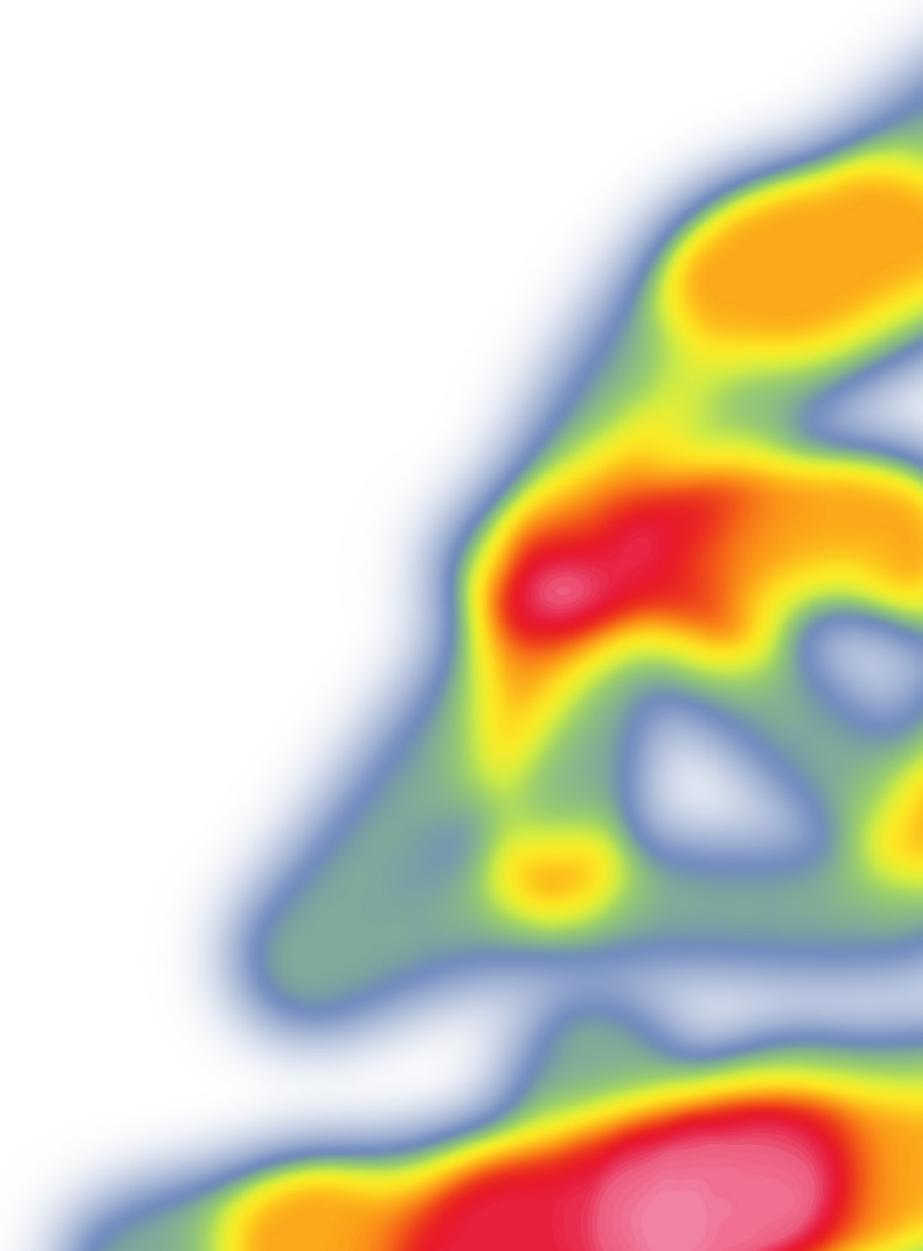


# Visualisierung von (Geo-) Daten im Internet/Intranet

Die Kombination von Daten und  
Webtechnologien

Jann Wendt



## Think spatial, discover potentials, develop solutions!

Ungefähr 80% der Daten in Unternehmen und Verwaltungen haben einen Raumbezug, jedoch wird diese Informationen kaum oder überhaupt nicht genutzt. Wir helfen dabei diese Potentiale voll auszuschöpfen!

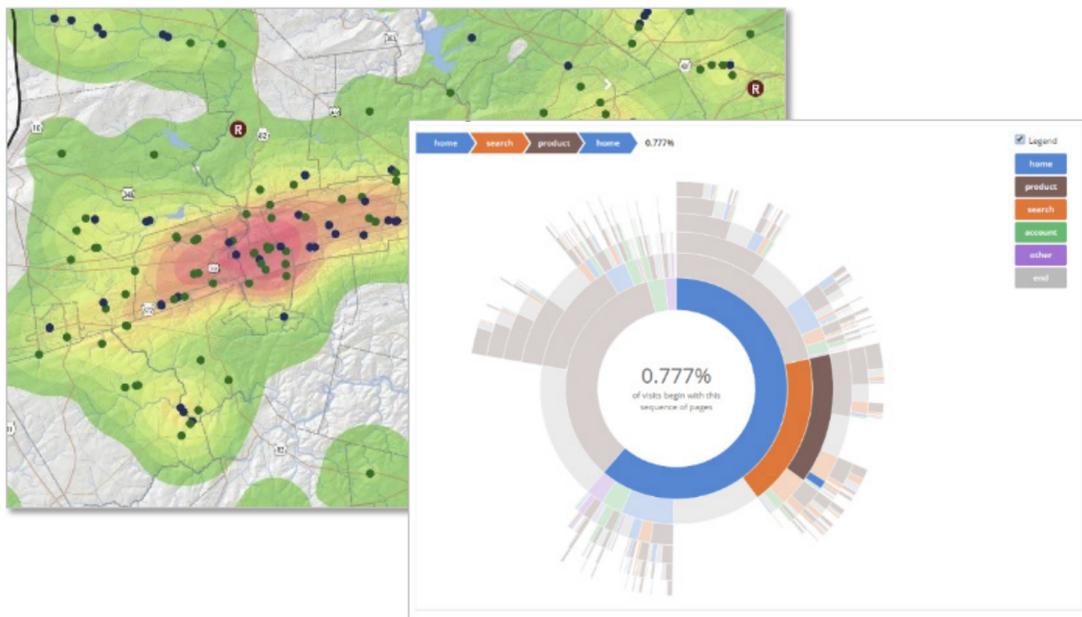
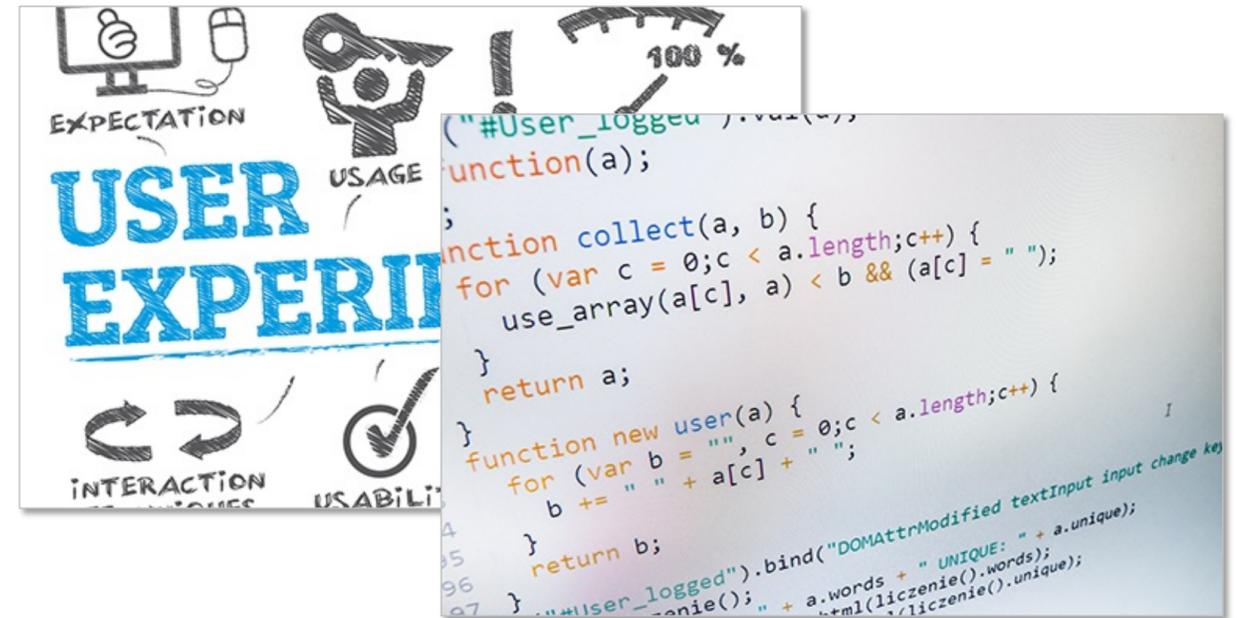
- Gründung im Jahr 2011
- Sitz im Kieler Wissenschaftspark
- Internationales Team aus Geoinformatikern, Webentwicklern, Webdesignern und Geographen
- Jann Wendt - Geschäftsführer



## Tätigkeitsfelder

### Web-Anwendungsentwicklung

- Entwicklung von individuellen Web-Applikationen
- (Webbasierte) GIS-Infrastrukturen
- Anpassung, Support und Weiterentwicklung

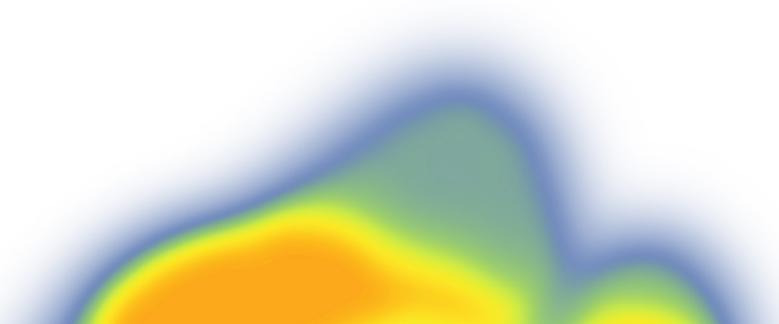


### Datenmanagement und -analyse

- Datenmanagement und Anwendungsintegration
- Auswertung und Visualisierung von (räumlichen) Daten
- Lage-, Attribut- und Prozessanalyse von (Geo-) Daten

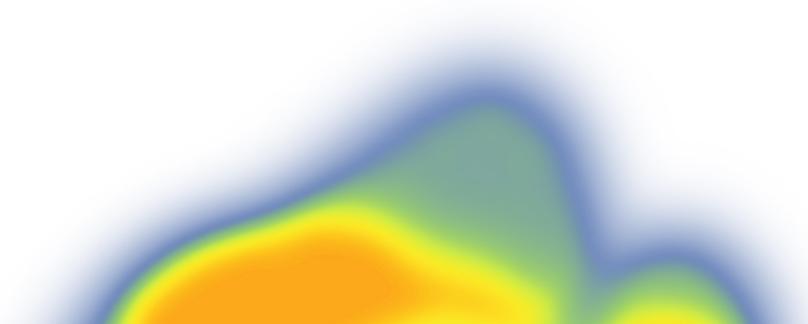
## Geodaten und Web

Teil des täglichen Lebens



## Geodaten und Web

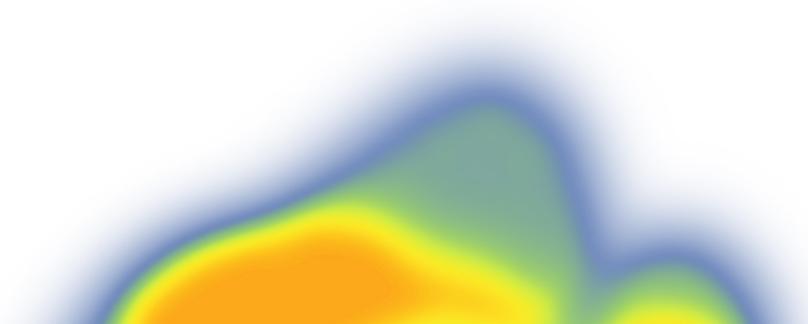
Teil des täglichen Lebens: Google Maps



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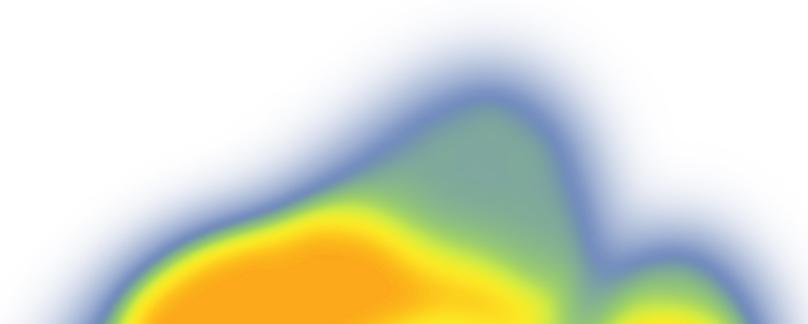
- Start am 8. Februar 2005



