JADE UNIVERSITY OF APPLIED SCIENCES
Wilhelmshaven Oldenburg Elsfleth

Animated Cartographic Visualisation of Networks on Mobile Devices

Andreas Gollenstede, Manfred Weisensee | www.jade-hs.de

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OUTLINE

JADE UNIVERSITY OF APPLIED SCIENCES
Wilhelmshaven Oldenburg Elsfleth

- Networks
- Cartographic Visualisation of Networks
- Mobile Devices and Off-Screen Objects
- Existing Approaches
- Animation
- A First Model / Rules for Cartographic Visualisation
- Outlook

NETWORKS

Types of networks:

- metro networks
- street networks
- organisational networks
- power supply grids
- ...

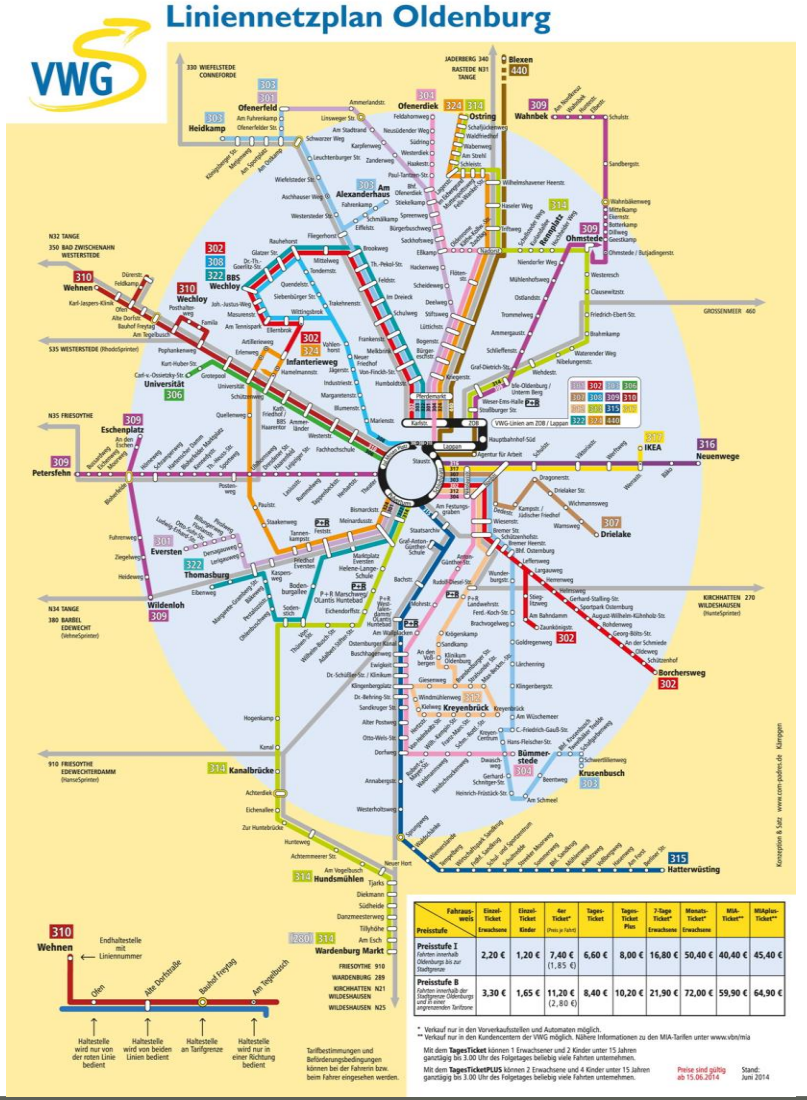
Cartographic Presentations of Networks help to ...

