

Cityware: Interplay between physical and digital space

Vassilis Kostakos

Lab:USE

University of Madeira

Carnegie Mellon University

Overview

- Current trends
- Technology, the city & people!
- How to think of city-ware
- Dark scenarios
- Cityware on the web (Facebook)
- Cityware on buses

Current trends

Current trends

- Web 2.0
 - User generated content, web applications
- Mashups
 - Mixing various sources of information
- The social web
 - Web of friends is a resource

Technology, the city, and people!

Nokia Sensor

- “See and be seen”
- Local peer-to-peer profile searching





**MOBILEDATINGSOFTWARE.COM
& www.bluedating.info**

Bluedating

Find your soul-mate right next to
you!

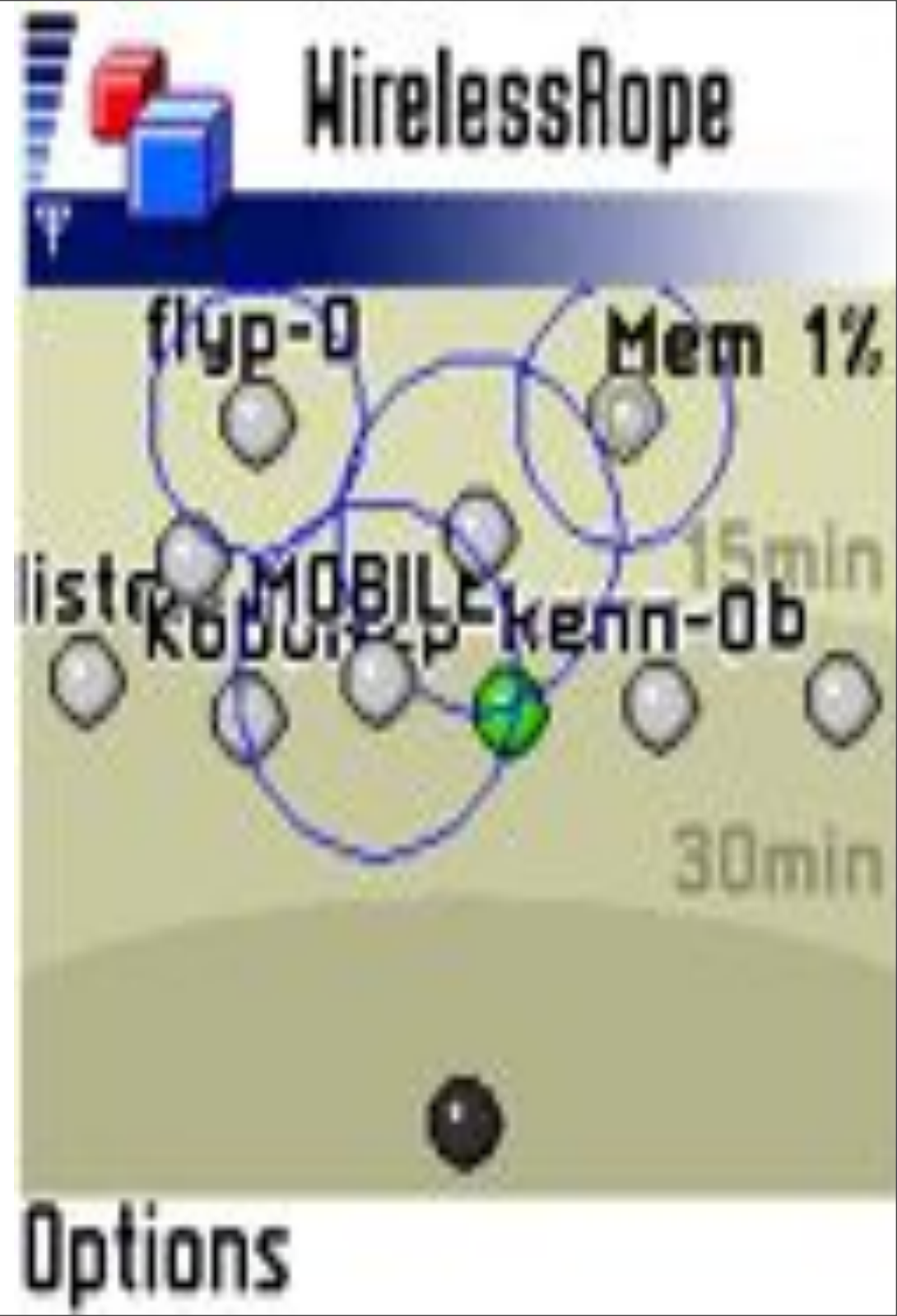
Bluetella

- Peer to peer file sharing
- File forwarding over clients



Wireless Rope

- See people nearby
- “Rope” your friends so you don’t get lost in a crowd





Jabberwocky

Meet familiar strangers
“Urban atmospheres” project



Telelogs

Listen to familiar strangers' audio blogs

ContextPhone

- Context aware
- Instant messenger
- Communicates over network / bluetooth



decoy

A red mobile phone is shown with a green circuit board attached to its back. The circuit board is labeled 'SNAP' and 'www.insystech.com'. The phone is positioned diagonally across the frame, with the word 'decoy' overlaid in large white letters. The background is a solid blue color.

Decoy

An invisible poster, graffiti or a direction sign which gets alive by the mobile in the pocket



MobiTip

Location-based tips about
restaurants, shops, etc.