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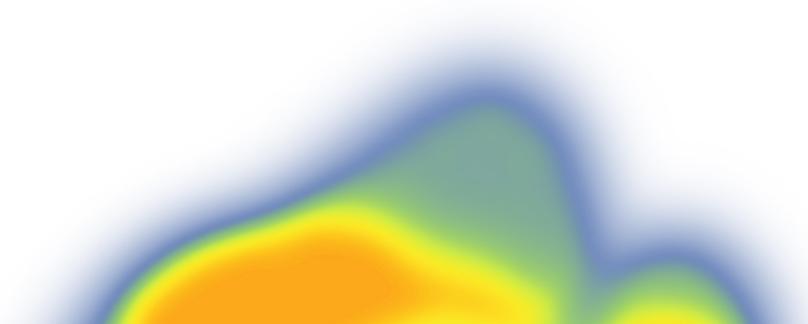
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- Routenplaner, Navigation



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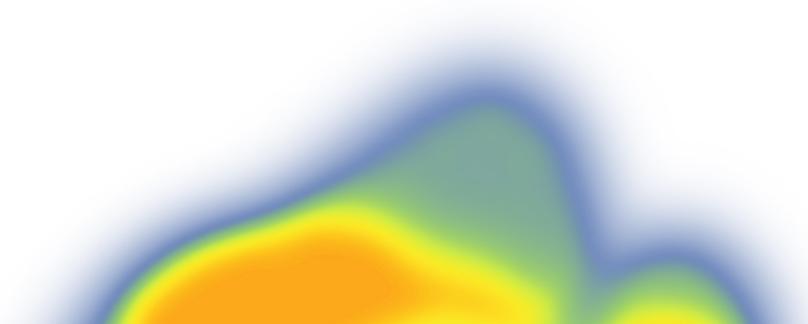
- Start am 8. Februar 2005
- Routenplaner, Navigation
- StreetView

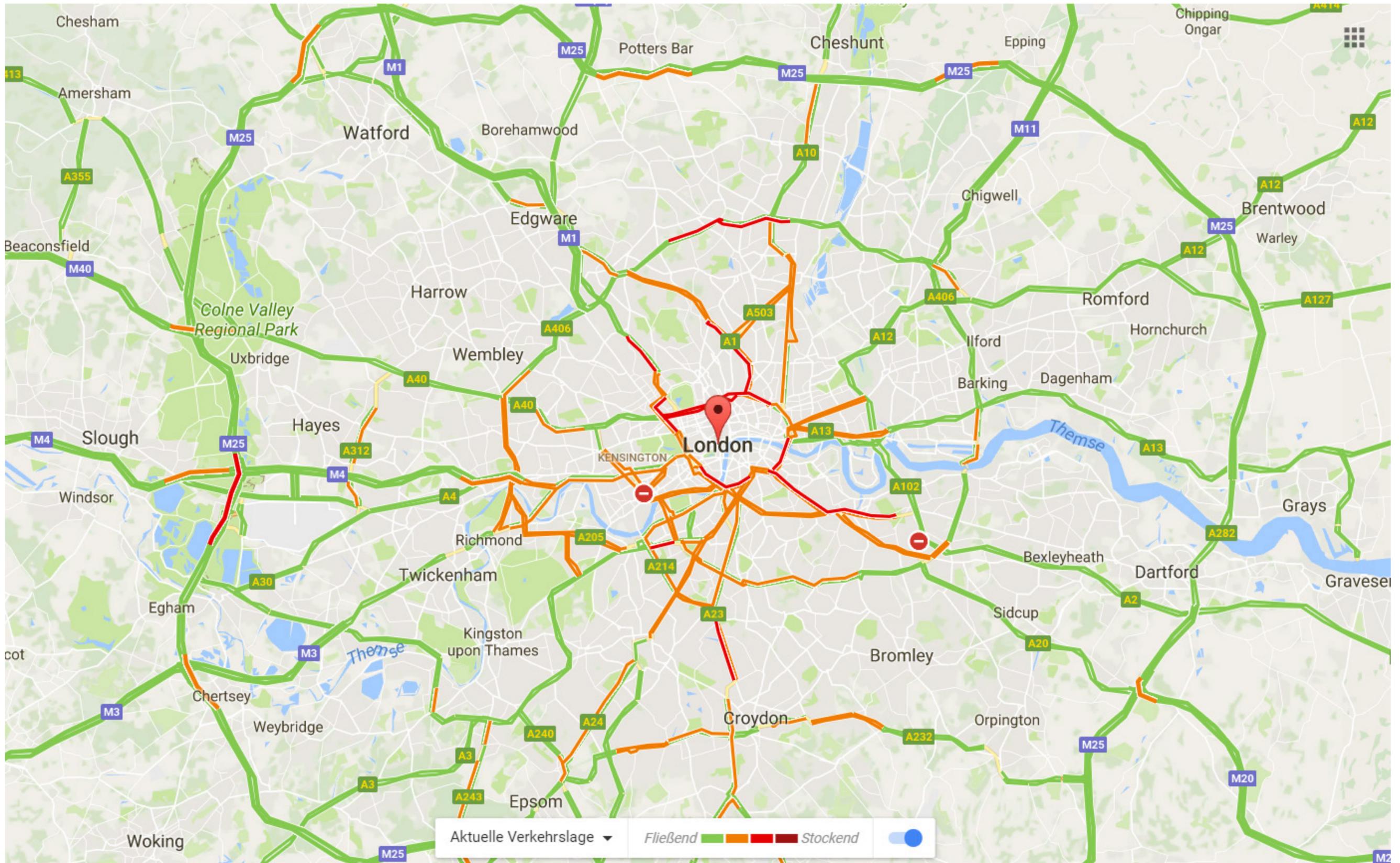


## Geodaten und Web

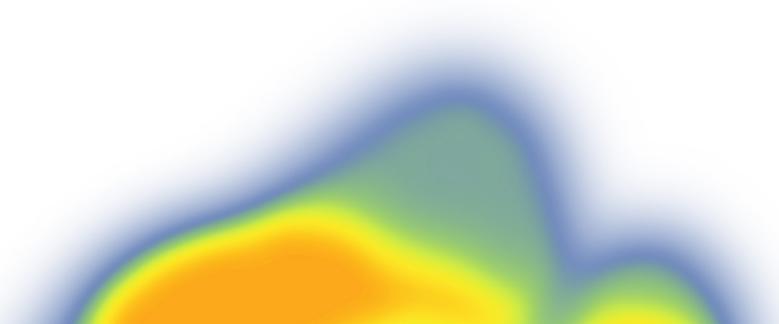
Teil des täglichen Lebens: Google Maps

- Start am 8. Februar 2005
- Routenplaner, Navigation
- StreetView
- **Traffic**



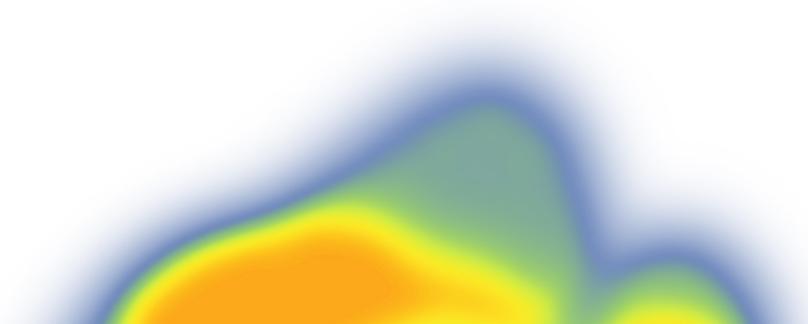


## Warum eigentlich Visualisierung?



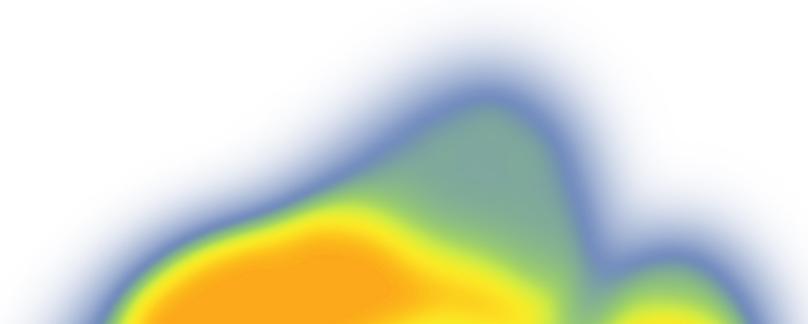
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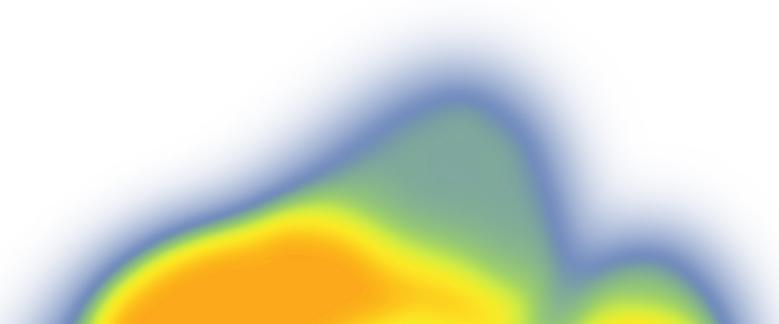


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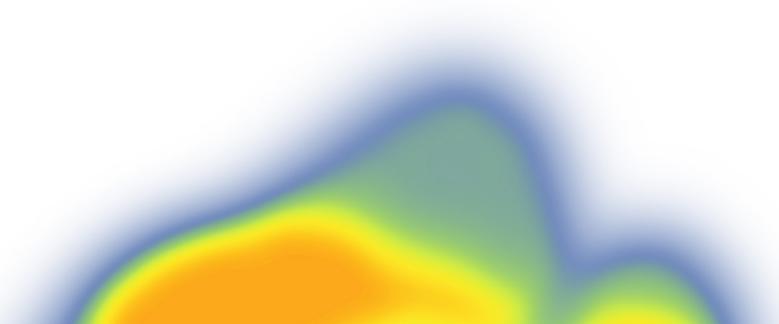
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- Kontext erkennen



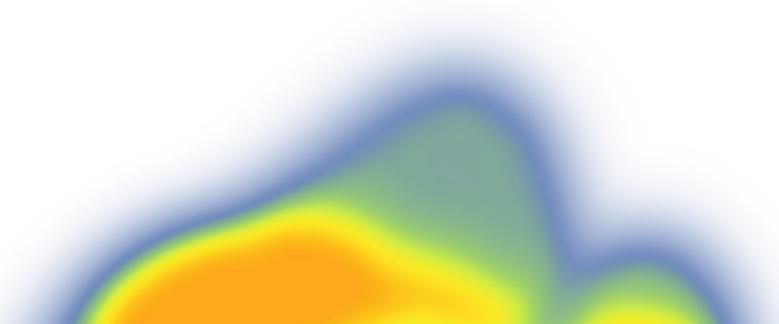
## Warum eigentlich Visualisierung?

