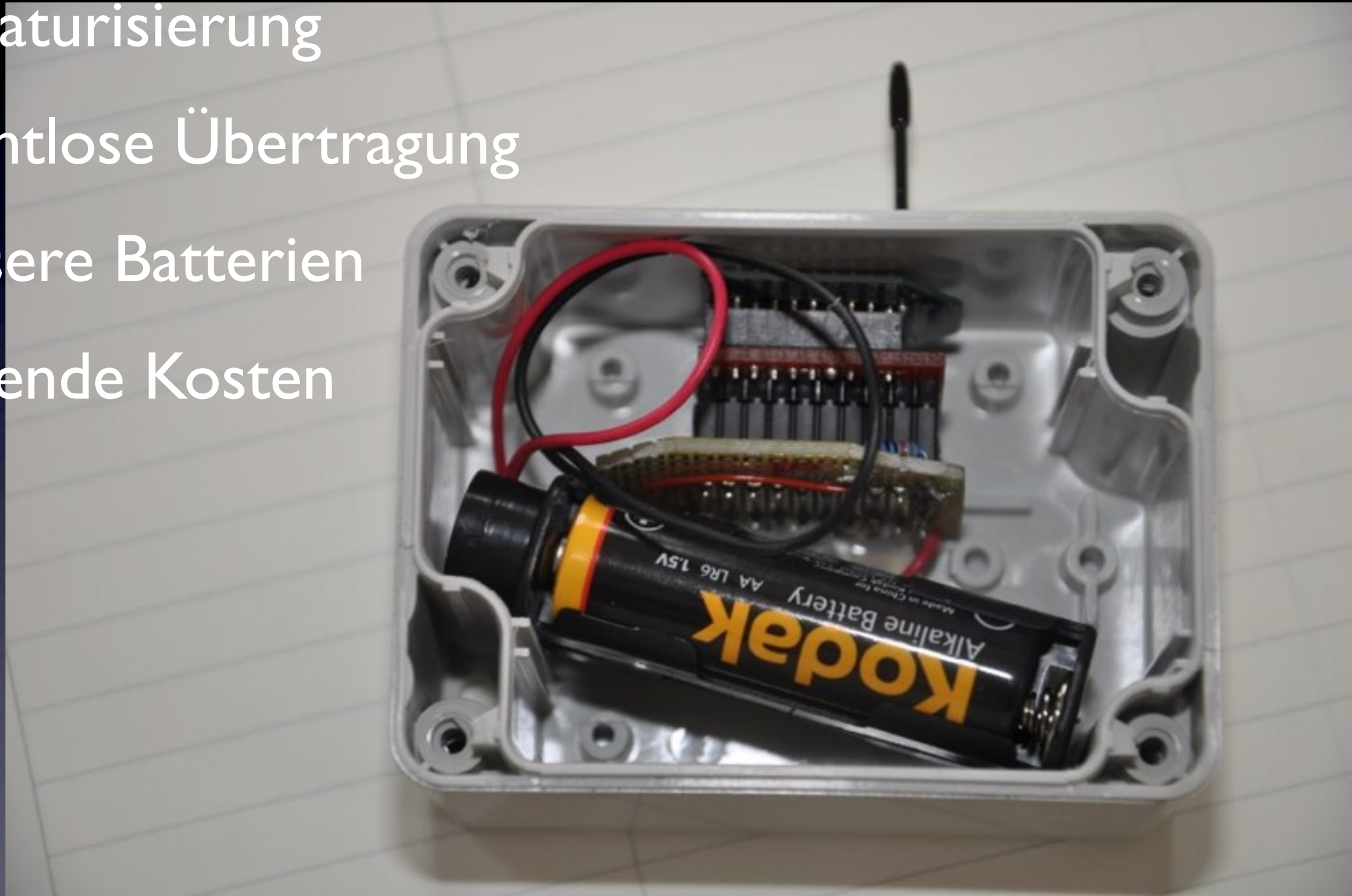
Sensornetze: Big Data

- Boeing 787 erzeugt pro Flug etwa 500 GByte an (Sensor-) Daten
- Library of Congress hält insgesamt etwa 250 TByte an Daten
- 100 TByte neue Daten pro Tag bei facebook



Sensornetze: Warum jetzt ?

- Miniaturisierung
- Drahtlose Übertragung
- Bessere Batterien
- Sinkende Kosten



So far so good ...

Internet of things =

Riesige Mengen von Daten werden nicht mehr manuell, sondern automatisiert durch Sensoren aller Art ins Web gespeist.

So far so good ...

Internet of things =

Riesige Mengen von Daten werden nicht mehr manuell, sondern automatisiert durch Sensoren aller Art ins Web gespeist.

Innovation ?

Trend ?

Hype ?

Bubble ?

Eine kurze Geschichte des Internets

Mailboxes, Usenet: Die Anfänge

```
L      LLLLLL  LLLLLL L      L      L      LLLLL  LLLL  LLLLLL
L      L      L      L LL  L      L L  L      L      L      L      L
L      LLL     L      L L L  L      LLLLLL  LLLL  L      L      L
L      L      L      L L L  L      L      L      L      L      L      L
LLLLLL  LLLLLL  LLLLLL L      LL L      LL      L      LLLL  LLLLLL
```

ELECTRONIC NEWS

November 15, 1992

Volume 2 : Number 11

WORDS ON WORKS ISSUE

Contents:

<<<<< WORDS ON WORKS >>>>>

About Words on Works: Judy Malloy
PALM-SIZE PLASTIC CASE SERIES: Joe Rosen
DEUS EX MACHINA/CLOSET OF ANGELS: Deborah Whitman
PORTRAITS OF PEOPLE LIVING WITH AIDS: Hazen Reed
QUIBBLING, A HYPERFICTION: Carolyn Guyer
THE WORD THE PLAY: Jim Rosenberg