You-Who

Question-and-answer game to
meet strangers



Talking points

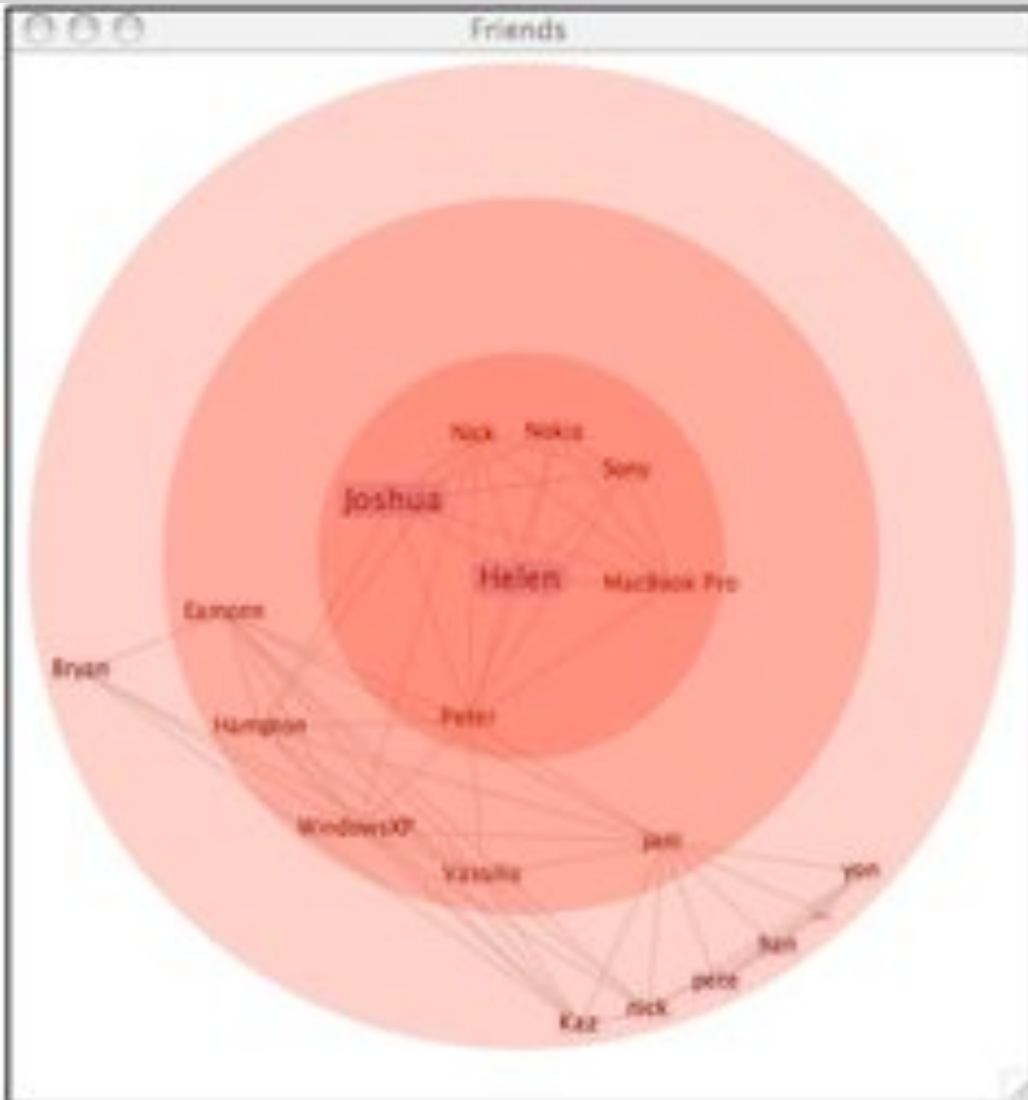
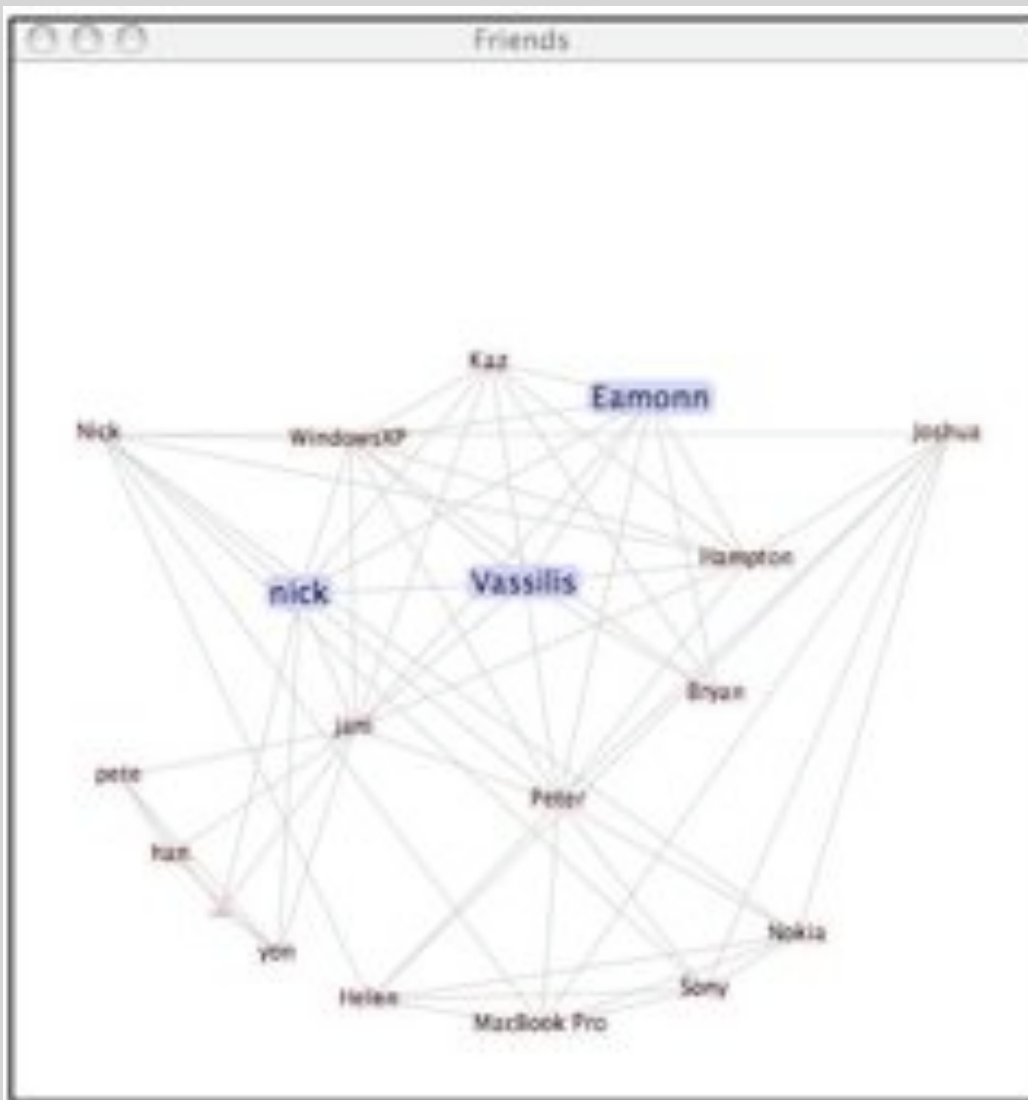
Bluetooth augmented spaces
help blind people navigate