- Fragen beantworten (oder aufwerfen)
  - Kontext erkennen
  - Entscheidungen unterstützen
- 

## Warum eigentlich Visualisierung?

- Fragen beantworten (oder aufwerfen)
  - Kontext erkennen
  - Entscheidungen unterstützen
  - Muster entdecken
- 

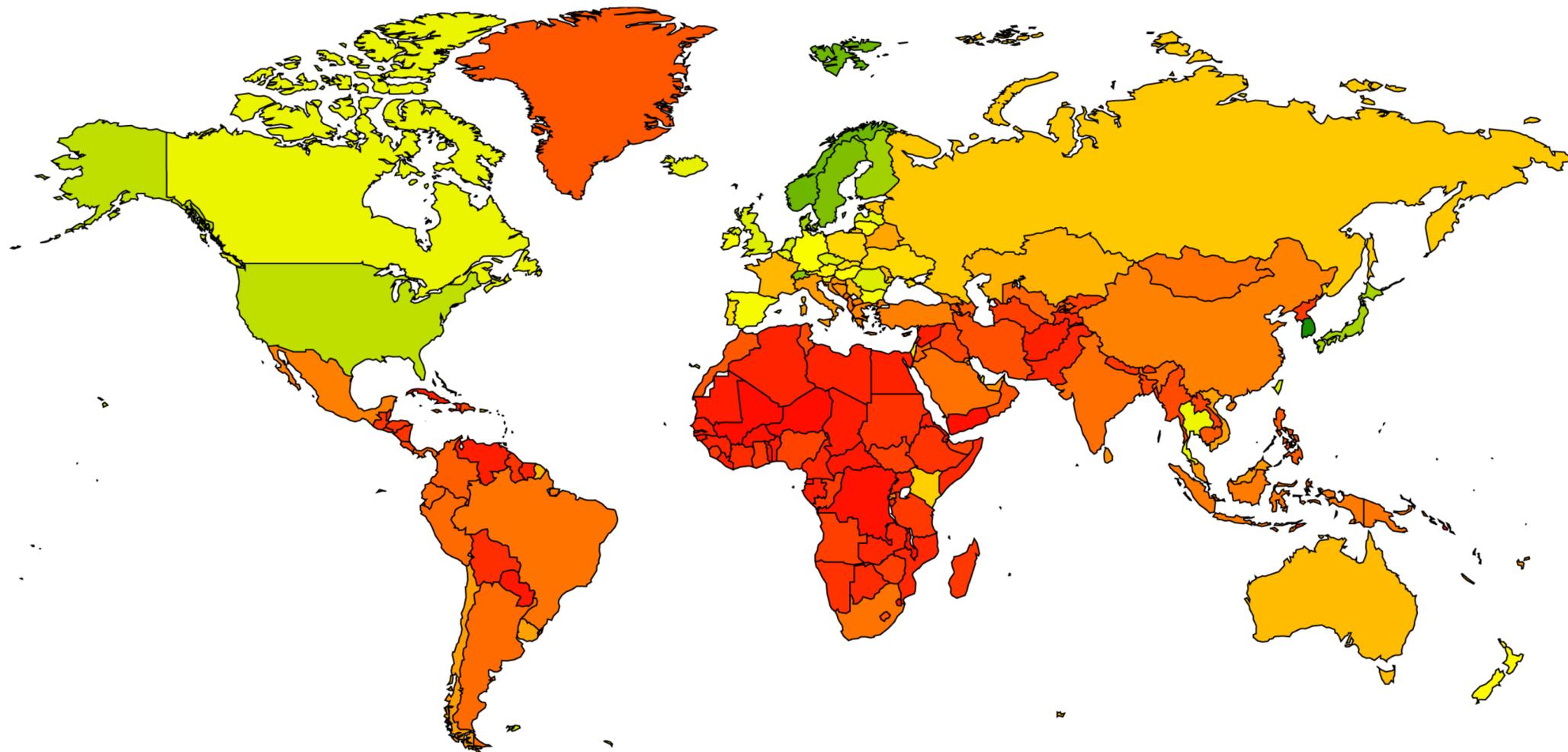
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- Fragen beantworten (oder aufwerfen)
  - Kontext erkennen
  - Entscheidungen unterstützen
  - Muster entdecken
  - Inspirieren
- 



## Beispiele: Internet Connection Speed (Karte)

Average connection speed



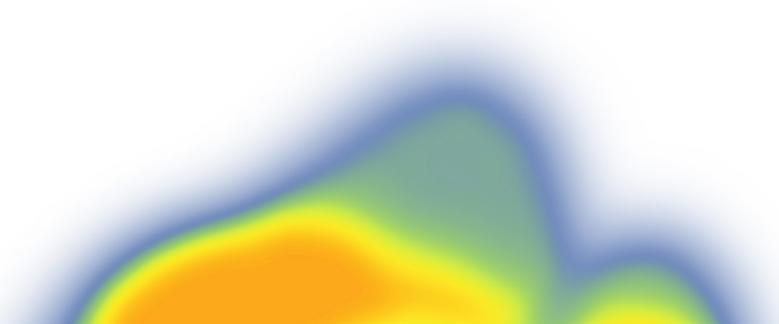
Quelle: [www.akamai.com](http://www.akamai.com)



## Beispiele: Kombination von Informationen

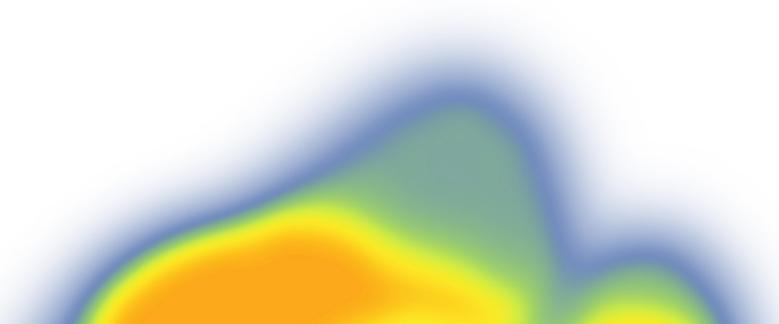


## Herausforderungen im Internet



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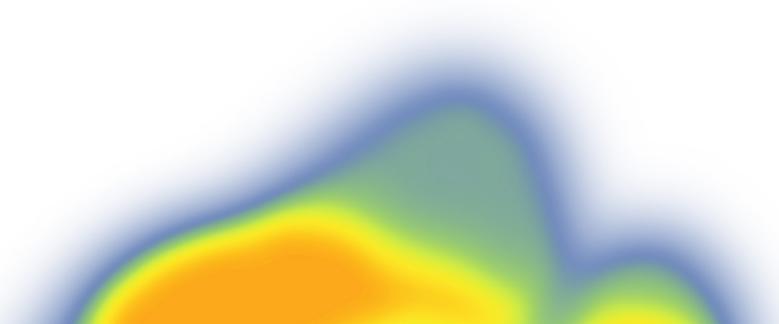
User Interface & User Experience



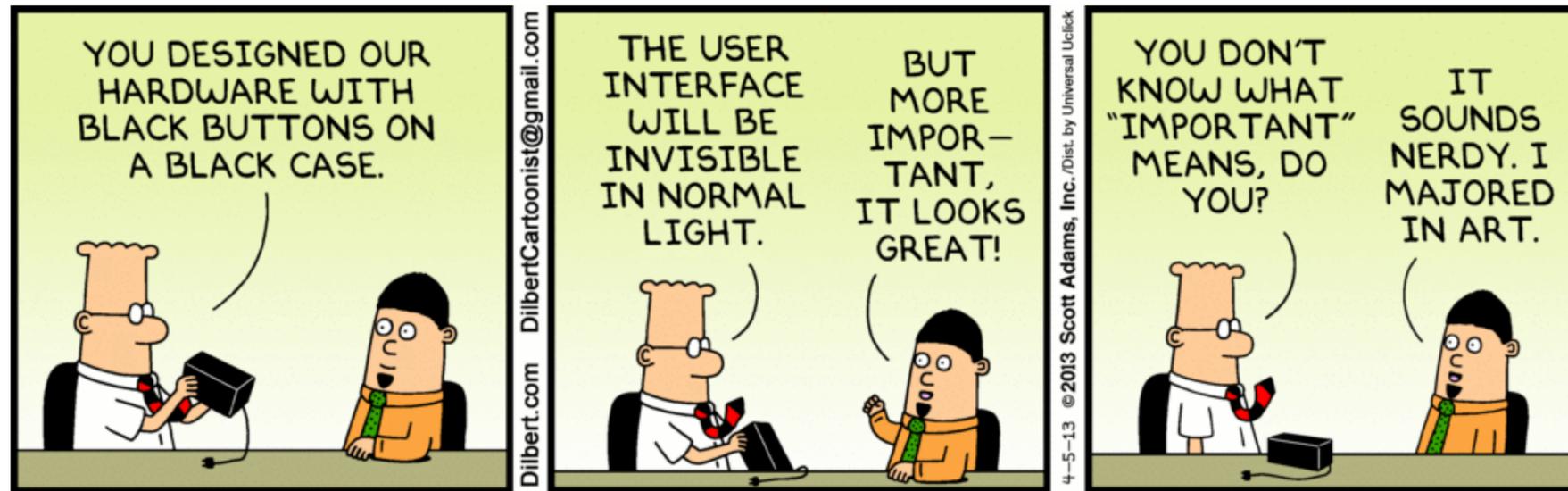
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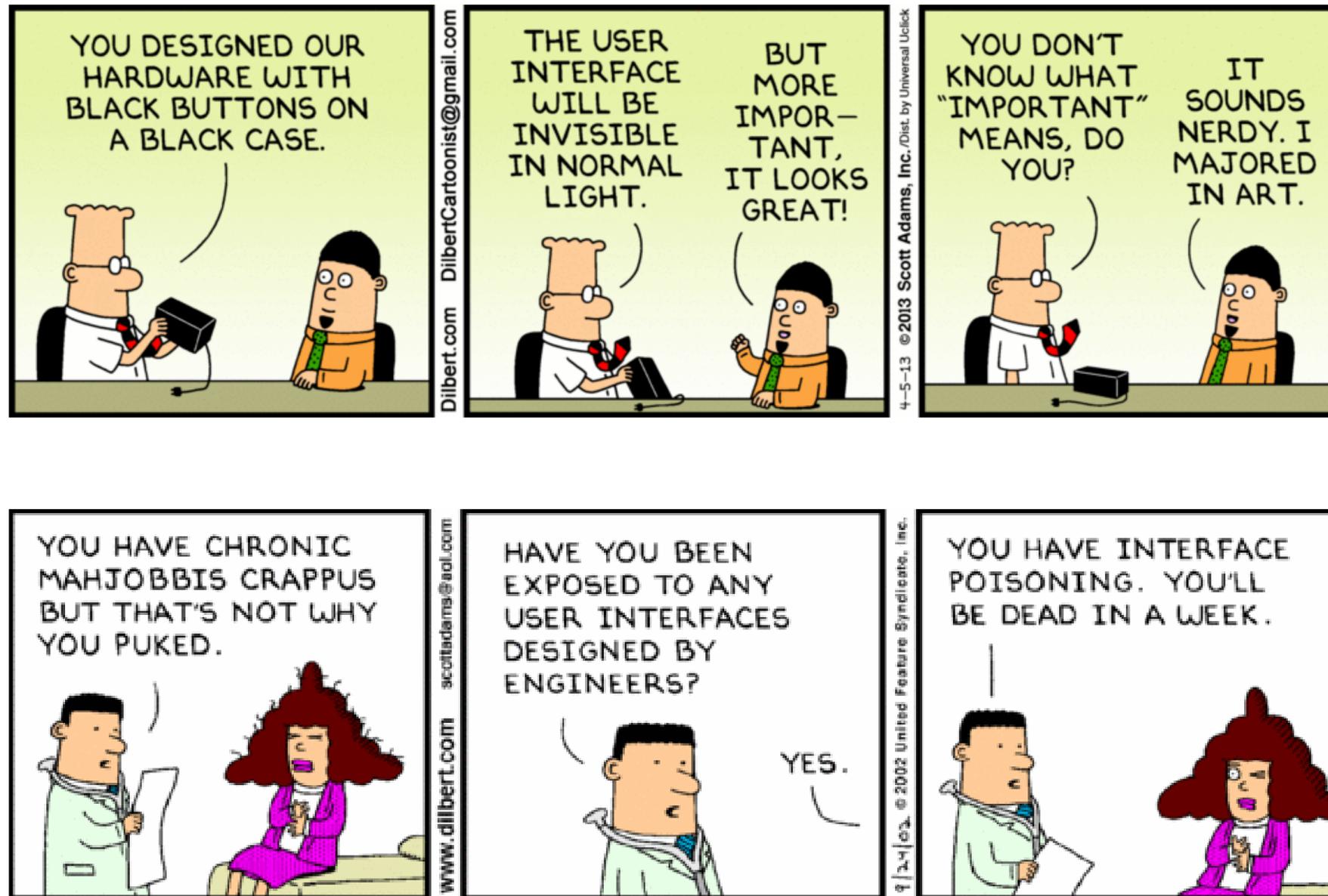
- „Keep things simple and consistent“