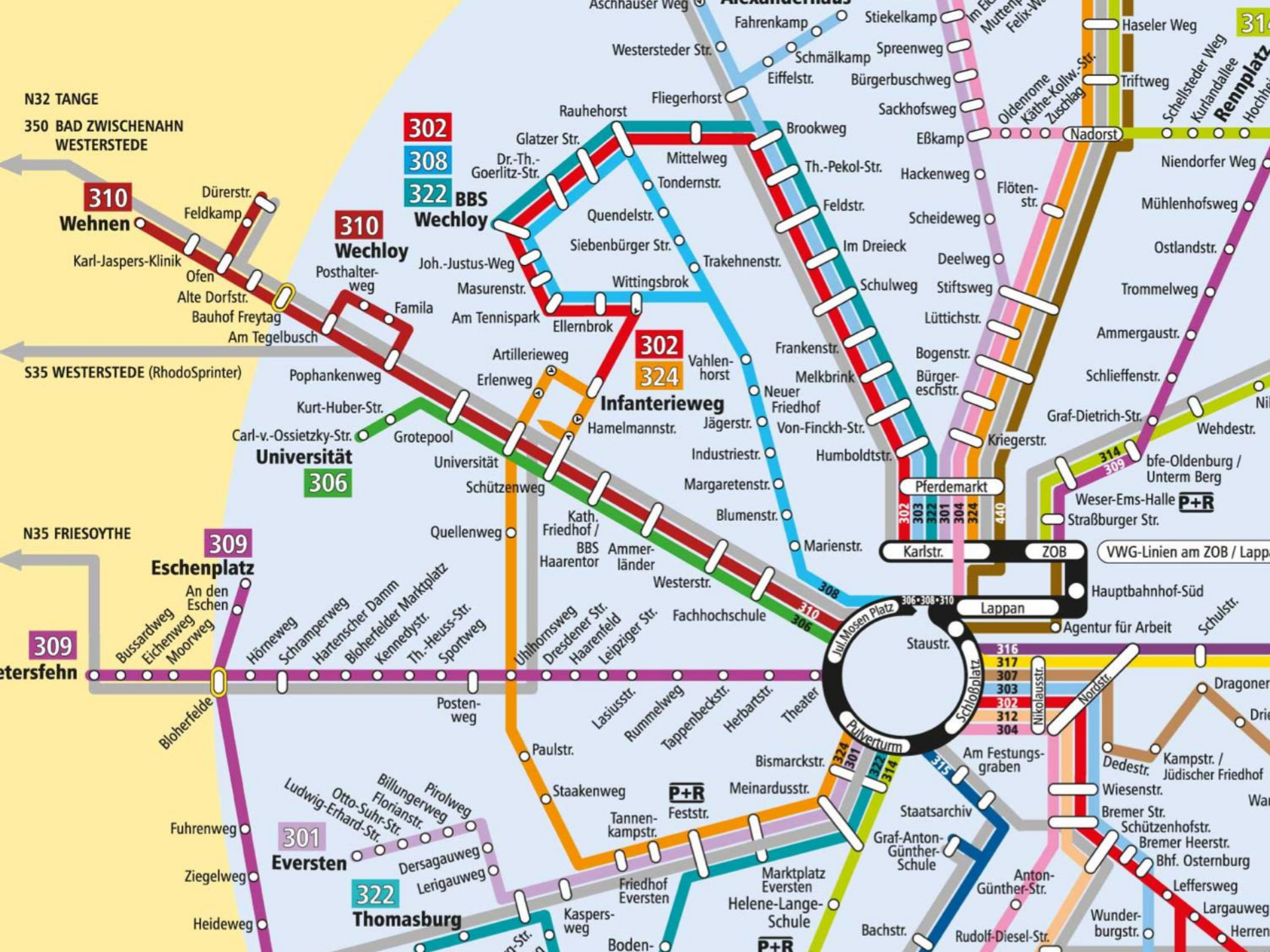
- explore
- analyse
- interpret
- ...

... relations between objects

CARTOGRAPHIC REPRESENTATION

- example:
  "classical" bus map
  - highly generalised
  - schematic
  - raumtreu
  - focus on „correct“ topology
  - …




N32 TANGE
350 BAD ZWISCHENAHN
WESTERSTEDE
310
Wehnen
Dürerstr.
Feldkamp
Karl-Jaspers-Klinik
Ofen
Alte Dorfstr.
Bauhof Freytag
Am Tegelbusch
S35 WESTERSTEDE (RhodoSprinter)
310
Wechloy
Posthalter-weg
Famila
Pophankenweg
Kurt-Huber-Str.
Carl-v.-Ossietzky-Str.
Universität
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BBS
Wechloy
Glatzer Str.
Dr.-Th.-Goerlitz-Str.
Rauhehorst
Joh.-Justus-Weg
Masurenstr.
Am Tennispark
Ellernbrok
Quendelstr.
Siebenbürger Str.
Wittingsbrok
Tondernstr.
Mittelweg
Fliegerhorst
Westersteder Str.
Aschhauser Weg
Alexandrinhaus
Fahrenkamp
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Erlenweg
Infanterieweg
Hamelmannstr.
Vahlen-horst
Neuer Friedhof
Jägerstr.
Grotepool
Universität
Schützenweg
Quellenweg
Kath. Friedhof / BBS Haarentor
Ammer-länder
Westerstr.
Fachhochschule
Uhlhornsweg
Dresdener Str.
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Bloherfelder Marktplatz
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Th.-Heuss-Str.
Sportweg
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Fuhrenweg
Ziegelweg
Heideweg
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Eversten
Billungerweg
Pirolweg
Florianstr.
Otto-Suhr-Str.
Ludwig-Erhard-Str.
Dersagauweg
Lerigauweg
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Thomasburg
Frankenstr.
Melkbrink
Von-Finckh-Str.
Industriestr.
Margaretenstr.
Blumenstr.
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Stiekelkamp
Spreenweg
Bürgerbuschweg
Sackhofsweg
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Im Dreieck
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Th.-Pekol-Str.
Brookweg
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Karlstr.
ZOB
VWG-Linien am ZOB / Lappa
Hauptbahnhof-Süd
Lappan
Agentur für Arbeit
Schulstr.
Straßburger Str.
Weser-Ems-Halle
P+R
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bfe-Oldenburg / Unterm Berg
Graf-Dietrich-Str.
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Trommelweg
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Nikolausstr.
Nordstr.
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Am Festungs-graben
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Staatsarchiv
Graf-Anton-Günther-Schule
Anton-Günther-Str.
Bachstr.
Rudolf-Diesel-Str.
Dedestr.
Kampstr. / Jüdischer Friedhof
Wiesenstr.
Bremer Str.
Schützenhofstr.
Bremer Heerstr.
Bhf. Osternburg
Leffersweg
Largauweg
Wunder-burgstr.
Dragoner
Schellsteder Weg
Kurlandallee
Rennplatz


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P+R
Meinardusstr.