Bluefish

Each person has a fish

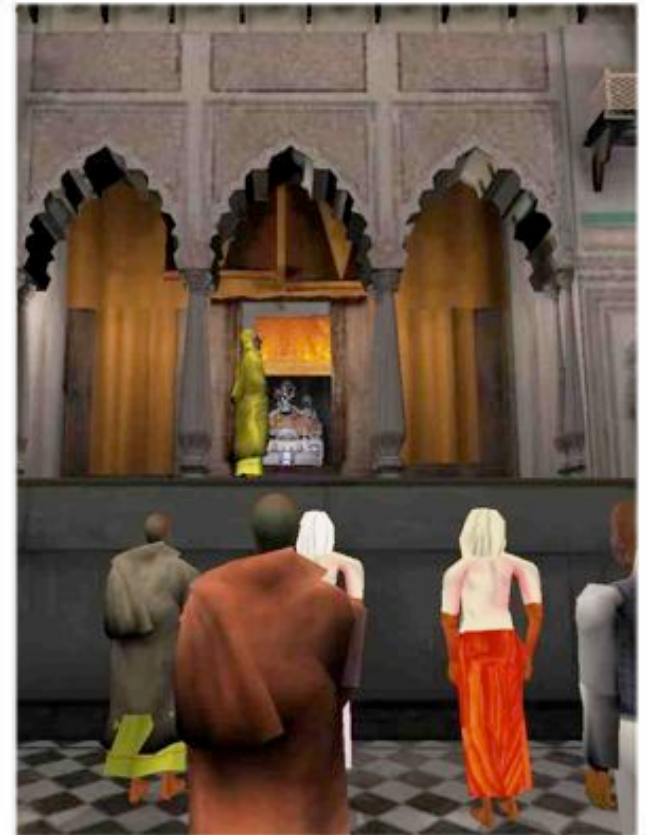




Friend of a friend

Explore your community

How to think about city-ware



Virtual reality?



Augmented reality?



Wearable computing?



Pervasive computing?