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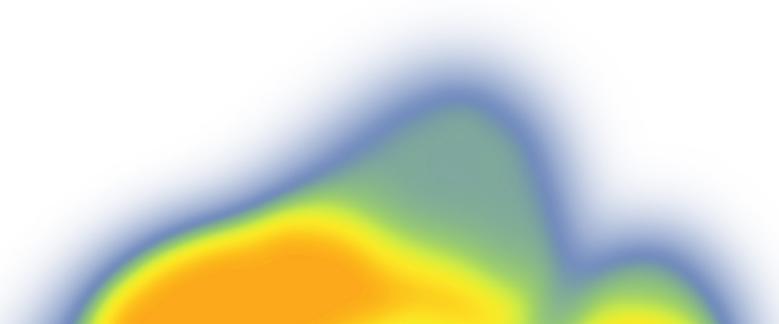


## Herausforderungen im Internet

### User Interface & User Experience

- „Keep things simple and consistent“

### Skalierbarkeit



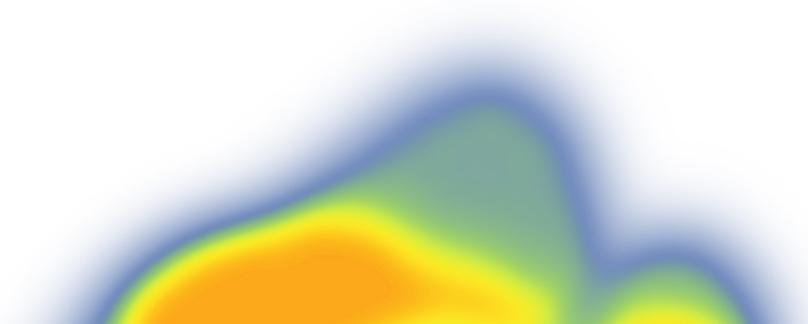
## Herausforderungen im Internet

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- „Keep things simple and consistent“

### Skalierbarkeit

- Verteilen von Lasten (Load-Balancing)



---

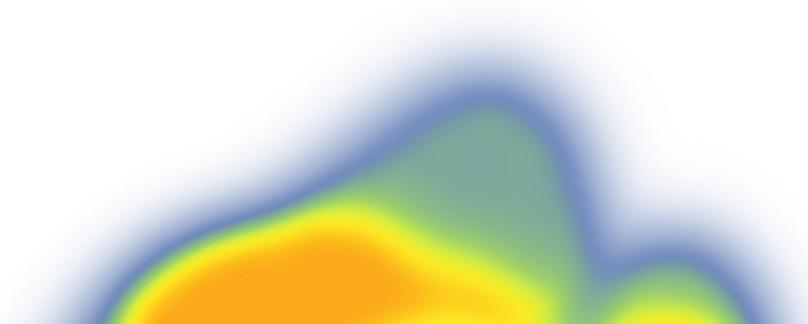
## Herausforderungen im Internet

### User Interface & User Experience

- „Keep things simple and consistent“

### Skalierbarkeit

- Verteilen von Lasten (Load-Balancing)
- Effektives Abfangen von Lastspitzen



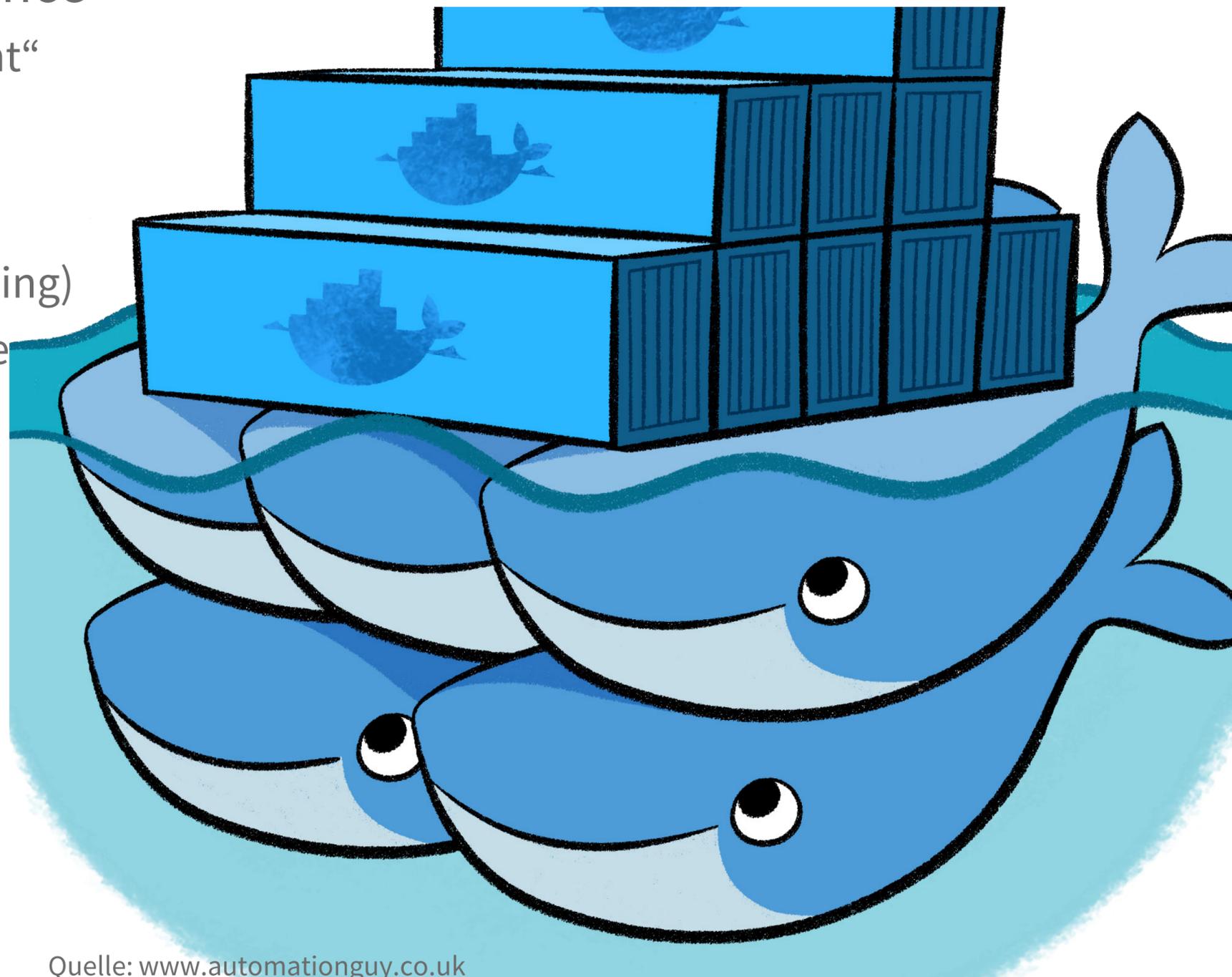
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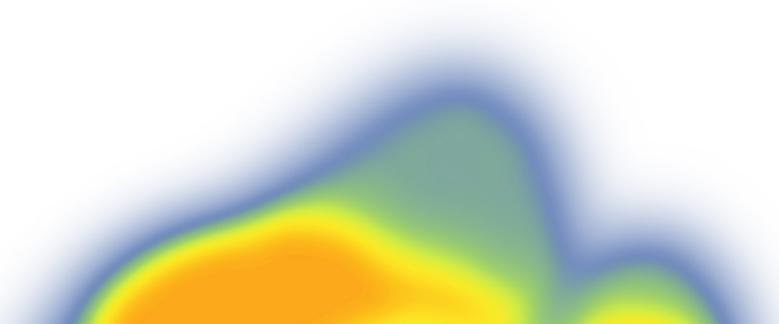
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### Skalierbarkeit

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### Performance



## Herausforderungen im Internet

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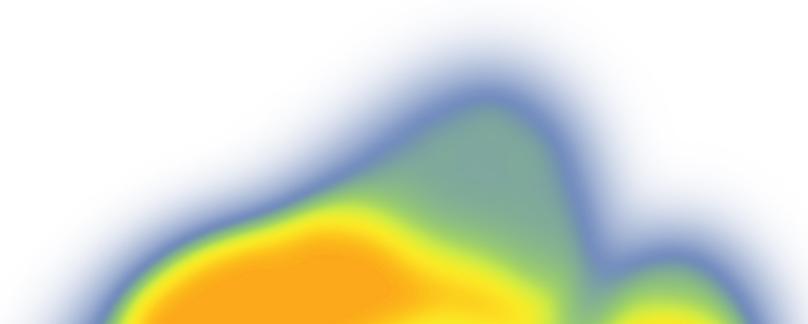
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- Verteilen von Lasten (Load-Balancing)
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### Performance

- Schlüssel für die Akzeptanz der Applikation/Website





...DER BESUCHER KOMMEN  
NICHT WIEDER AUF EINE  
LANGSAME SEITE.



...DER BESUCHER VERLASSEN EINE  
MOBILE SEITE, WENN SIE ÜBER  
5 SEKUNDEN LÄDT.



**JEDER VIERTE...**

...BESUCHER VERLÄSST DIE SEITE,  
WENN SIE ÜBER 4 SEKUNDEN  
LÄDT.