MOBILE DEVICE

- very limited viewport
- special usability aspects

- find an acceptable compromise between mobility and the ability to show as much information as needed or even possible

OFF SCREEN OBJECTS

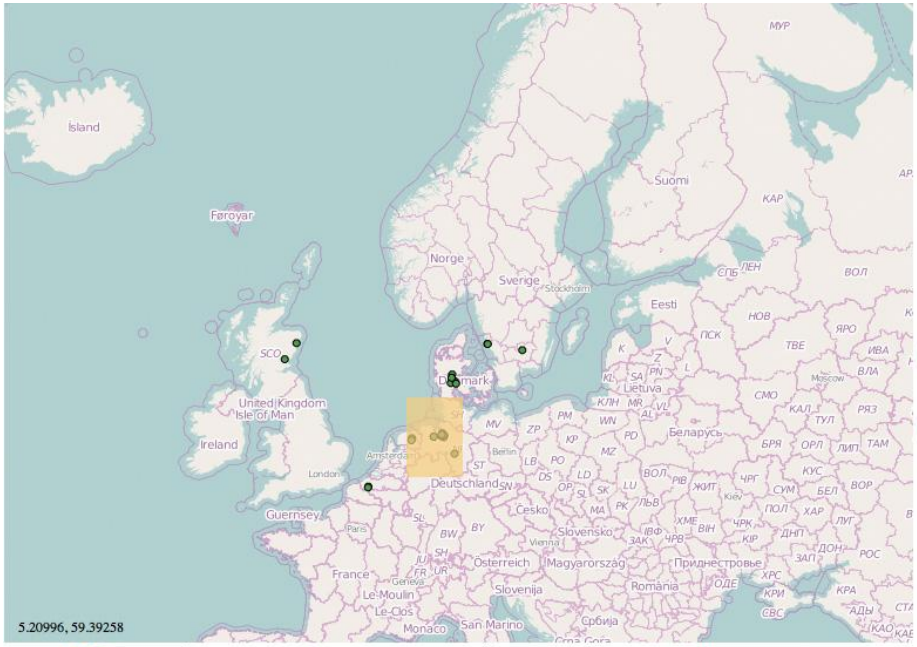
What?

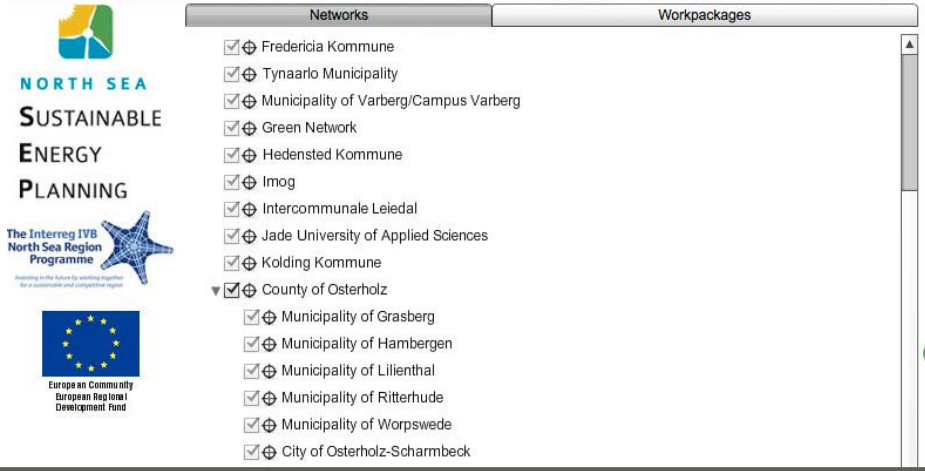
When?