<<<<< PROGRAMS AND PRODUCTS >>>>>

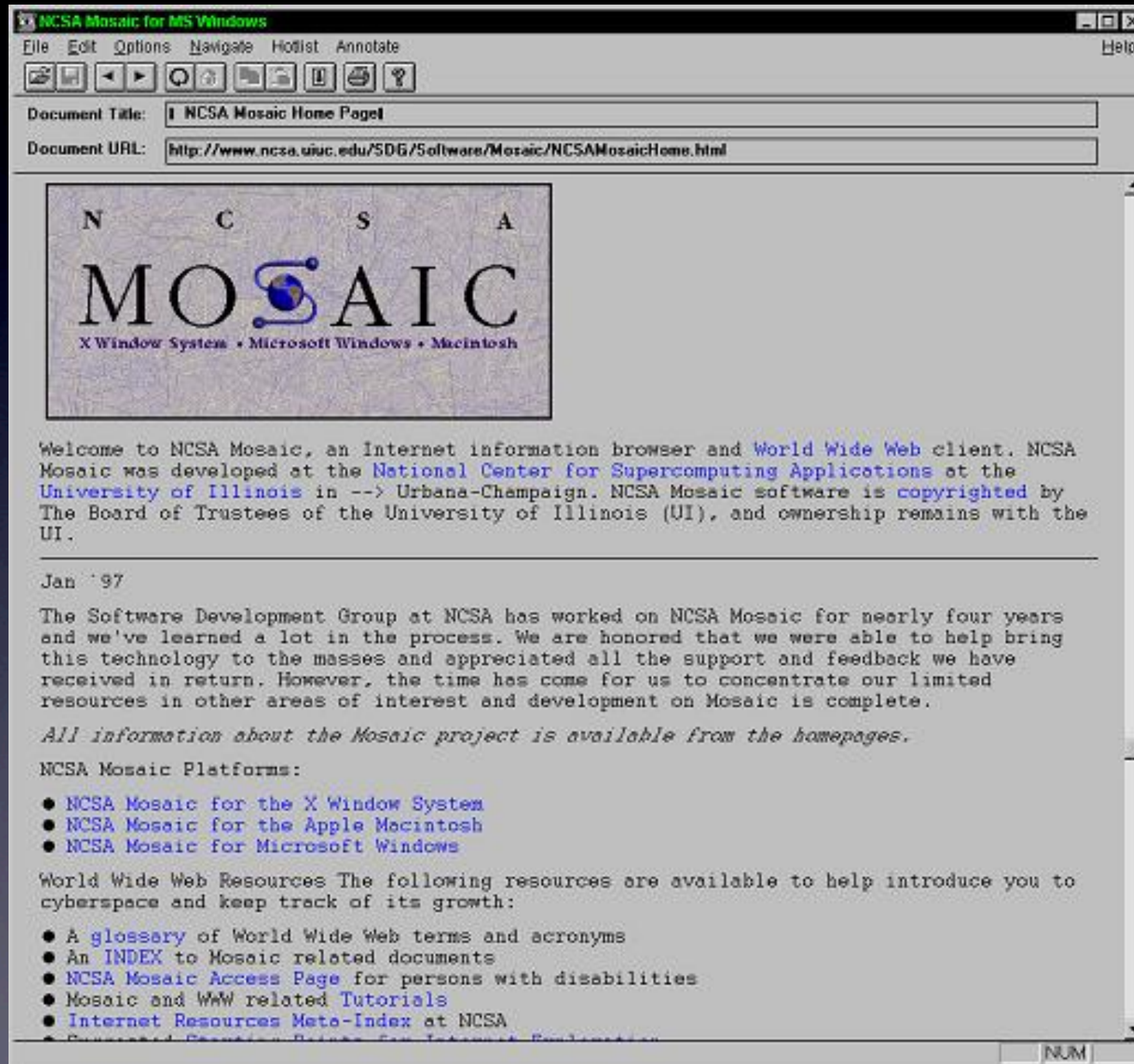
Hypertext/Hypermedia at MLA: Terence Harpold
Ryosuke Cohen's BRAIN CELL: Judy Malloy

<<<<< FAST and LEONARDO JOURNAL INFORMATION >>>>>

FAST Updates: Annie Lewis
FAST Calendar: Annie Lewis

<http://www.well.com/~couey/images/leonardo.gif>

Das WWW



Das WWW

Amazon.com: Online Shopping for Electronics, Apparel, Computers, Books, DVDs & more

http://www.amazon.com/gp/homepage.html/104-3141628-0961534

Amazon.com: Online Shopp...

amazon.com | Till's Store | See All 34 Product Categories | Your Account | Cart | Your Lists | Help

Gift Certificates | International | New Releases | Top Sellers | Today's Deals | Sell Your Stuff

Search Amazon.com | Find Gifts | Web Search

Hello, Till Haenisch. We have [recommendations](#) for you. (If you're not Till Haenisch, [click here](#).)