## Herausforderungen im Internet

### User Interface & User Experience

- „Keep things simple and consistent“

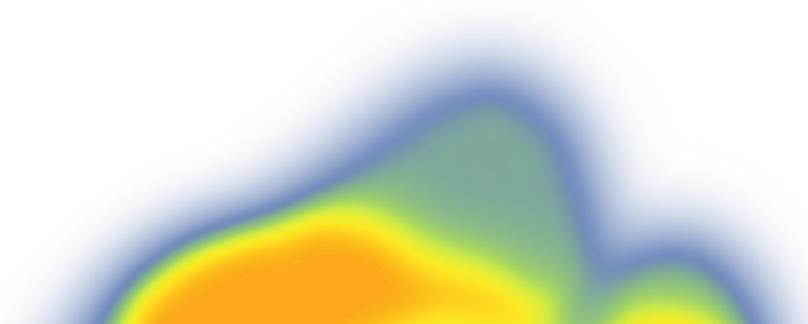
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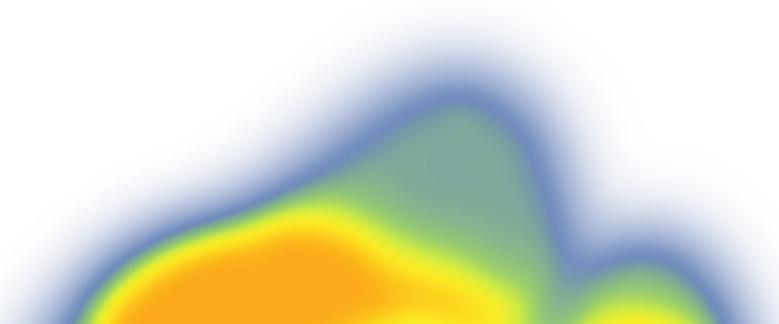
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- Oftmals nur zweitrangig im Vergleich zu User Experience und Design
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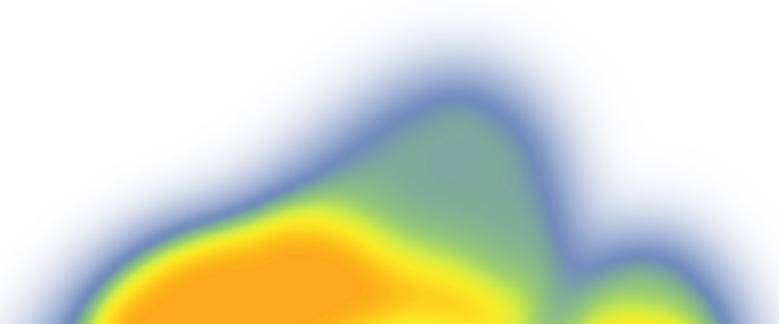
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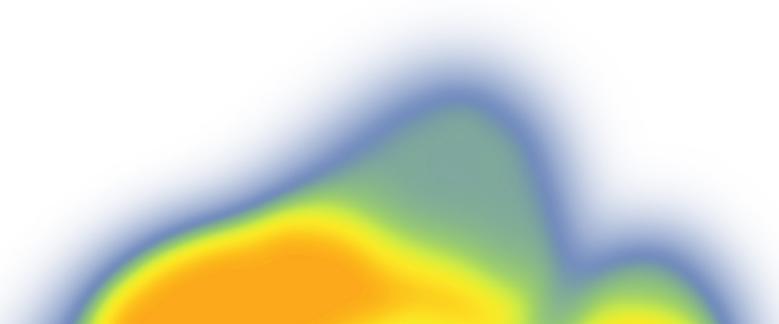
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### Sicherheit

- Oftmals nur zweitrangig im Vergleich zu User Experience und Design
  - z.B.: SQL-Injections, Cross-Site-Scripting, Session-Hijacking etc.
- 

## Herausforderungen im Internet

Browser



---

## Herausforderungen im Internet

### Browser

- Unterschiedlichste Browser (Internet Explorer, Firefox, Chrome, Edge, Safari), die Code auf unterschiedliche Weise (Cross-Browser Kompatibilität) verarbeiten

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Quelle: [www.vuepointcreative.com](http://www.vuepointcreative.com)

## Dialog element - LS

Global

68.1%

Method of easily creating custom dialog boxes to display to the user with modal or non-modal options. Also includes a `::backdrop` pseudo-element for behind the element.

Current aligned
Usage relative
Date relative
Show all

IE	Edge *	Firefox	Chrome	Safari	Opera	iOS Safari *	Opera Mini *	Android Browser *	Chrome for Android
			49						
			56						
		52	57			9.2		4.4	
	14	53	58			10.2		4.4.4	
11	15	54	59	10.1	46	10.3	all	56	59
	16	55	60	11	47	11			
		56	61	TP	48				
		57	62						

[Notes](#)
[Known issues \(2\)](#)
[Resources \(4\)](#)
[Feedback](#)

MS Edge status: Under Consideration

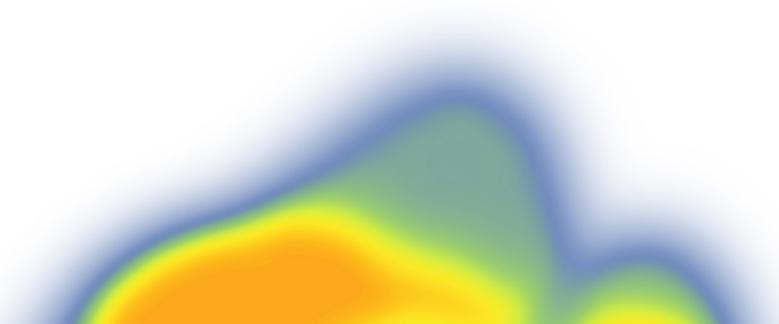
<sup>1</sup> Supported in Firefox by enabling "dom.dialog\_element.enabled" in about:config

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### Devices

- Unterschiedlichste Geräte mit verschiedensten Anforderungen
- 



Quelle: [www.petelepage.com](http://www.petelepage.com)

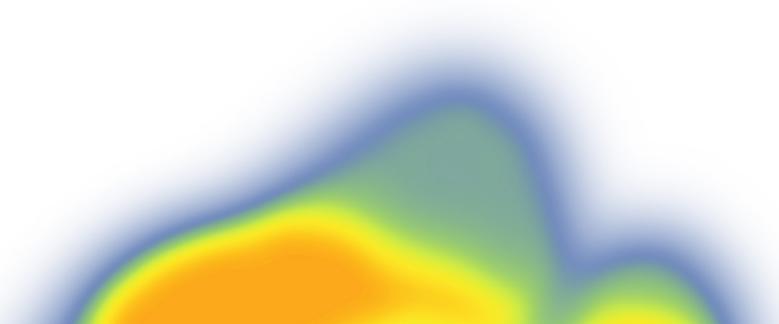
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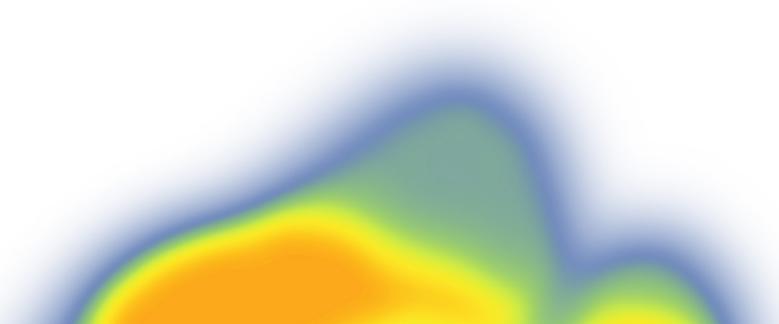


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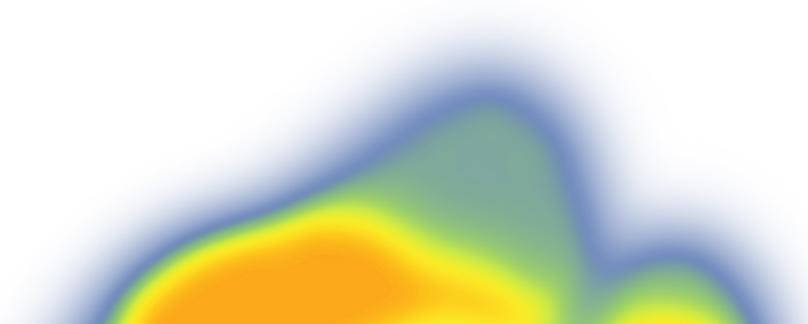
### Devices

- Unterschiedlichste Geräte mit verschiedensten Anforderungen
  - Responsives Webdesign
  - Neue Devices und Technologien
- 

## Herausforderungen im Internet



Quelle: [www.edudemic.com](http://www.edudemic.com)



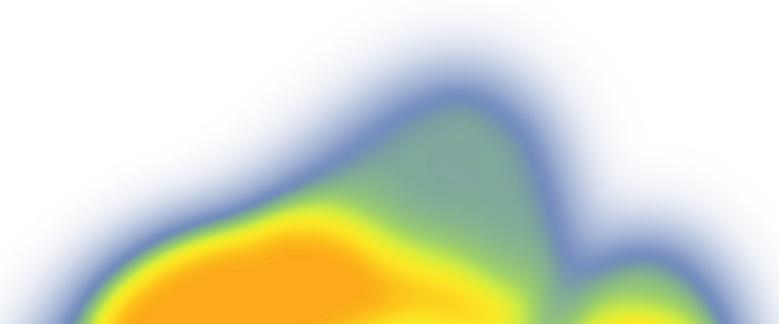
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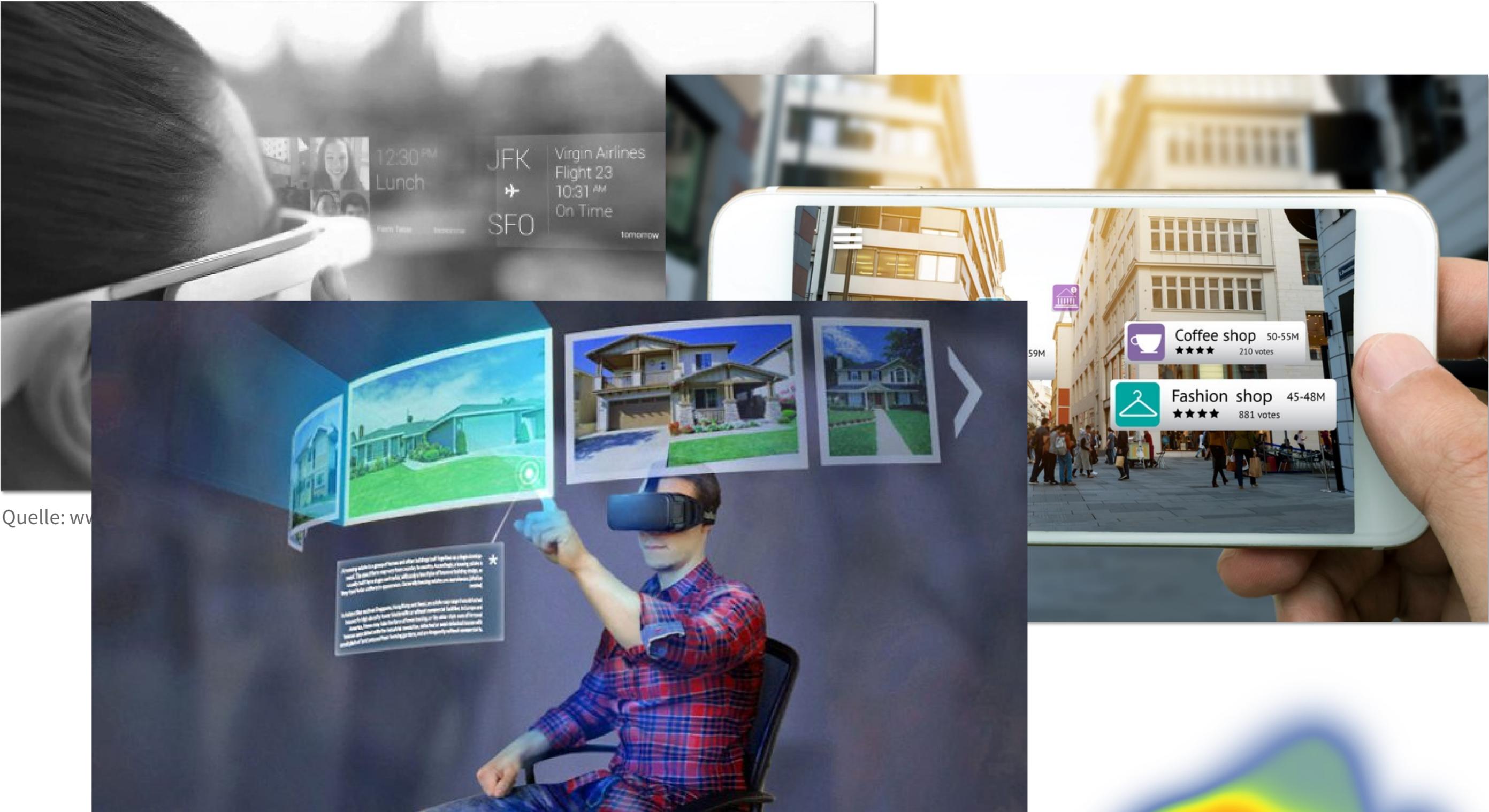
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Quelle: [www.bgr.com](http://www.bgr.com)