Pervasive computing

Location

Technology

Information

Private Space



Private Interaction Space



Social Space



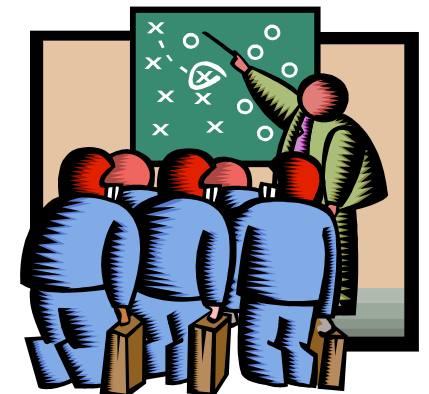
Private Sphere



Public Space



Public Interaction Space



Dark scenarios

Interesting problems
Interesting solutions

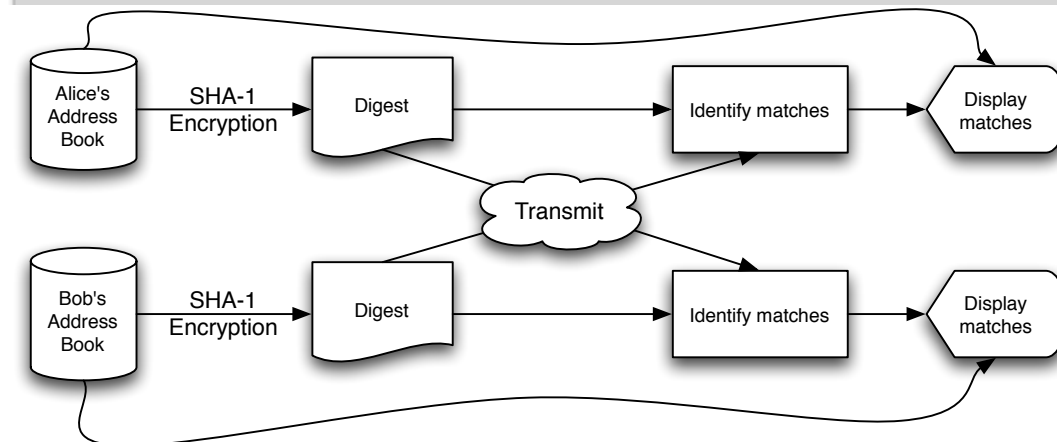
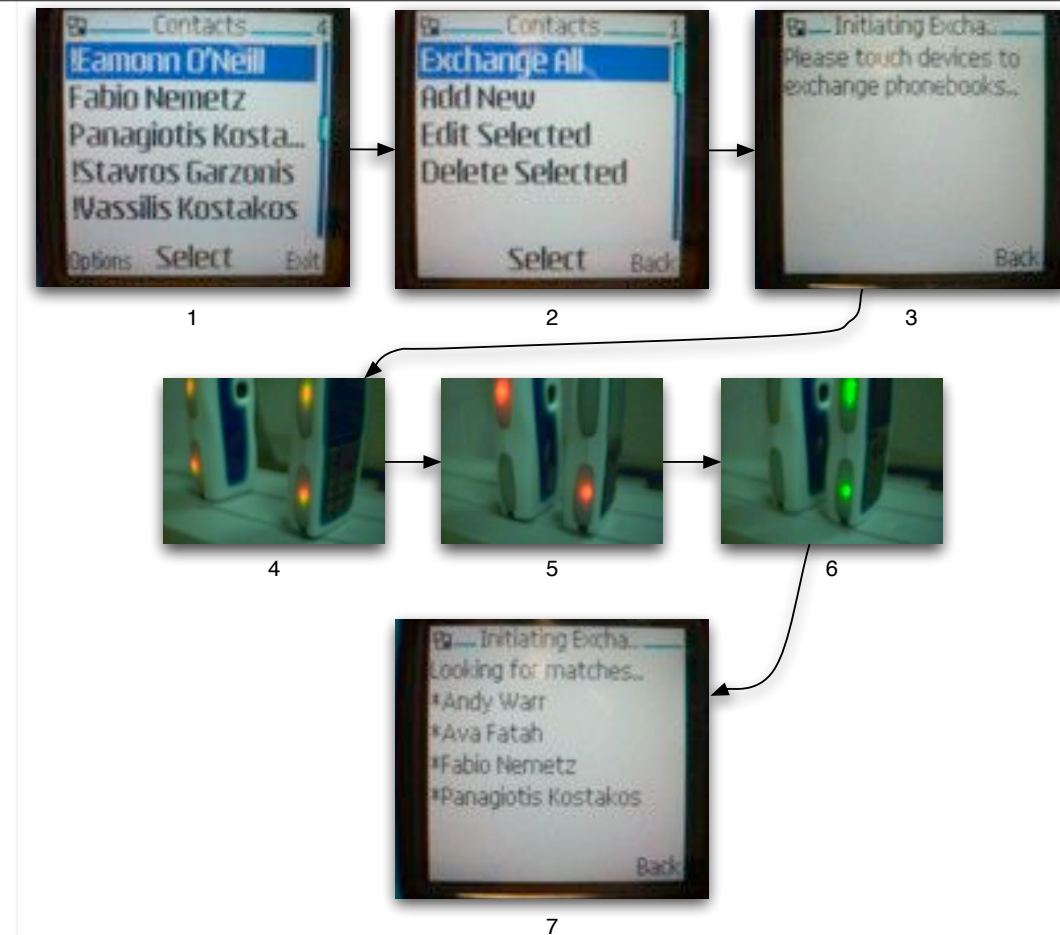
Who is using this device/service?

Extending TCP/IP protocol with biometric information gathered where physical interaction naturally takes place.



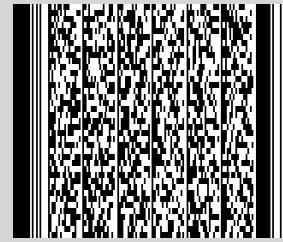
Who am I interacting with?

Private matching algorithm for ad-hoc peer to peer communication.



What am I interacting with?

Using physical tokens from the environment to verify the service or device you are communicating with. (NFC, RFID, sound, photo).



Still not convinced?



Last Updated: Thursday, 16 August 2007, 14:37 GMT 15:37 UK

[E-mail this to a friend](#)[Printable version](#)

Bluetooth helps Facebook friends

A team of UK researchers is combining the power of social network Facebook with communications tool Bluetooth to learn more about human interactions.

Bath University scientists have created a tool which can use the unique ID of Bluetooth devices, like a mobile phone, to build new friendship networks.

Users register with the Facebook tool, called Cityware, that tracks encounters in the real world via Bluetooth.

It is part of a wider project backed by Nokia, HP Labs and Vodafone.



Cityware nodes have been set up in Bath and London

SEE ALSO

- [Using Bluetooth](#)
07 Mar 07 | [School Report](#)
- [Art project tracks Bluetooth users](#)
22 May 07 | [Technology](#)
- [Legal fight over Bluetooth chips](#)
04 Jan 07 | [Technology](#)

RELATED INTERNET LINKS

- [Cityware](#)
- [About Cityware on Facebook](#)
(requires registration)

The BBC is not responsible for the content of external internet sites

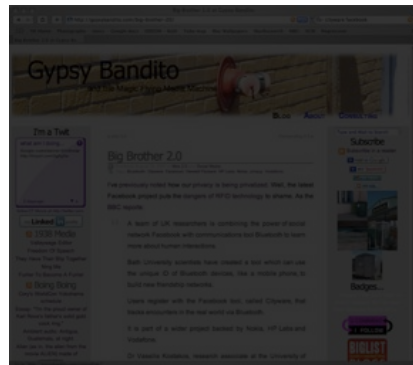
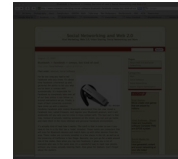
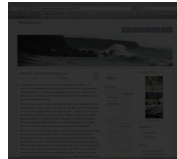
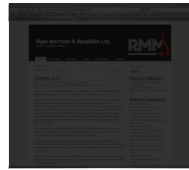
TOP TECHNOLOGY STORIES