Browse

- Books, Music & Movies
 - Books
 - DVD
 - Magazines & Newspapers
 - Music
 - Textbooks
 - VHS
- Clothing & Accessories
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 - Shoes
- Computer & Office
 - Computers
 - Office Products
 - Software
- Consumer Electronics
 - Audio & Video
 - Camera & Photo
 - Cell Phones & Service
 - Computer & Video Games
 - All Consumer Electronics

Around the DVD Store

-  **52% off**
[The Hot List: New DVDs as Low as \\$15.98](#)
-  **47% off**
[Hot Future DVD Releases](#)
-  **12% off**
[DVD Editors' June Picks](#)

Kickin' It with Calvin and Hobbes

 **34% off**

Treat yourself to a break this summer with the [The Complete Calvin and Hobbes](#). You'll get hours of laugh-out-loud fun from this three-volume hardcover set that comes with its own sturdy slipcase and includes all the Calvin and Hobbes cartoons that have ever been syndicated.

Save on World of Warcraft

How on Earth could we offer games so cheaply? Are we crazy? Are we trying to undermine the value of the U.S. dollar? Whatever the reason

Sylvania DOT-it Lights

Where do you need light? Get the [bright, white LED light](#) that sticks practically anywhere.

Extra Savings on Power and Lawn Tools

Save an **Extra 10%** Through July 4, get an [extra 10%](#) on your total purchase of [power tools](#) and [lawn care products](#) from [Amazon.com Tools](#). [See details](#).

[More deals in Tools](#)

Ice Cream Ball

Have a

Social Media

twitter

Suchen



Hast Du bereits ein Konto? [Einloggen](#)



Lady Gaga ✓

@ladygaga New York, NY

mother mons^ter

<http://www.ladygaga.com>

+ Folgen

Text follow ladygaga to your carrier's shortcode

Updates

Favoriten

Following

Follower

Listen

2 neue Tweets



ladygaga Lady Gaga

The single most special moment of my career. Naoto Kan, thank you for the honor. I'll miss you Japan: My Teal Rose

<http://twitpic.com/5j112a>

30 Juni



ladygaga Lady Gaga

TEAL AMBITION performance of BORN THIS WAY in Paris:

bit.ly/mocM2d I love it! The Edge of Glory at piano: bit.ly/kdpu9l

30 Juni



ladygaga Lady Gaga

SMAP SMAP REVENGE. BORN THIS WAY TATOO TUXEDO MEETS TARANTINO NINJA. <http://twitpic.com/5ii6gm>

29 Juni



ladygaga Lady Gaga

INTERVIEW IN JAPAN: GAGAPANDA! PART 1:

tinyurl.com/3e6tpyj PART 2: tinyurl.com/6ypg4lo

28 Juni

Folge Lady Gaga auf Twitter

Verpasse keine Updates von Lady Gaga. Melde dich heute an und folge deinen Interessen!

Anmelden »

Fragst du dich, wie Lady Gaga Twitter nutzt?

Entdecke, wem @ladygaga folgt



Über @ladygaga

917

Tweets

142.812

Following

11.334.158

Follower

203.565

Gelistet

[Über uns](#) [Hilfe](#) [Blog](#) [Handy](#) [Status](#) [Jobs](#) [AGB](#) [Sicherheit](#)
[Inserenten](#) [Unternehmen](#) [Medien](#) [Entwickler](#) [Quellen](#)

© 2011 Twitter

real life Kommunikation

www.facebook.com

facebook Suche Till Hänisch Freunde finden Startseite

Till Hänisch

Status aktualisieren Foto/Video hinzufügen Frage stellen

Was machst du gerade?

FAVORITEN

- Neuigkeiten
- Nachrichten
- Veranstaltungen
- Freunde finden

LISTEN

- Enge Freunde
- Abonnements
- Familie
- DHBW Heidenheim
- Universität Ulm 1
- Heidenheim an der Bren...

GRUPPEN

- Gruppe gründen ...

ANWENDUNGEN

- Fotos
- Musik
- Notizen
- Fragen

Freunde im Chat

Regine Nitschke hat Michael J. G Sacks Foto geteilt.

Veranstaltung erstellen

Personen, die du vielleicht kennst Alle anzeigen

 **Bernhard Bönnemann**
(Boennemann)
1 gemeinsame/r FreundIn
[FreundIn hinzufügen](#)

 **Sabine Wiegand-Steffan**
7 gemeinsame Freunde
[FreundIn hinzufügen](#)

Gesponsert Alle anzeigen

Lust auf New York?

 A-la-carte-Wunschmenü wählen und 2 KLM-Tickets nach New York gewinnen! Hier geht's zur Speisekarte, mit Empfehlung unserer Küchenchefs.

Komentieren

Schreibe einen Kommentar ...

Chat (7)

Web 2.0

Web 2.0

Technik
(Web Services,
Semantik Web)

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Technik
(Web Services,
Semantik Web)

Web für Menschen → Web für Computer

Web 2.0

Technik
(Web Services,
Semantik Web)

Web für Menschen → Web für Computer

Mitmach-Web

Web 2.0

Technik
(Web Services,
Semantik Web)

Web für Menschen → Web für Computer

Mitmach-Web

Web für Spezialisten → Web für alle

Web 2.0

Technik
(Web Services,
Semantik Web)

Web für Menschen → Web für Computer

Mitmach-Web

Web für Spezialisten → Web für alle

19

“Web 1.0 was making the Internet for people, Web 2.0 is making the internet better for computers” (Jeff Bezos)