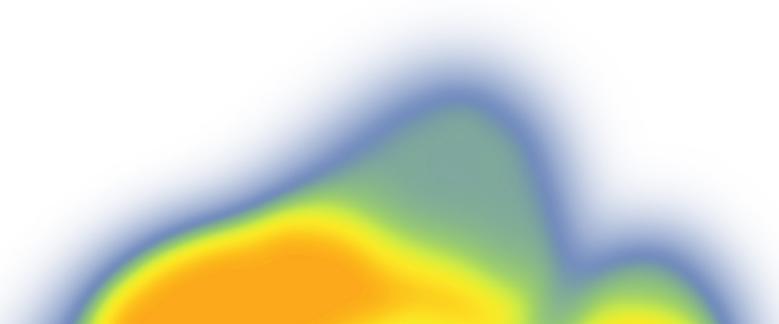
## Herausforderungen im Internet



Quelle: ww

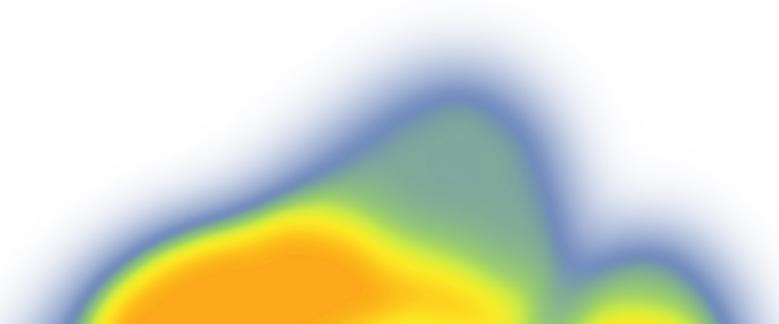
Quelle: www.makerfairerome.eu

## Big Data und IoT



## Big Data und IoT

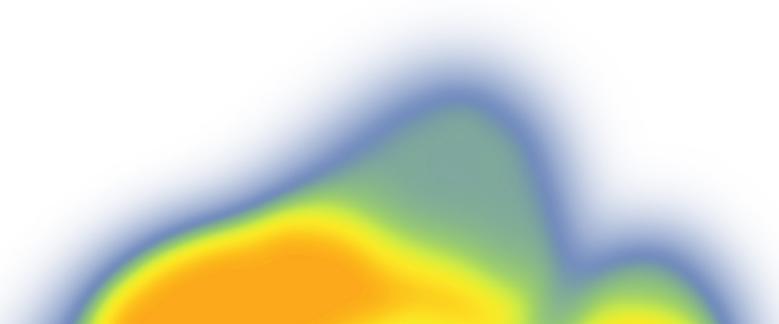
Big Data (unabhängig, aber Web macht sammeln und verbreiten einfach)

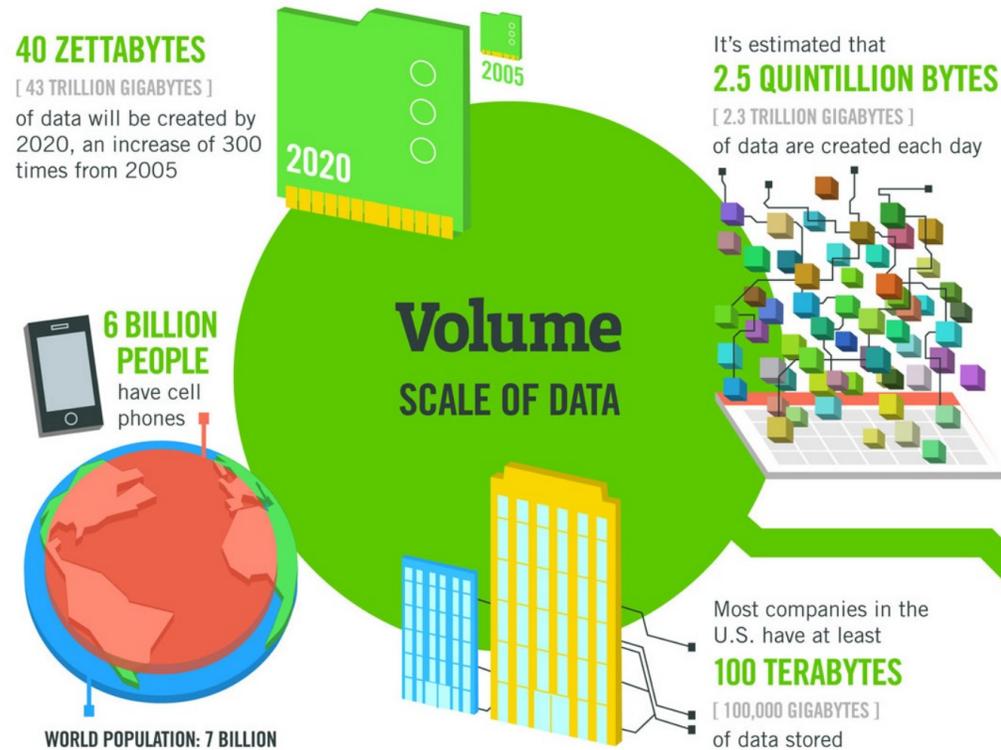


## Big Data und IoT

Big Data (unabhängig, aber Web macht sammeln und verbreiten einfach)

- Volume, Variety, Velocity, Veracity





# The FOUR V's of Big Data

From traffic patterns and music downloads to web history and medical records, data is recorded, stored, and analyzed to enable the technology and services that the world relies on every day. But what exactly is big data, and how can these massive amounts of data be used?

As a leader in the sector, IBM data scientists break big data into four dimensions: **Volume, Velocity, Variety and Veracity**

Depending on the industry and organization, big data encompasses information from multiple internal and external sources such as transactions, social media, enterprise content, sensors and mobile devices. Companies can leverage data to adapt their products and services to better meet customer needs, optimize operations and infrastructure, and find new sources of revenue.

By 2015 **4.4 MILLION IT JOBS** will be created globally to support big data, with 1.9 million in the United States



As of 2011, the global size of data in healthcare was estimated to be **150 EXABYTES**  
[ 161 BILLION GIGABYTES ]

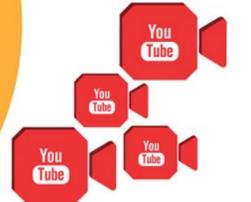


**30 BILLION PIECES OF CONTENT** are shared on Facebook every month



By 2014, it's anticipated there will be **420 MILLION WEARABLE, WIRELESS HEALTH MONITORS**

**4 BILLION+ HOURS OF VIDEO** are watched on YouTube each month

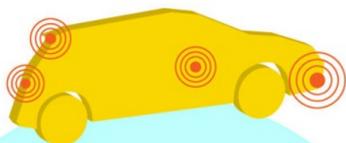


**400 MILLION TWEETS** are sent per day by about 200 million monthly active users



## Variety DIFFERENT FORMS OF DATA

The New York Stock Exchange captures **1 TB OF TRADE INFORMATION** during each trading session



Modern cars have close to **100 SENSORS** that monitor items such as fuel level and tire pressure

## Velocity ANALYSIS OF STREAMING DATA

By 2016, it is projected there will be **18.9 BILLION NETWORK CONNECTIONS** – almost 2.5 connections per person on earth



**1 IN 3 BUSINESS LEADERS** don't trust the information they use to make decisions

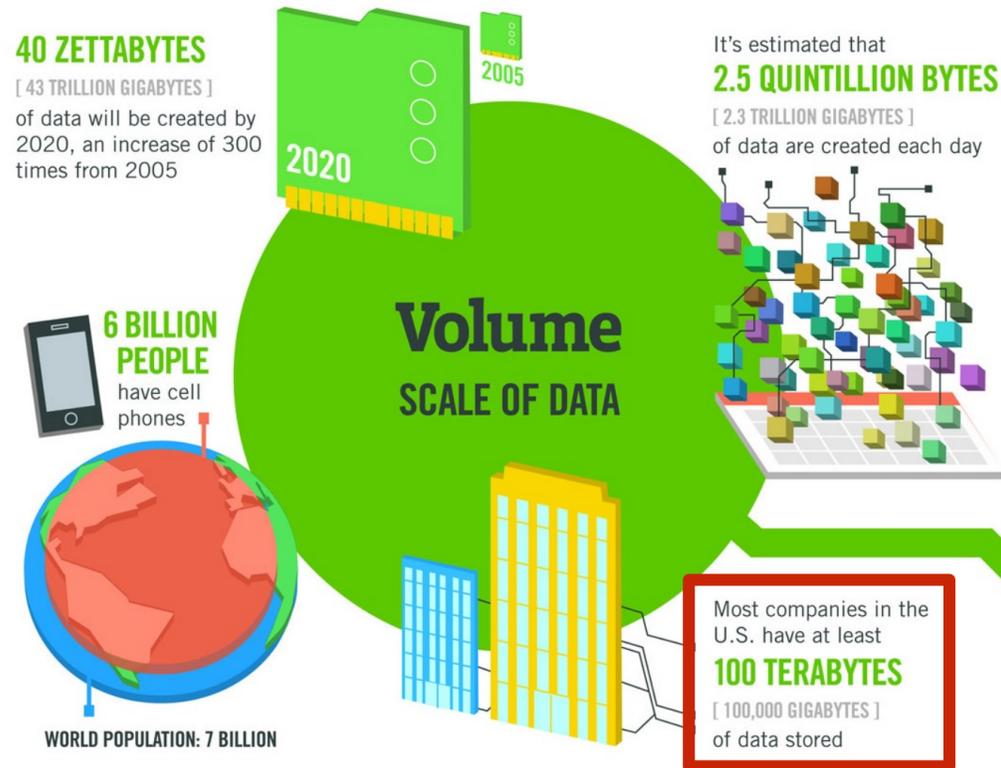


Poor data quality costs the US economy around **\$3.1 TRILLION A YEAR**



**27% OF RESPONDENTS** in one survey were unsure of how much of their data was inaccurate

## Veracity UNCERTAINTY OF DATA



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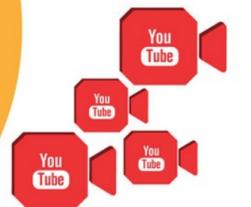
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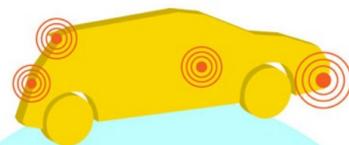
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### Veracity UNCERTAINTY OF DATA

## Volume SCALE OF DATA

**40 ZETTABYTES**  
[ 43 TRILLION GIGABYTES ]  
of data will be created by 2020, an increase of 300 times from 2005

It's estimated that **2.5 QUINTILLION BYTES**  
[ 2.3 TRILLION GIGABYTES ]  
of data are created each day

**6 BILLION PEOPLE** have cell phones

**WORLD POPULATION: 7 BILLION**

Most companies in the U.S. have at least **100 TERABYTES**  
[ 100,000 GIGABYTES ]  
of data stored

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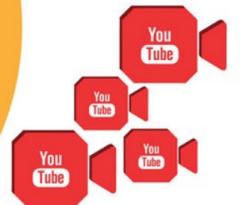


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## Variety DIFFERENT FORMS OF DATA

**4 BILLION+ HOURS OF VIDEO** are watched on YouTube each month



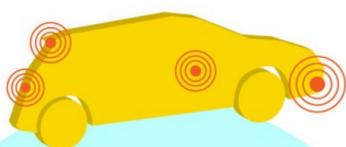
**400 MILLION TWEETS** are sent per day by about 200 million monthly active users



The New York Stock Exchange captures **1 TB OF TRADE INFORMATION** during each trading session



Modern cars have close to **100 SENSORS** that monitor items such as fuel level and tire pressure



## Velocity ANALYSIS OF STREAMING DATA

By 2016, it is projected there will be **18.9 BILLION NETWORK CONNECTIONS** – almost 2.5 connections per person on earth



**1 IN 3 BUSINESS LEADERS** don't trust the information they use to make decisions



Poor data quality costs the US economy around **\$3.1 TRILLION A YEAR**



**27% OF RESPONDENTS**

in one survey were unsure of how much of their data was inaccurate

## Veracity UNCERTAINTY OF DATA

## Volume SCALE OF DATA

**40 ZETTABYTES**  
[ 43 TRILLION GIGABYTES ]  
of data will be created by 2020, an increase of 300 times from 2005

It's estimated that **2.5 QUINTILLION BYTES**  
[ 2.3 TRILLION GIGABYTES ]  
of data are created each day

**6 BILLION PEOPLE** have cell phones

**WORLD POPULATION: 7 BILLION**

Most companies in the U.S. have at least **100 TERABYTES**  
[ 100,000 GIGABYTES ]  
of data stored

# The FOUR V's of Big Data

From traffic patterns and music downloads to web history and medical records, data is recorded, stored, and analyzed to enable the technology and services that the world relies on every day. But what exactly is big data, and how can these massive amounts of data be used?