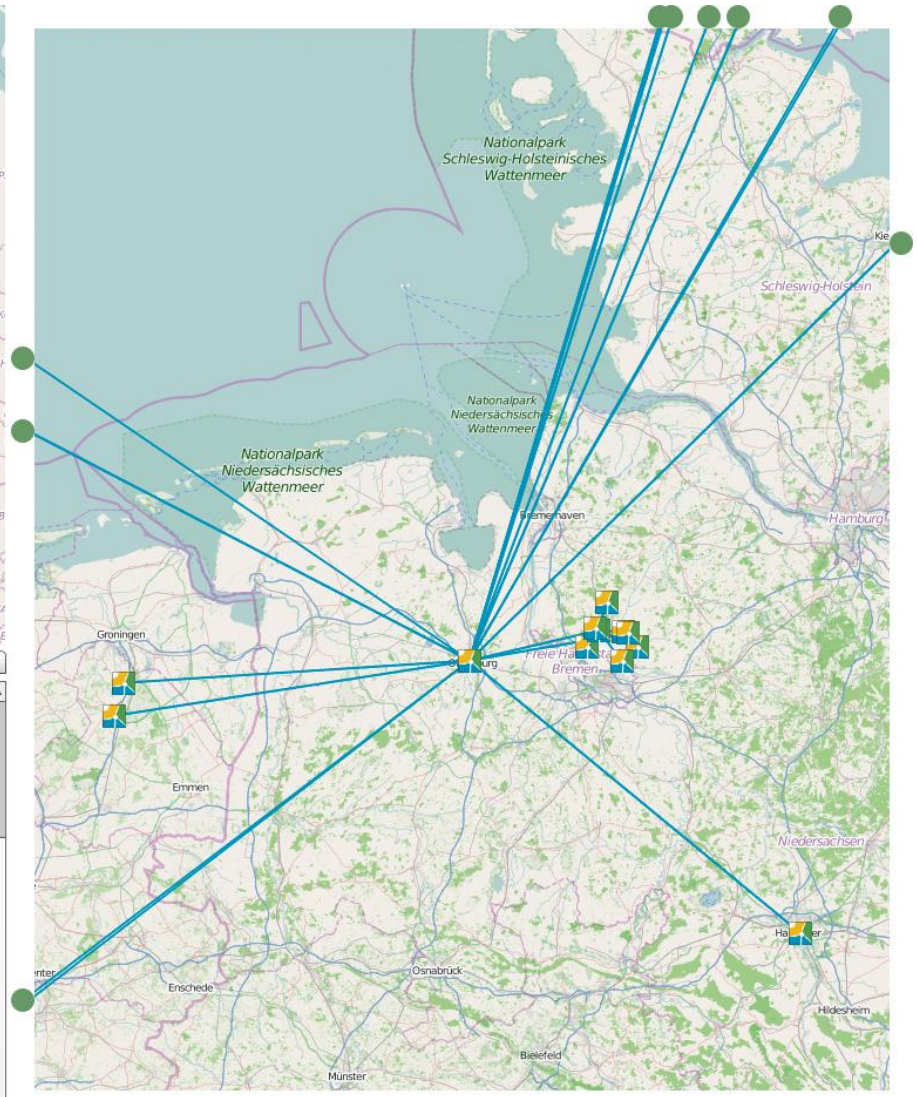
Where?

How much?

OFF-SCREEN OBJECTS







THE FRINGE

NOUN a fringe | fringes
VERB to fringe | fringed | fringed
fringing | fringes
SYNO fringe | interference fringe | bang ...

to fringe
ausfransen
umsäumen
säumen cloth. textil.

to fringe [hem, border]
einsäumen

to fringe sth.
etw. mit Fransen besetzen textil.

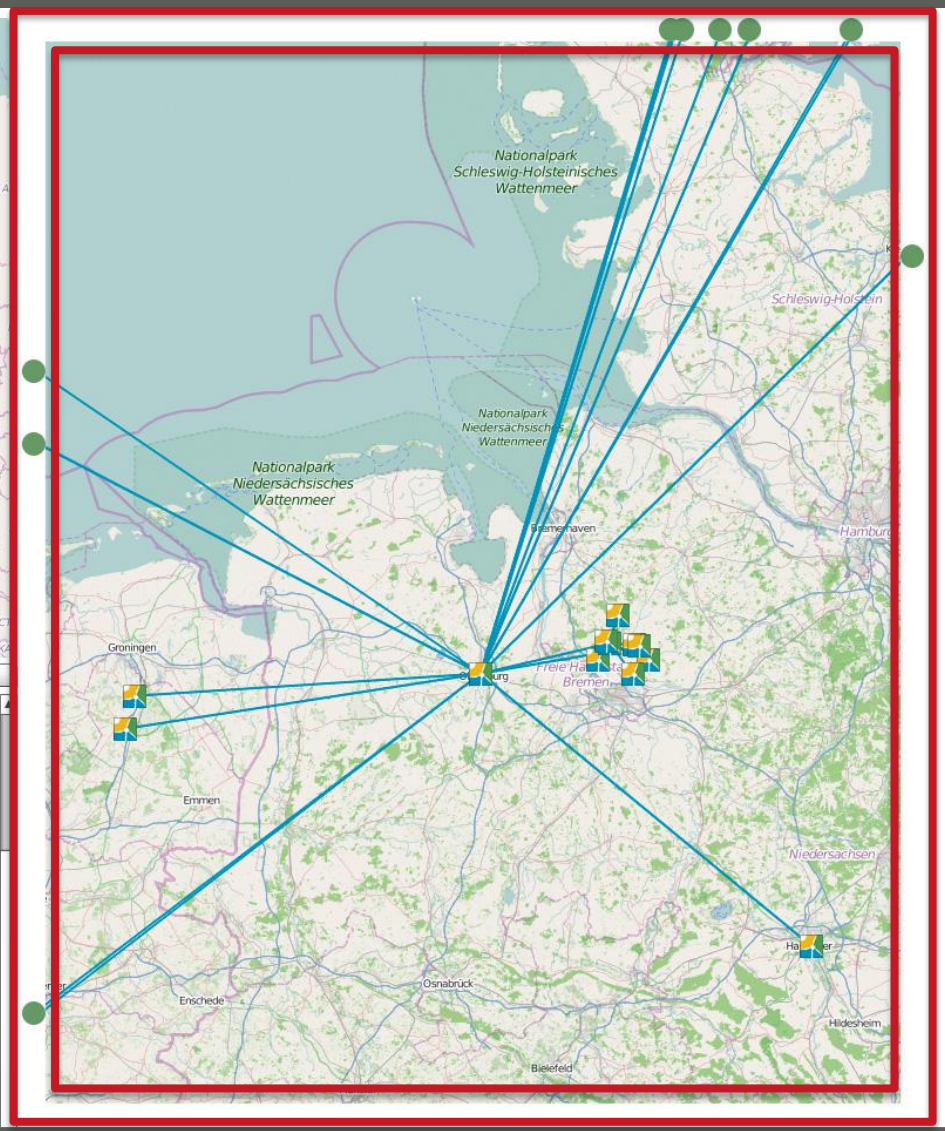
fringe [periphery]
Rand {m} [Peripherie]