WWW

Social Web

Physical Web

1990

2005

2020

WWW

Social Web

Physical Web

1990

2005

2020

Mehr Teilnehmer, nicht nur Menschen

WWW

Social Web

Physical Web

1990

2005

2020

Mehr Teilnehmer, nicht nur Menschen

Mehr Verbindung zur realen Welt

WWW

Social Web

Physical Web

1990

2005

2020

Mehr Teilnehmer, nicht nur Menschen

Mehr Verbindung zur realen Welt

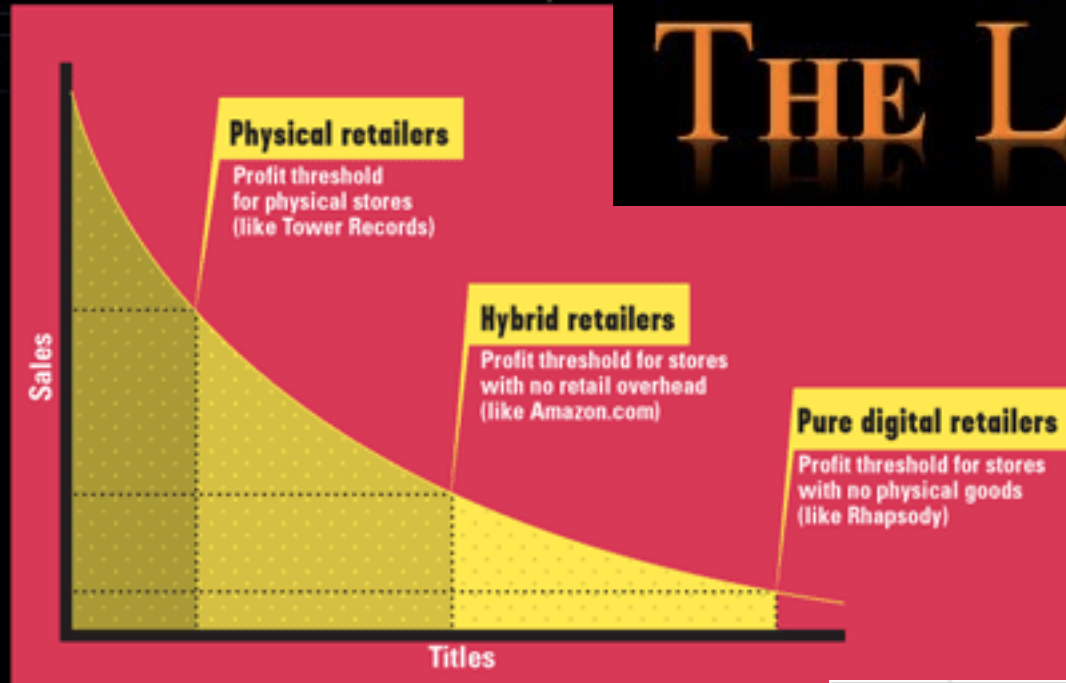
keine Revolution sondern Evolution !

The long tail: Was ist anders als vorher ?