- [Legal threats halt iPhone crack](#)
- [Apollo Moon photos reveal detail](#)
- [Yahoo plea over China rights case](#)

[News feeds](#)

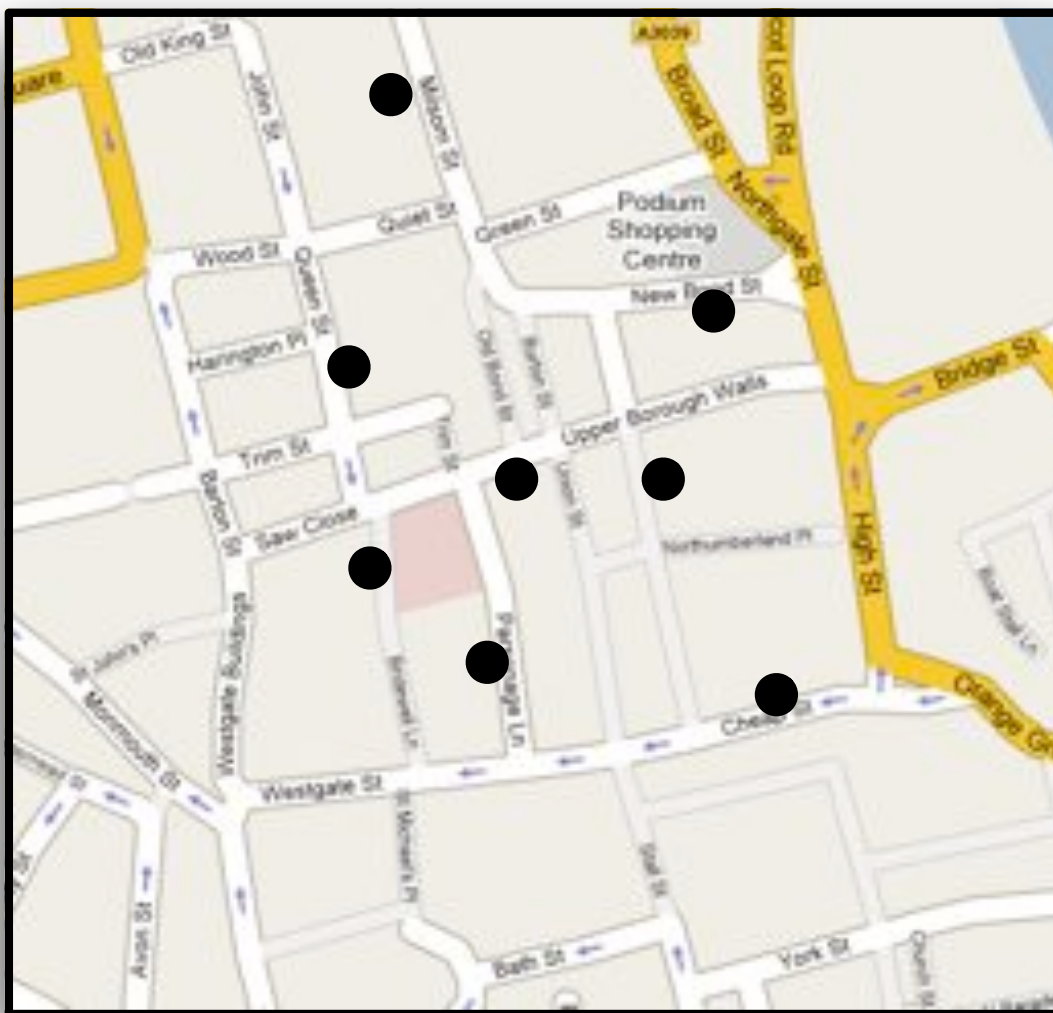