fringe [chiefly Br.]
Pony {m} [Frisur]

fringe
Franse {f}
Randgebiet {n}
Saum {m}
Umrandung {f}
Randzone {f}
Randbezirk {m}
Einfassung {f}
Ponyfrisur {f}

fringe [hairstyle]
Stirnfransen {pl}

fringe {sg} [hairstyle]
Ponyfransen {pl}

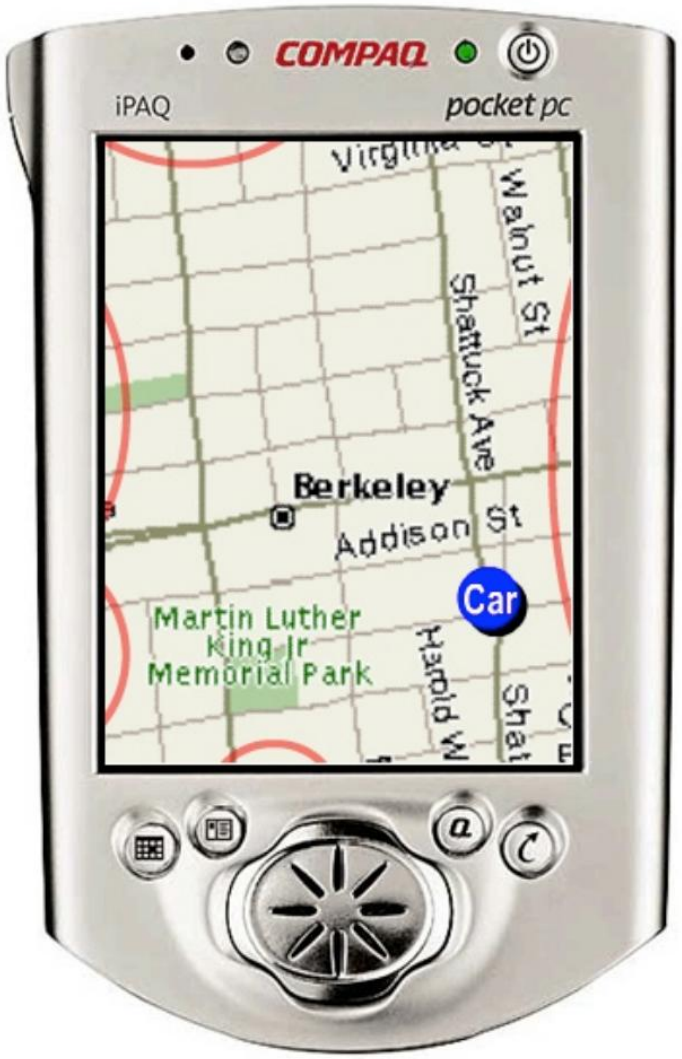


NORTH SEA SUSTAINABL ENERGY PLANNING

The Interreg IVB North Sea Region Programme

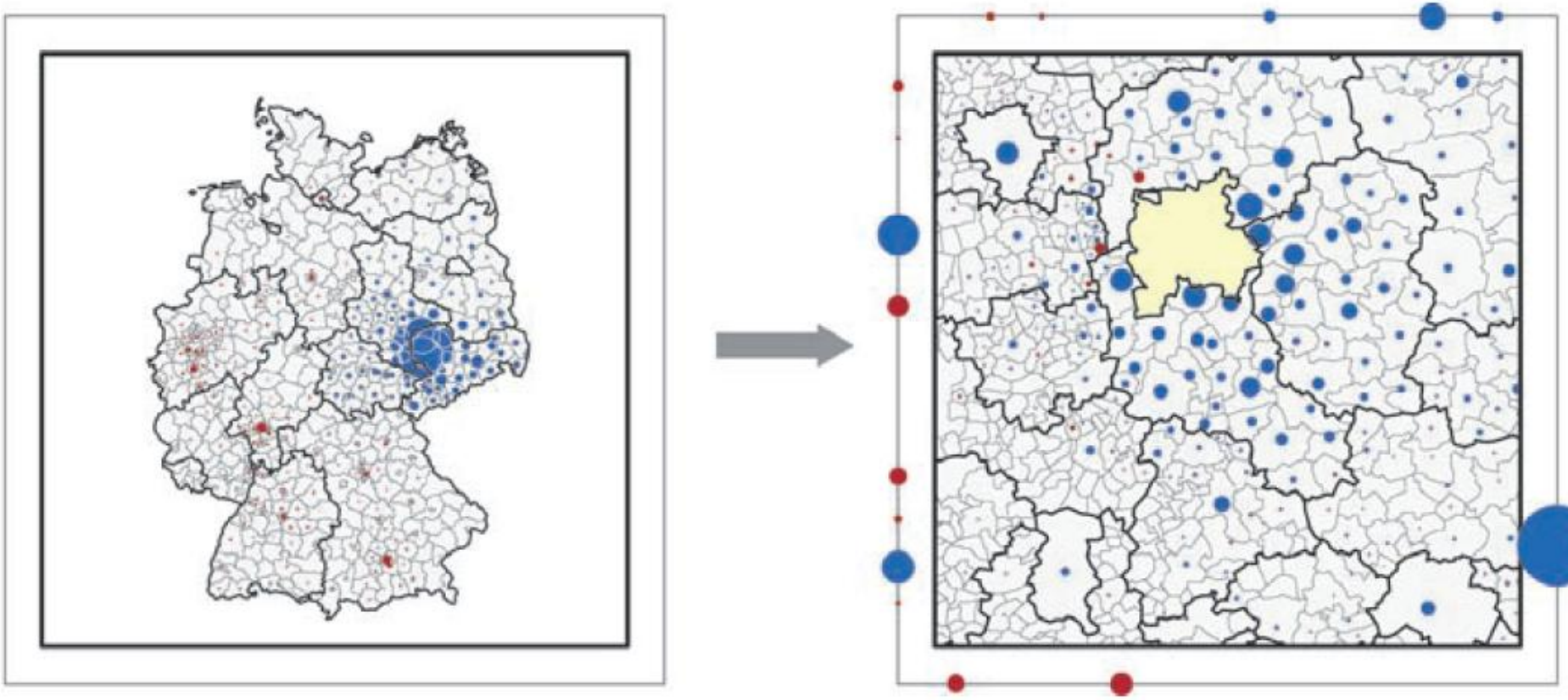
European Community European Regional Development Fund

PUBLISHED APPROACHES



Baudisch P, Rosenholtz R (2003) Halo: A Technique for Visualizing Off-Screen Locations. In Proceedings of CHI 2003, Fort Lauderdale, FL, April 2003, p.481-488

PUBLISHED APPROACHES



Hanewinkel C, Specht S (2010) Die Visualisierung von Pendlerverflechtungen – eine Herausforderung. Kartographische Nachrichten 2/2010, p.59-68