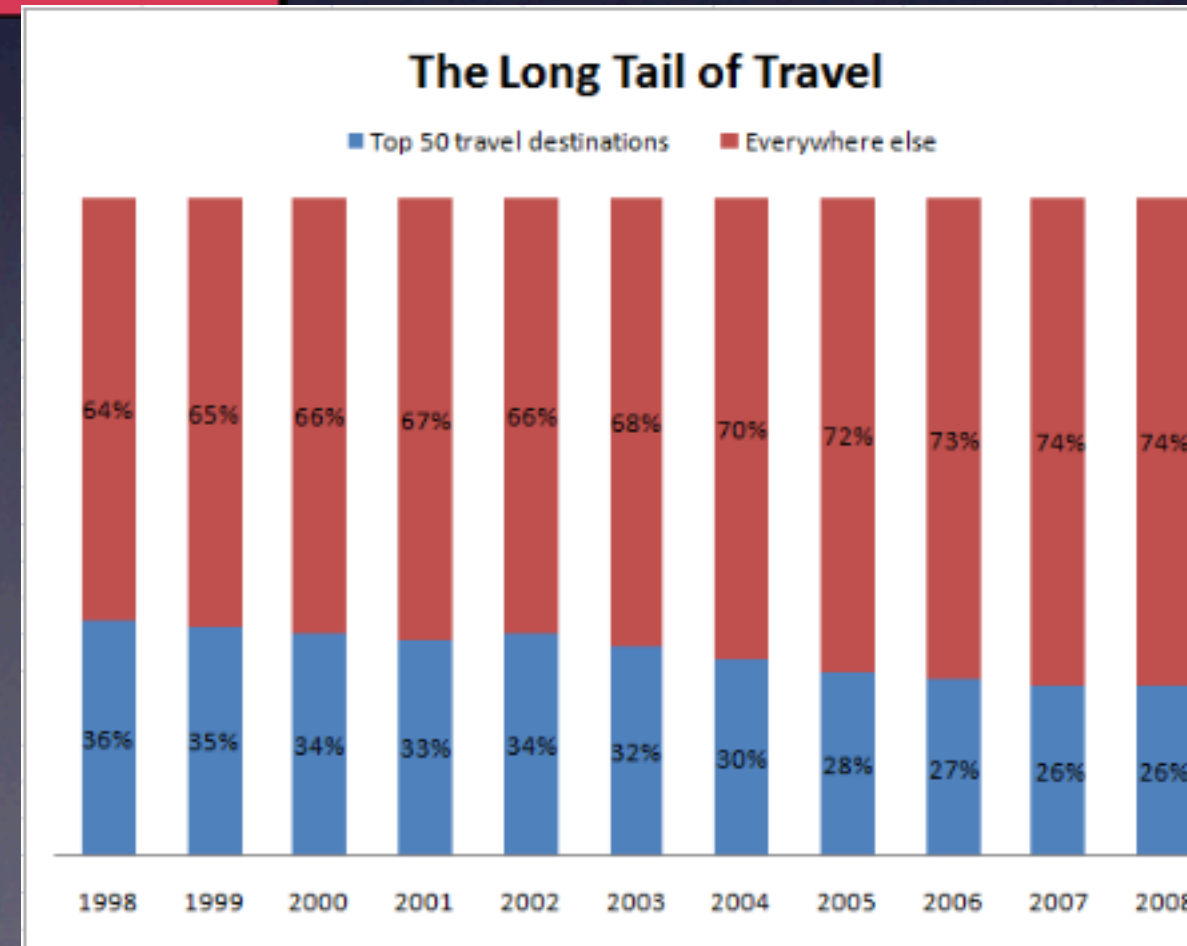
THE BIT PLAYER ADVANTAGE

Beyond bricks and mortar there are two main retail models – one that gets halfway down the Long Tail and another that goes all the way. The first is the familiar hybrid model of Amazon and Netflix, companies that sell physical goods online. Digital catalogs allow them to offer unlimited selection along with search, reviews, and recommendations, while the cost savings of massive warehouses and no walk-in customers greatly expands the number of products they can sell profitably.

Pushing this even further are pure digital services, such as iTunes, which offer the additional savings of delivering their digital goods online at virtually no marginal cost. Since an extra database entry and a few megabytes of storage on a server cost effectively nothing, these retailers have no economic reason not to carry *everything* available.



THE LONG TAIL



[http://longtail.typepad.com/the_long_tail/]

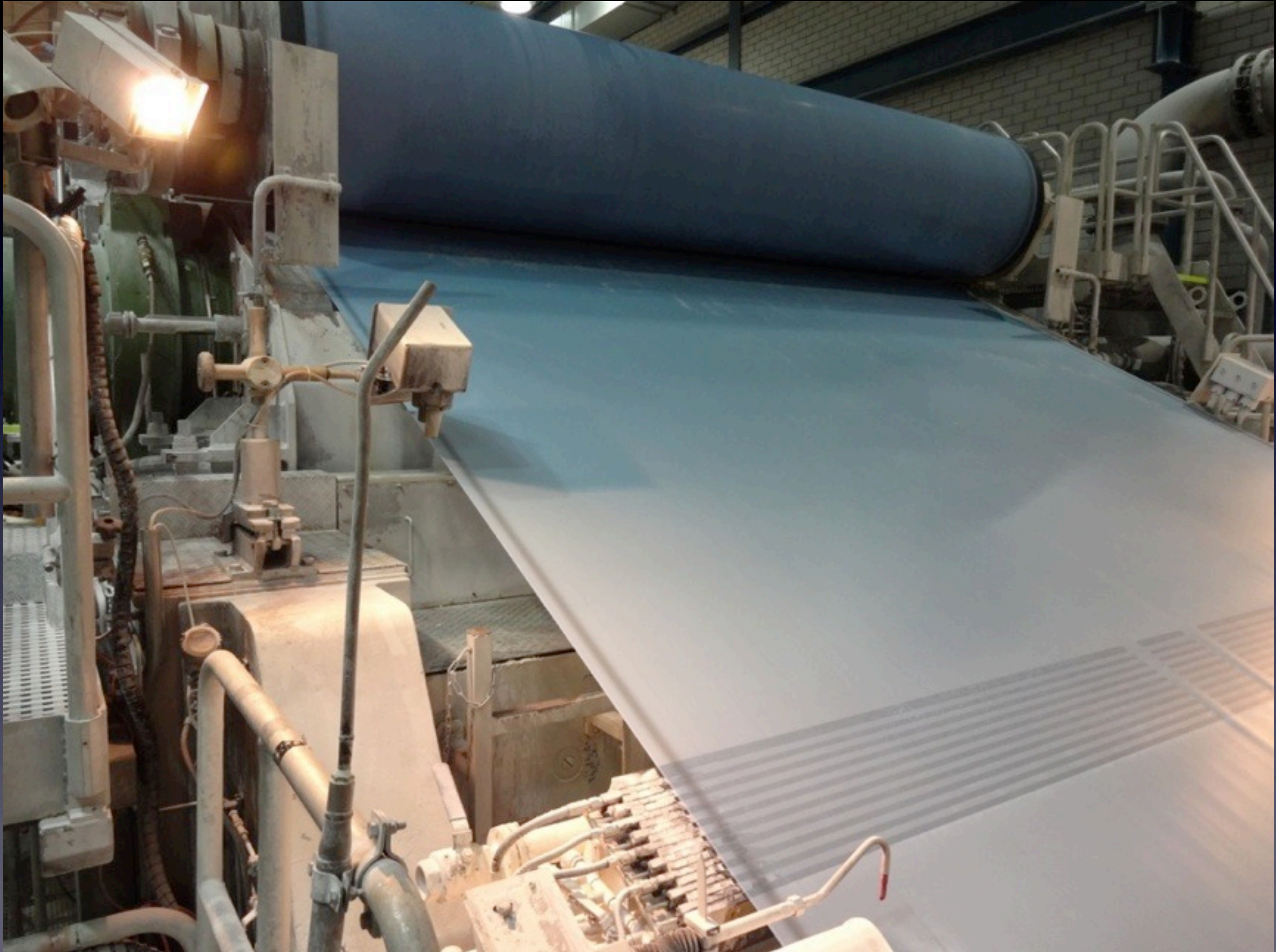
Was damit anfangen ?