MOST POPULAR STORIES NOW

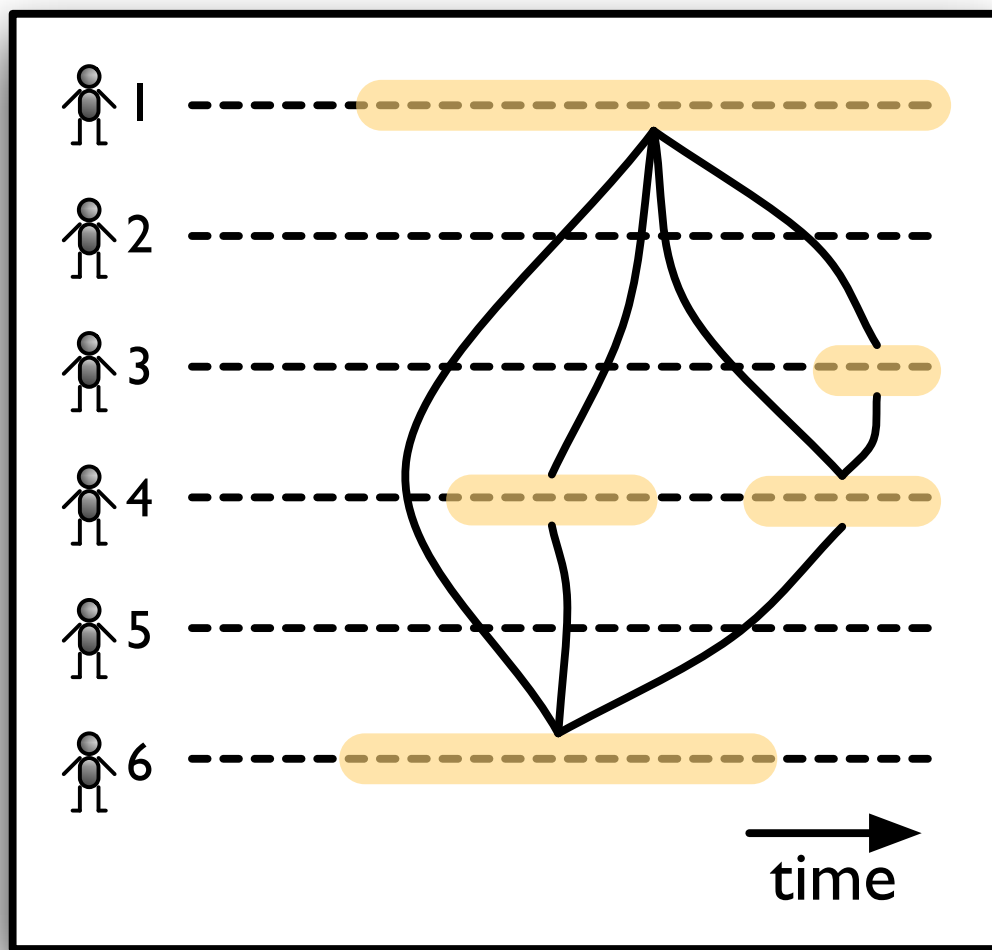
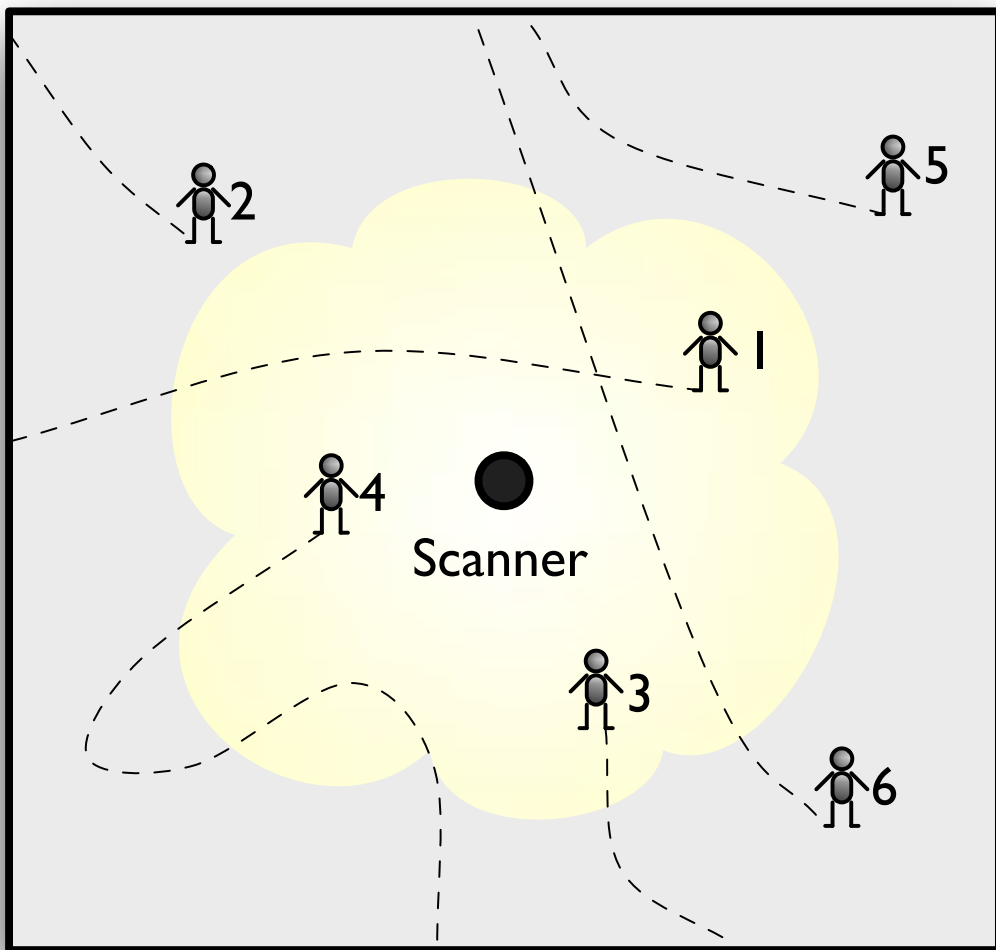
Dr Vanessa Kustakov, research associate at the University of