As a leader in the sector, IBM data scientists break big data into four dimensions: **Volume, Velocity, Variety and Veracity**

Depending on the industry and organization, big data encompasses information from multiple internal and external sources such as transactions, social media, enterprise content, sensors and mobile devices. Companies can leverage data to adapt their products and services to better meet customer needs, optimize operations and infrastructure, and find new sources of revenue.

By 2015 **4.4 MILLION IT JOBS** will be created globally to support big data, with 1.9 million in the United States



As of 2011, the global size of data in healthcare was estimated to be **150 EXABYTES**  
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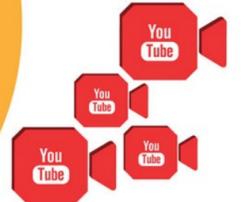


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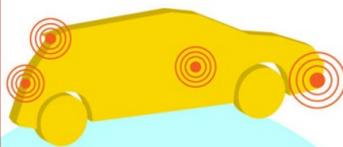
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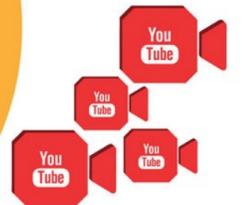


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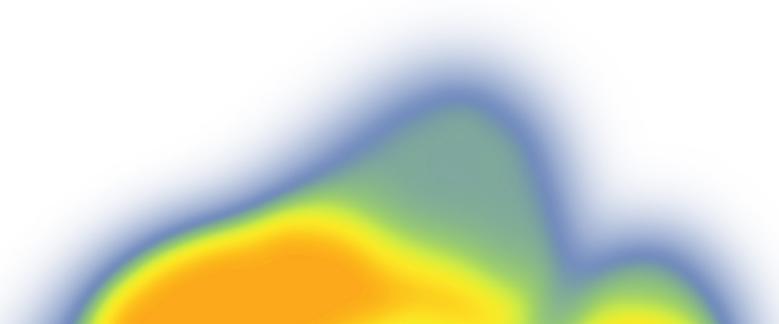
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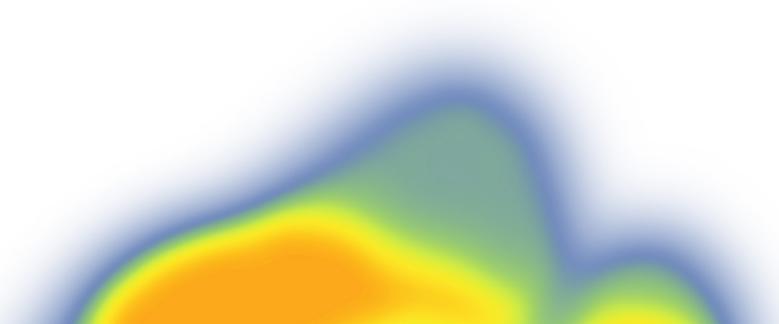
## Big Data und IoT

Big Data (unabhängig, aber Web macht sammeln und verbreiten einfach)

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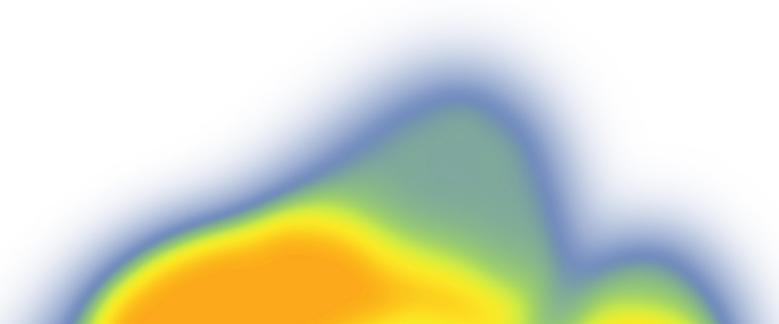
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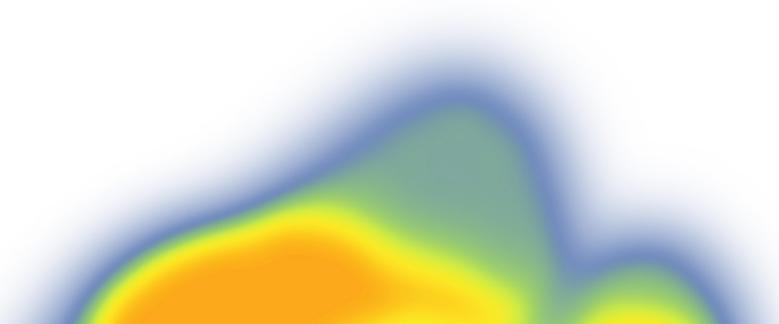


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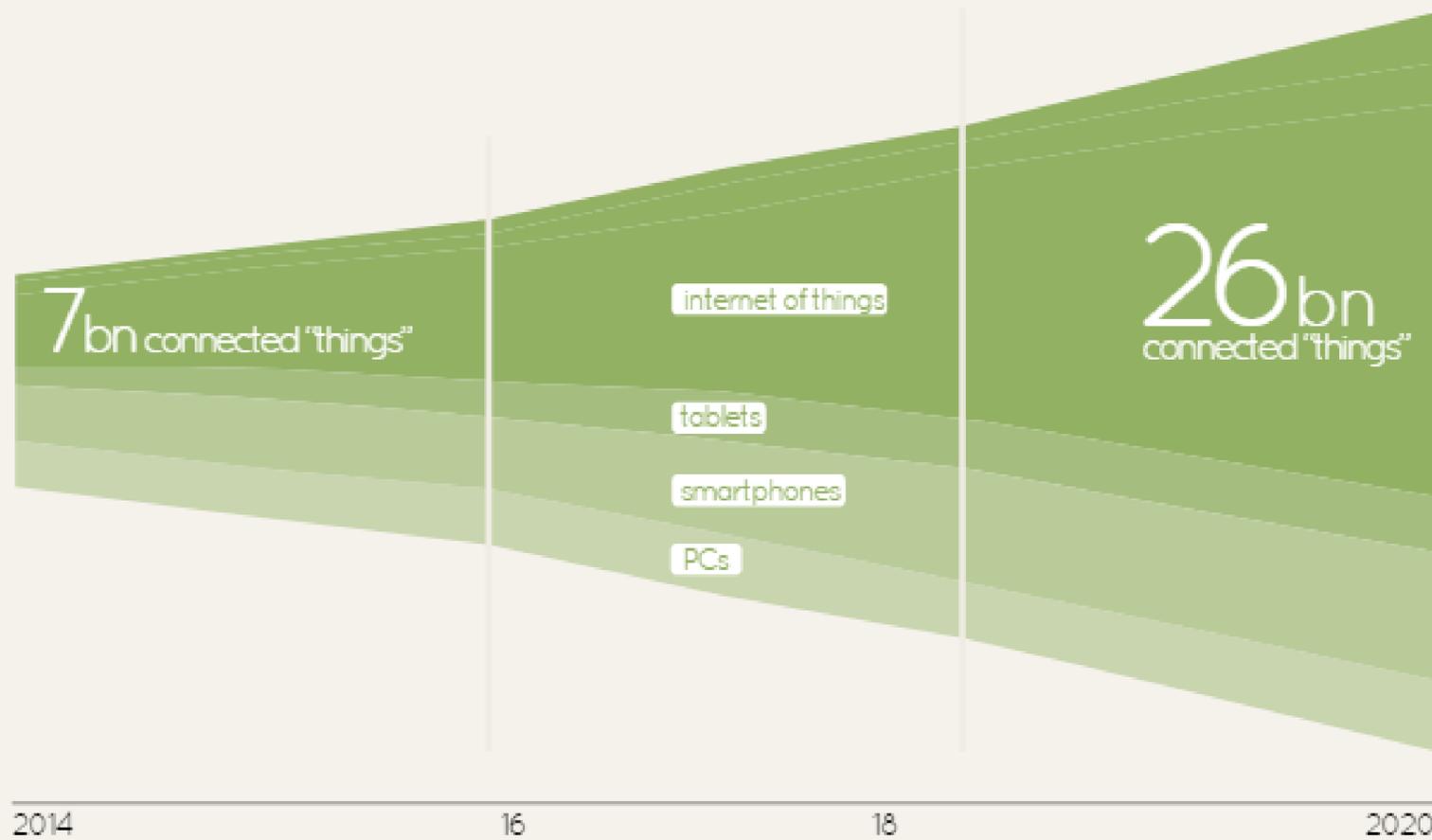
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- Alltagsgegenstände mit Sensoren/Prozessoren/Netzwerktechnik
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## CONNECTED DEVICES