Industrie 4.0



<http://www.heise.de/newsticker/meldung/Industrie-4-0-zum-Anfassen-1838897.html>

Industrial Internet konkret



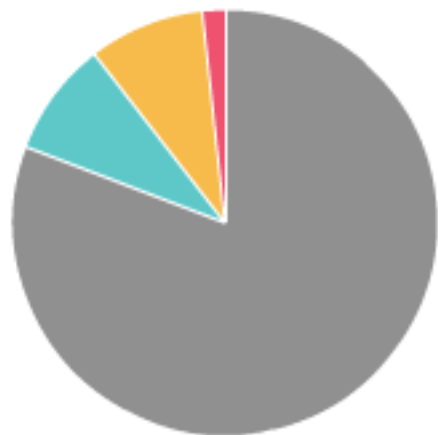
Industrial Internet konkret





Verbrannte Kalorien Schritte Stockwerke **Aktive Zeit**

Analyse der heutigen Aktivität (ohne Schlaf)



Im Sitzen
↑ **19Std 24Min**
(80,8%)

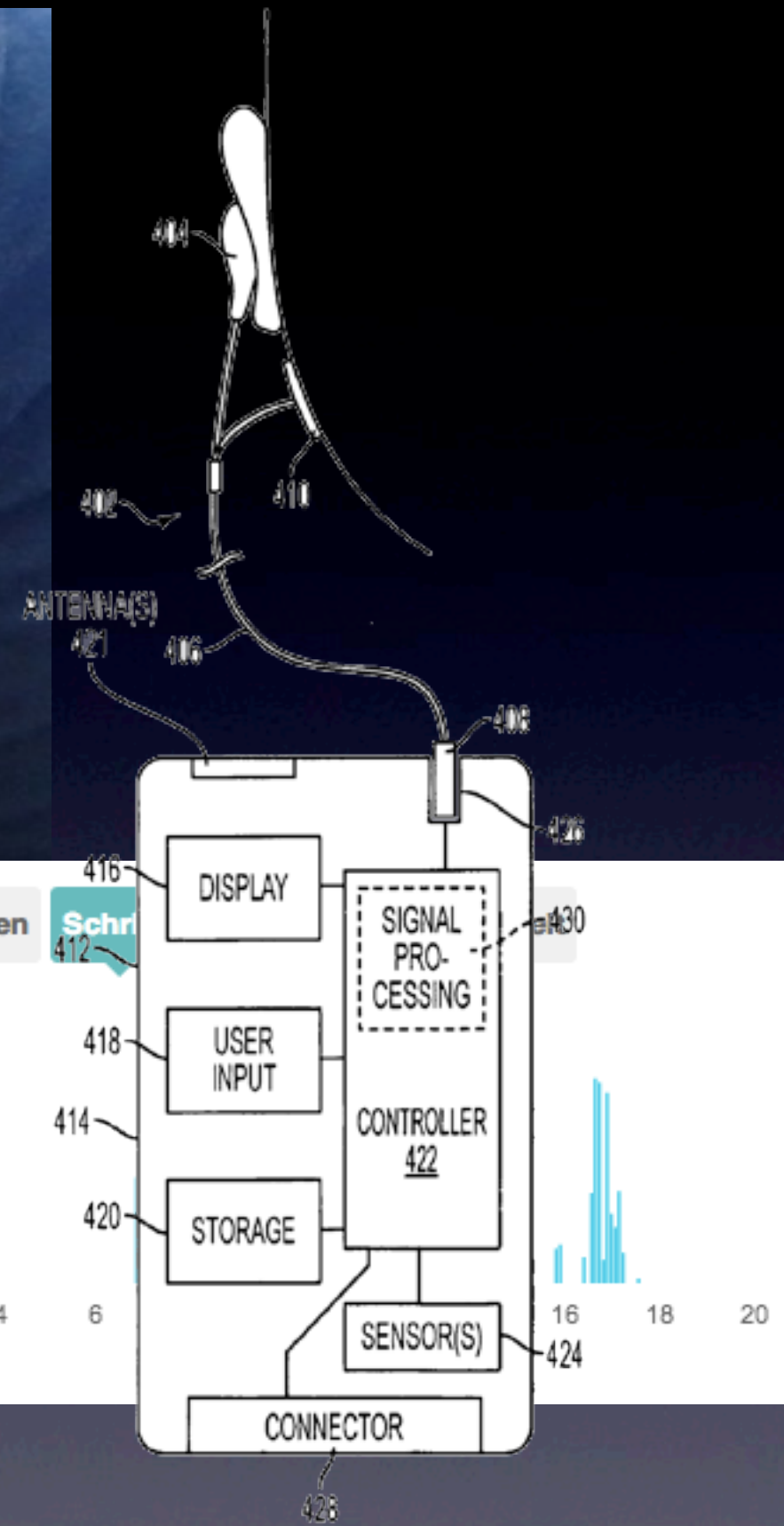
Relativ aktiv
↓ **2Std 7Min**
(8,8%)

Leicht aktiv
↓ **2Std 5Min**
(8,7%)

Sehr aktiv
↑ **24Min**
(1,7%)

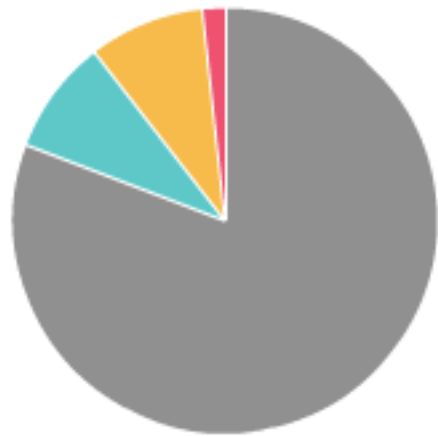
Verbrannte Kalorien **Schritte** Stockwerke Aktive Zeit