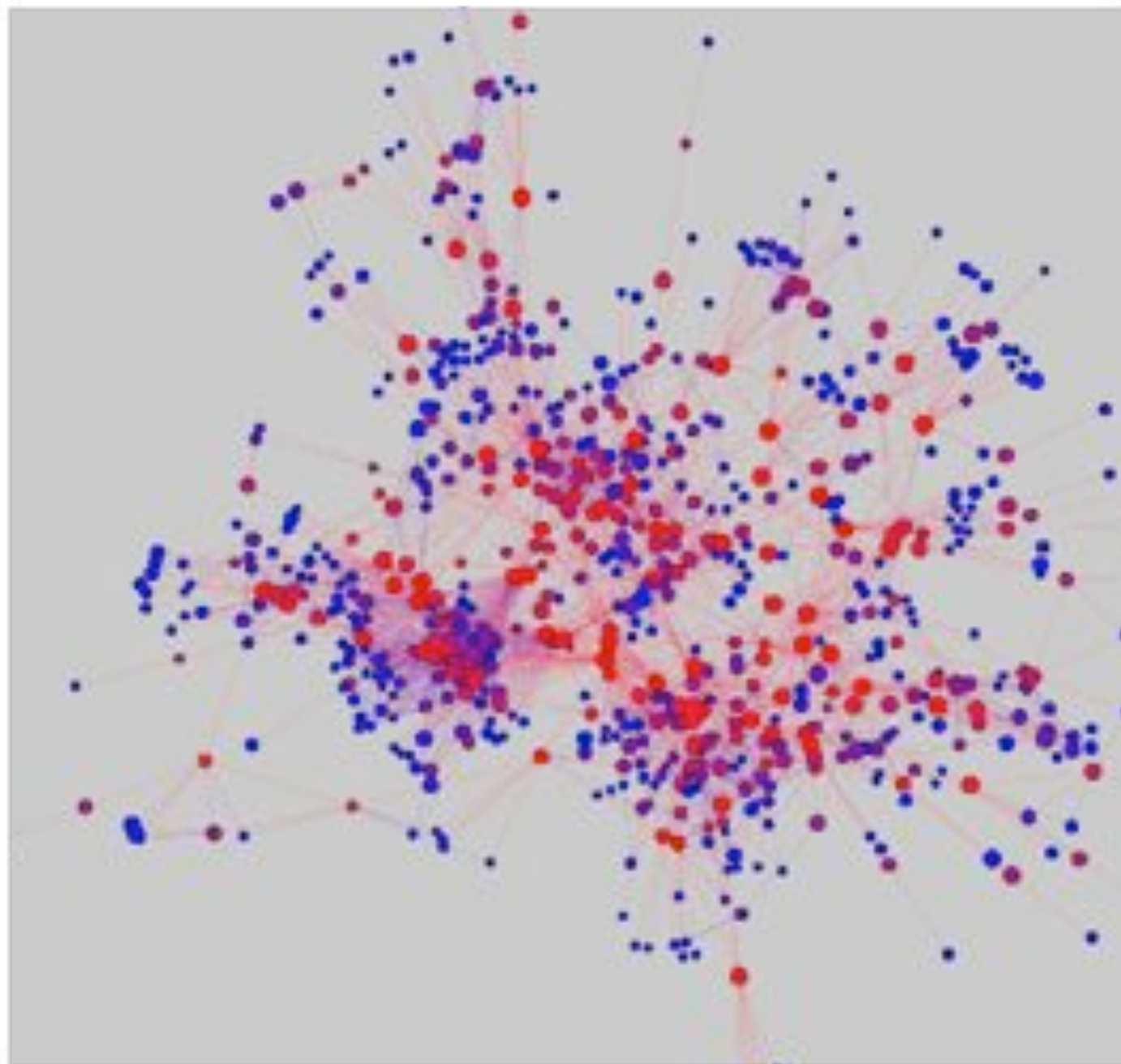


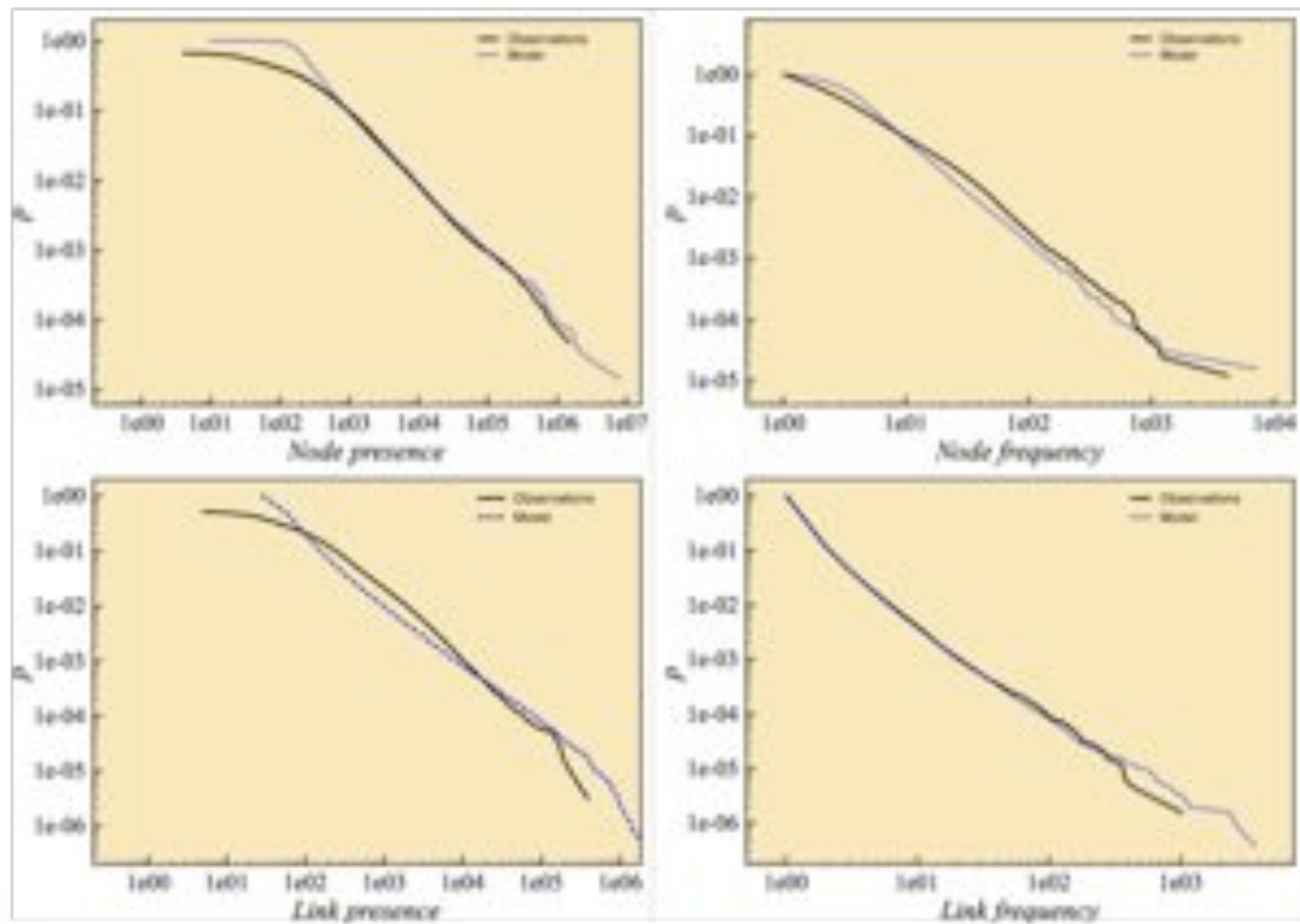
Mixed reactions

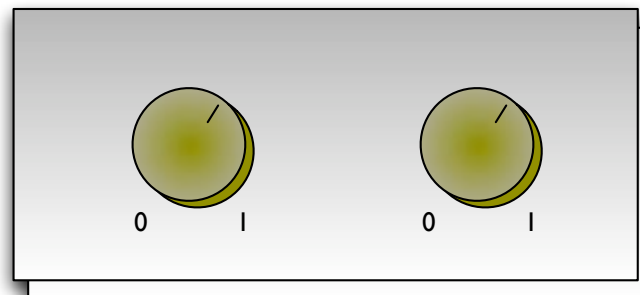