PUBLISHED APPROACHES

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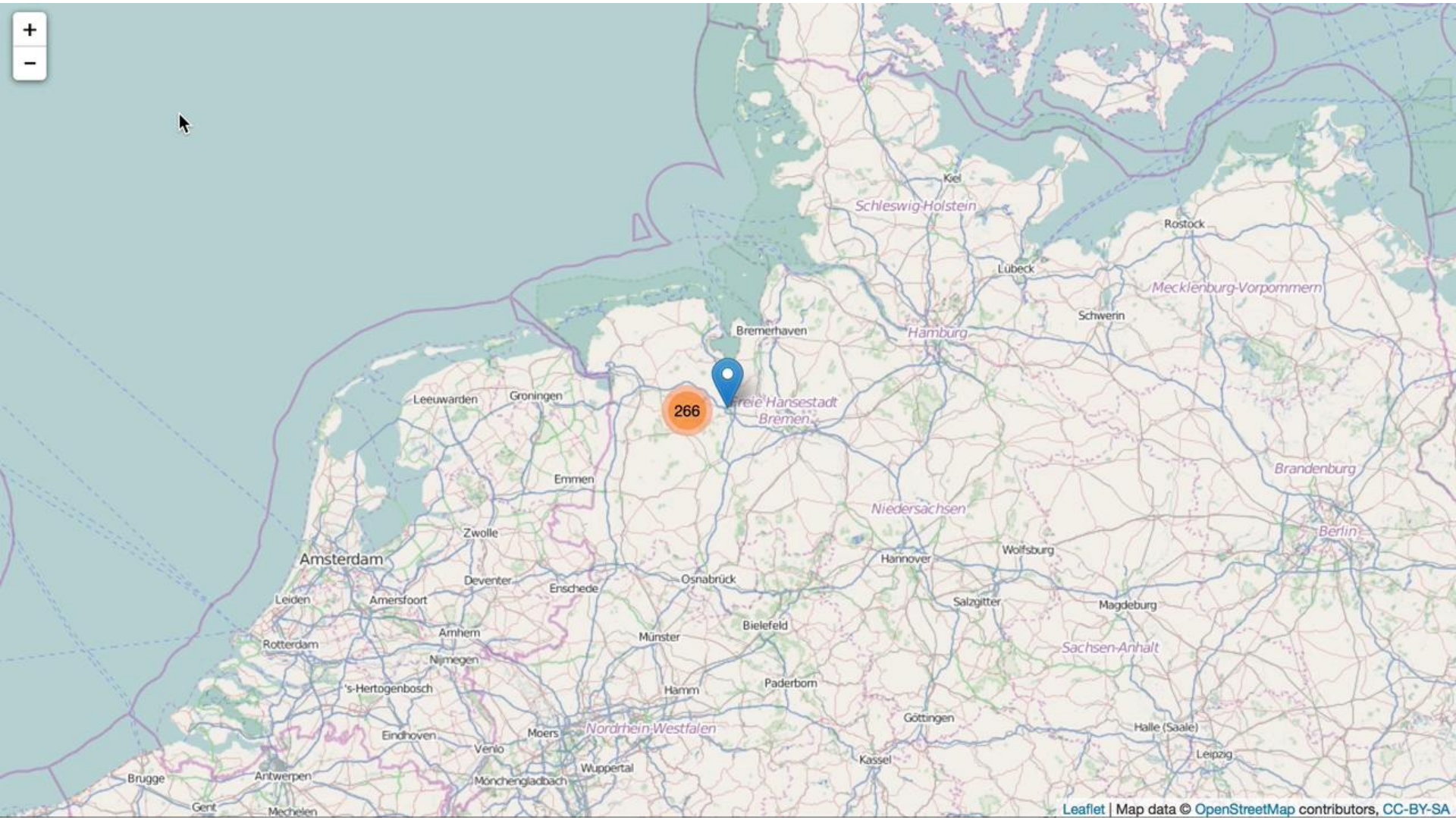
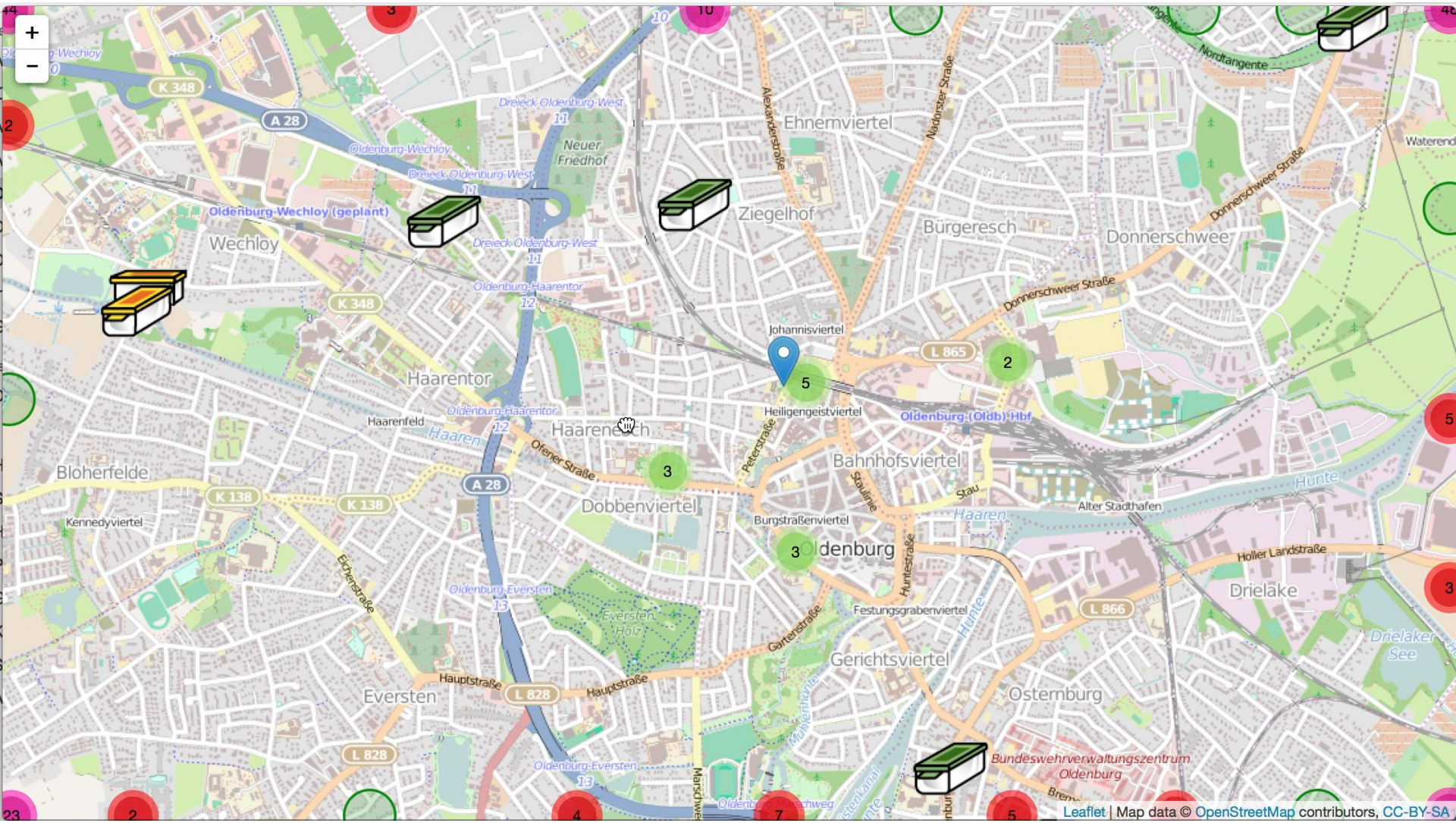
- Existing approaches are
  - not always following the rules for cartographic presentations
  - not always appropriate for mobile devices
  - not specialized on networks presentations
  - ...