Verbrannte Kalorien Schritte Stockwerke **Aktive Zeit**

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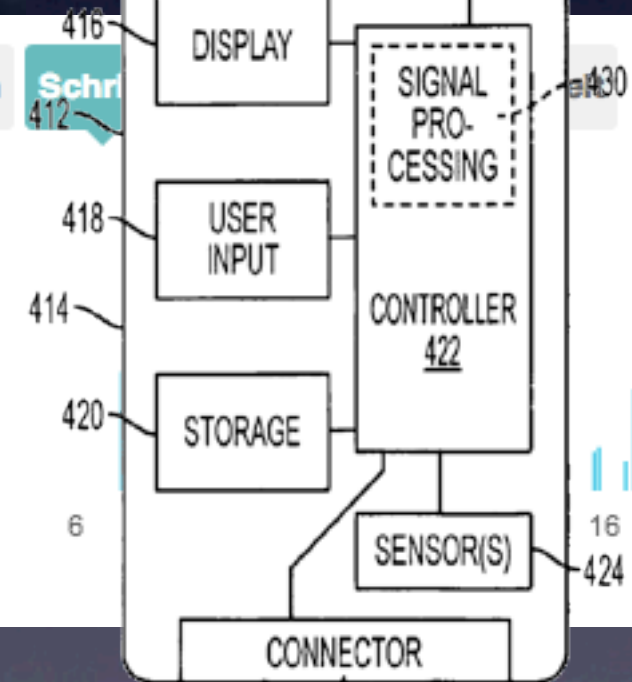
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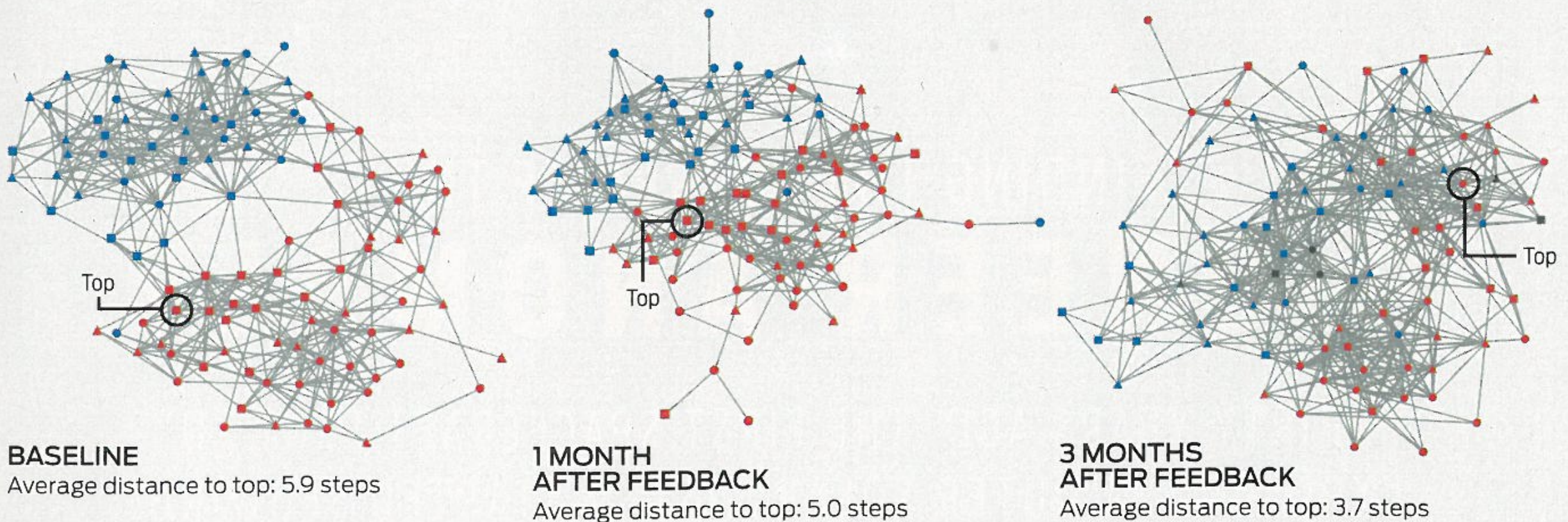
Verbrannte Kalorien Schritte