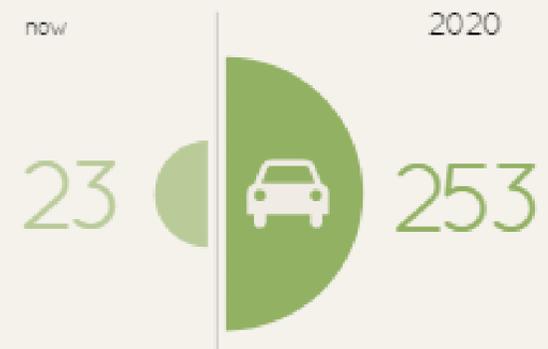


2014 16 18 2020  
source: Gartner

## IoT MARKET VALUE

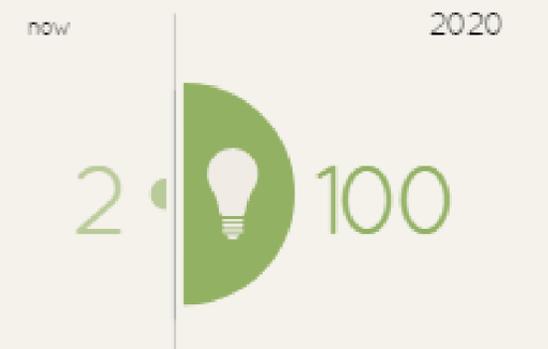


## CONNECTED CARS



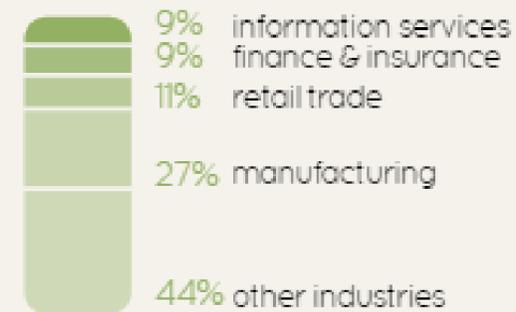
source: Forbes

## CONNECTED LIGHTS



source: On World via Forbes

## CONNECTED INDUSTRIES



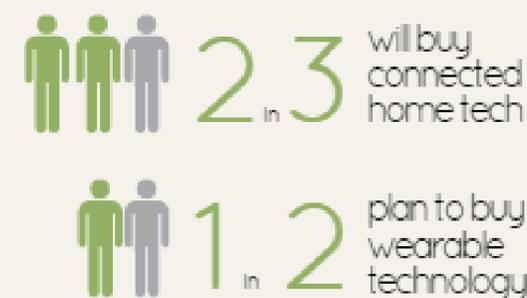
source: Deutsche Bank, Cisco

## CONNECTED BIZ

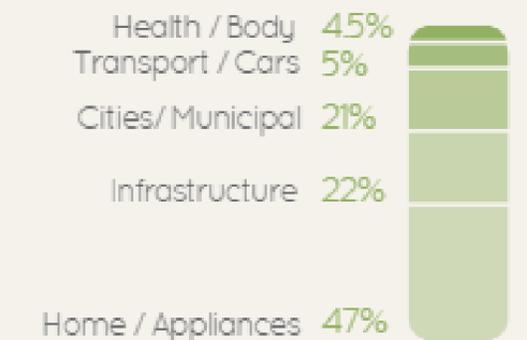


source: SAP

## CONNECTED PEOPLE



## CONNECTED TECH

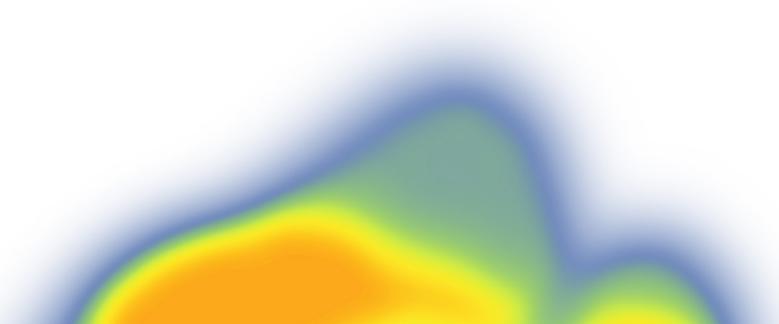


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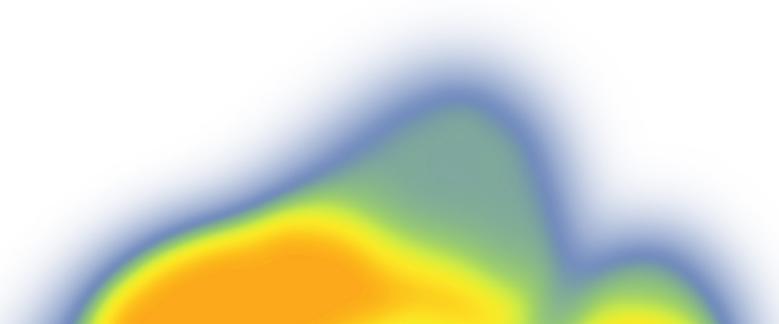
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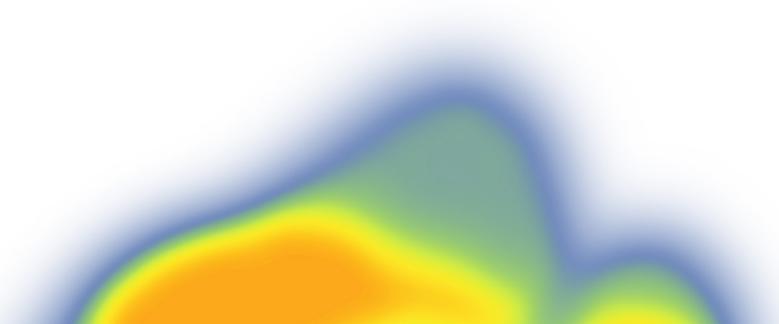
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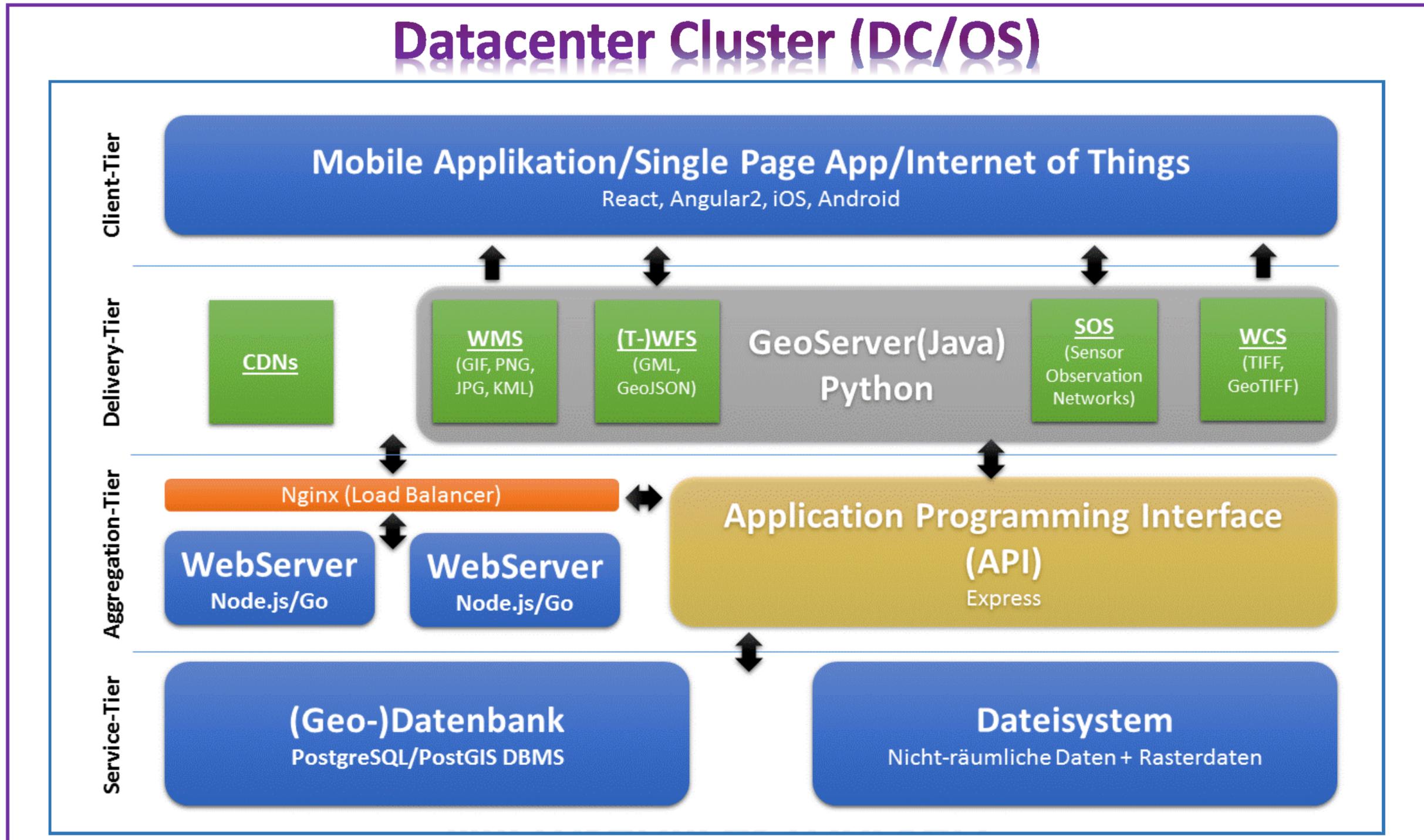
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  - Beispiel: Industrie 4.0
- 

# Applikationsstruktur

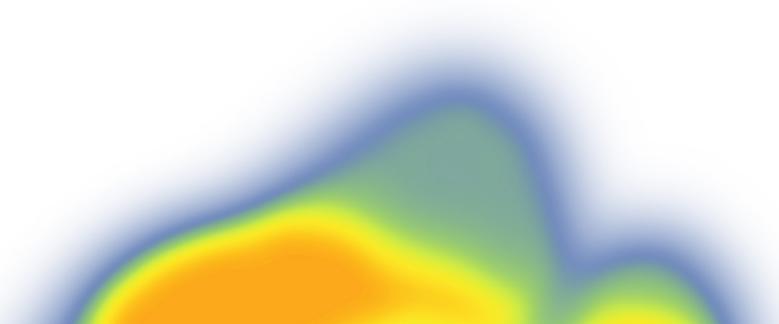


## Beispiele

<http://uber.github.io/deck.gl/#/examples/core-layers/line-layer>

<http://akveo.com/blur-admin/#/dashboard>

[www.AmuCad.org](http://www.AmuCad.org) (Beta)



KARTE

DASHBOARD

LOGOUT

GER

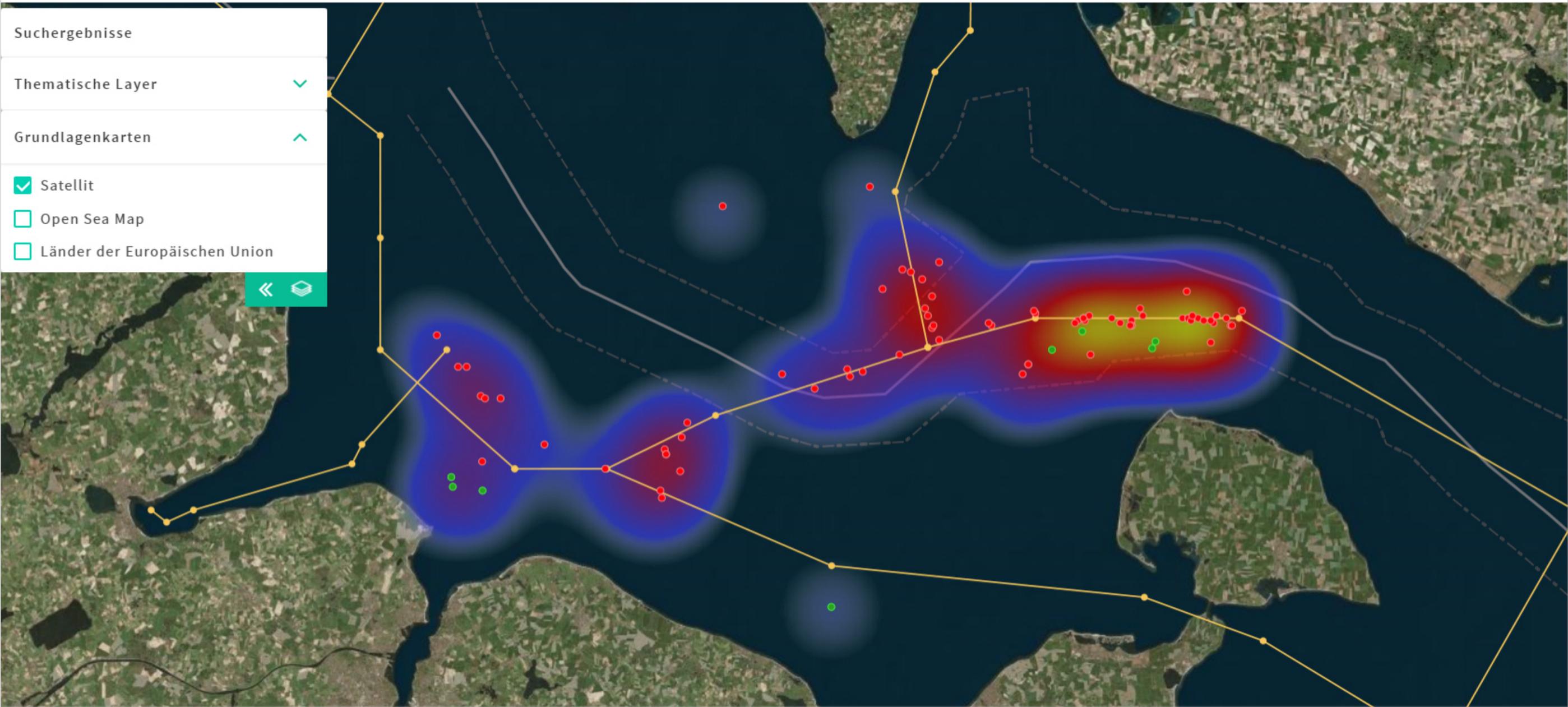
Suchergebnisse

Thematische Layer ▼

Grundlagenkarten ▲

- Satellit
- Open Sea Map
- Länder der Europäischen Union

◀ ◻



**Vielen Dank!**