THE ANIMATED FRINGE



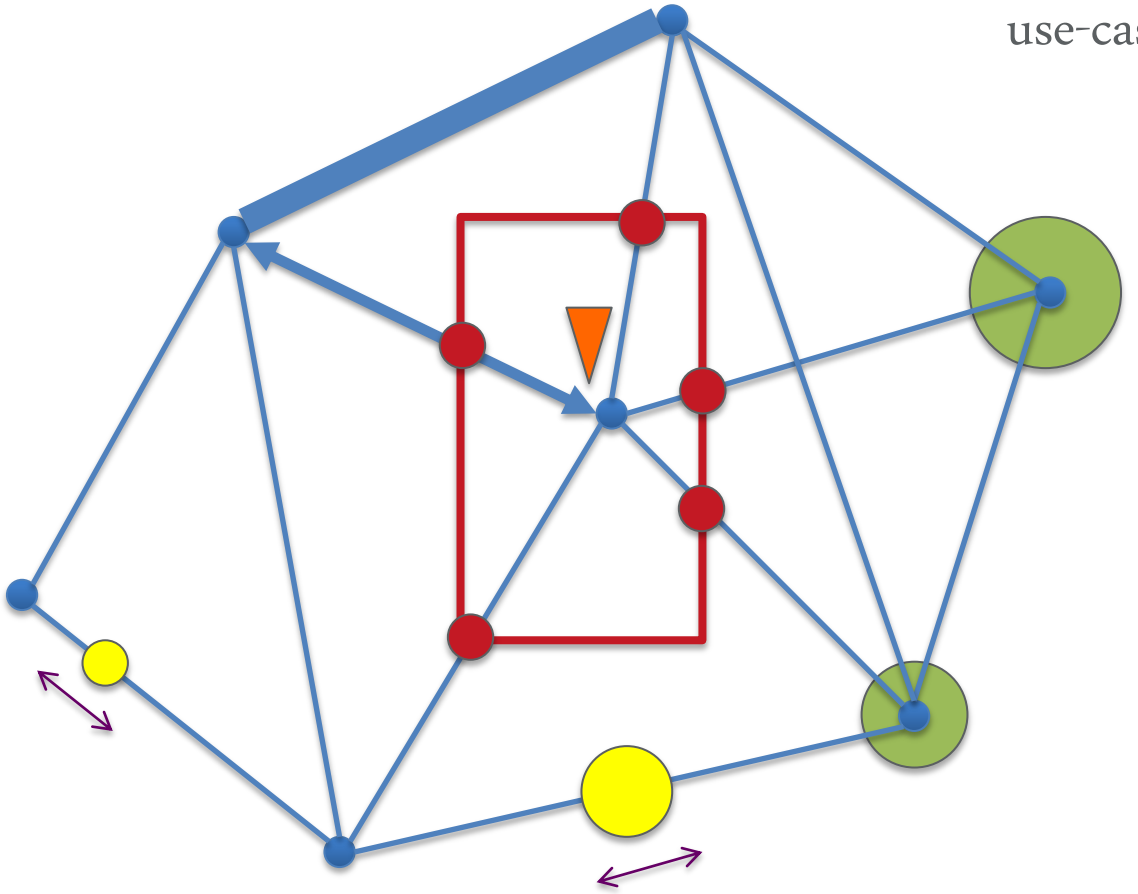
THE ANIMATED FRINGE



THE "MOBILE" FRINGE

- "Leaflet" JS framework (www.leafletjs.com)
- leaflet plug-in for the fringe
- PhoneGap for mobile devices (www.phonegap.com)
- cartographic rules for visualisation have not been taken into account here yet!!!
- just a functional prototype

A FIRST SIMPLE MODELL



- schematic visual model for the use-case “bus network”

FIRST MODEL BASED RULES (EXCERPT)

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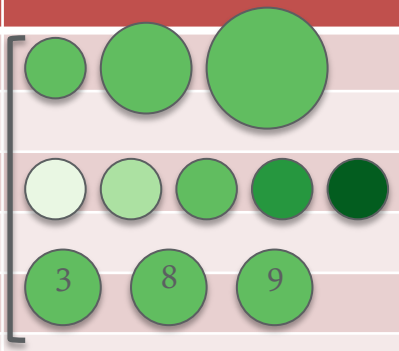
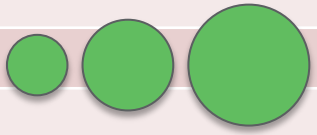
elements	attribute-types	static/dynamic	un-/directed	direction	network objects	fringe objects
nodes	qualities	static				
		changing				
	quantities	static				
		changing				
edges	qualities	static				
		changing				
	quantities	static	undirected			
			directed	single		
				bidir		
		changing	undirected			
			directed	single		
				bidir		
objects moving on edges	qualities					
	quantities					
	time					
...	...	...	...	...		

colours: www.colorbrewer2.org

LOCATION BASED INFORMATION

OUTLOOK

- more complex and more generic model
- refining the visualisation rulebook
  - algorithms ...
- implementing generalisation techniques
- not “just” focussing on network presentations
- also using the techniques in e. g. web apps
- optimising user interaction
- empirical user tests
- ...

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Thank you for your attention