500
400
300
200
100
0 2 4 6



16 18 20

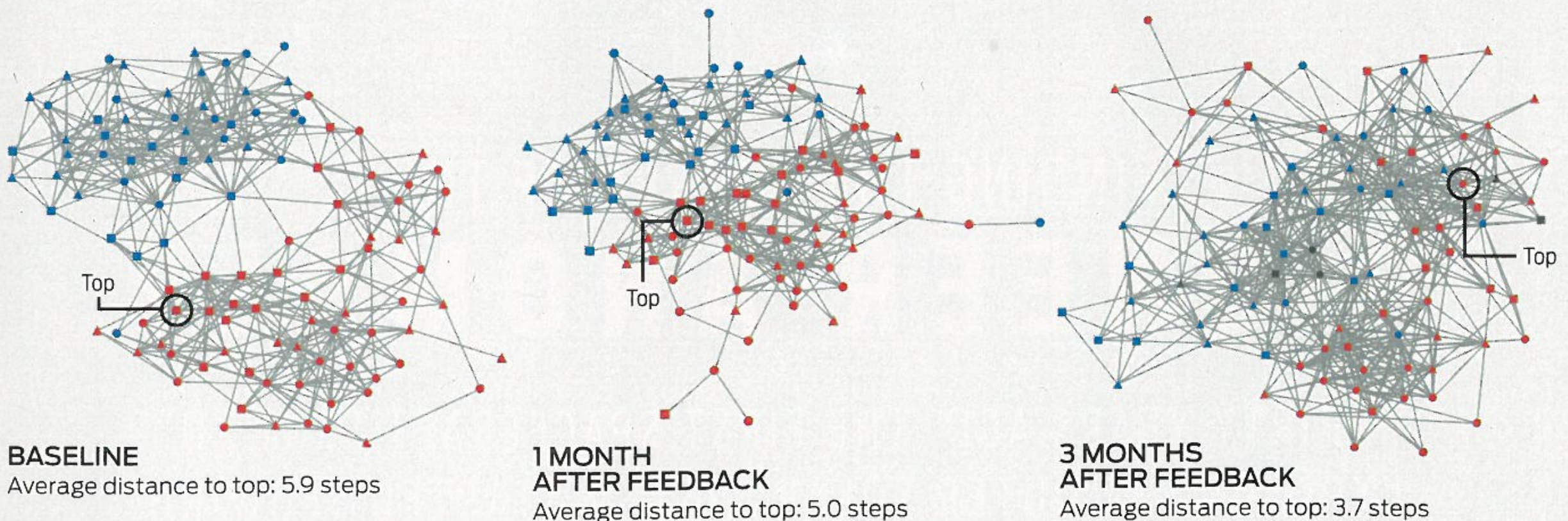
Engineering happiness



Kazuo Yano et al, Sensing Happiness, IEEE Spectrum, Dezember 2012

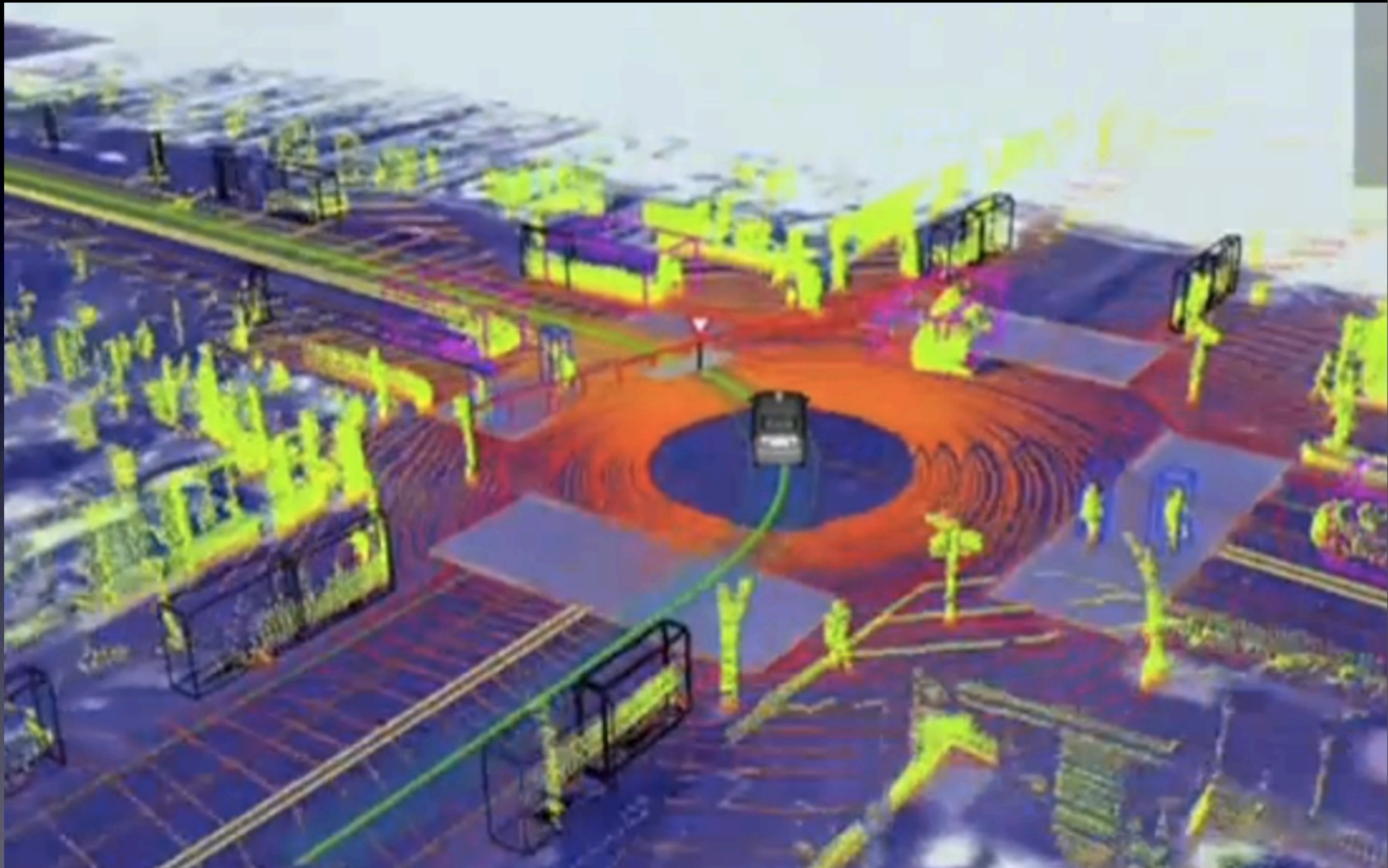
Engineering happiness

Engineering health:
Monitoring von Klinikpersonal bei
Desinfektion (30.000 Tote jährlich
wegen Klinikinfektionen allein in D)



Kazuo Yano et al, Sensing Happiness, IEEE Spectrum, Dezember 2012

Google car: Vermeidung von Unfällen



https://www.ted.com/talks/sebastian_thrun_google_s_driverless_car.html

Fragen ?

<http://imari.dhbw-heidenheim.de/iot.pdf>

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