- People are not sure how to react
- It is definitely 2.0

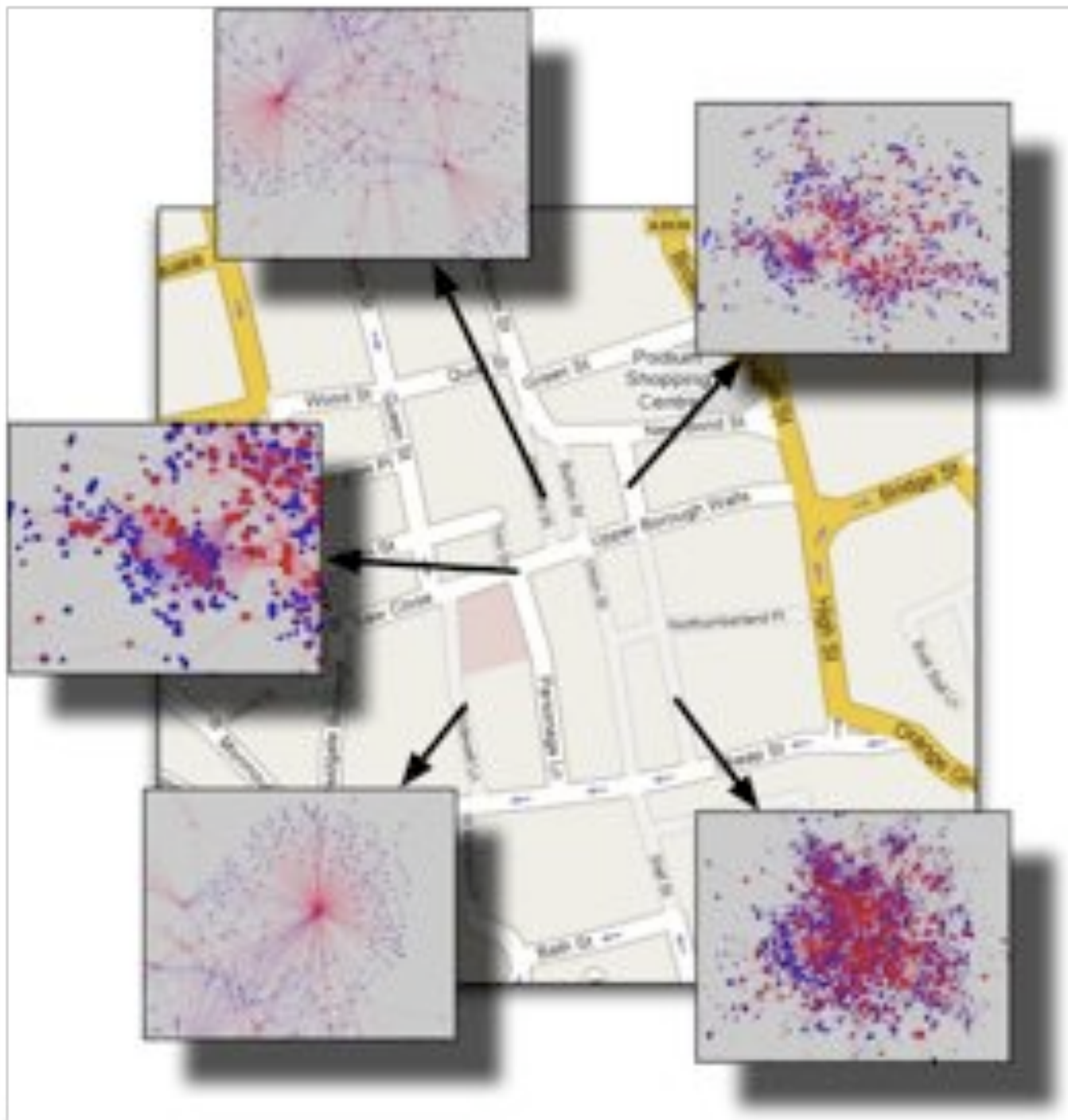


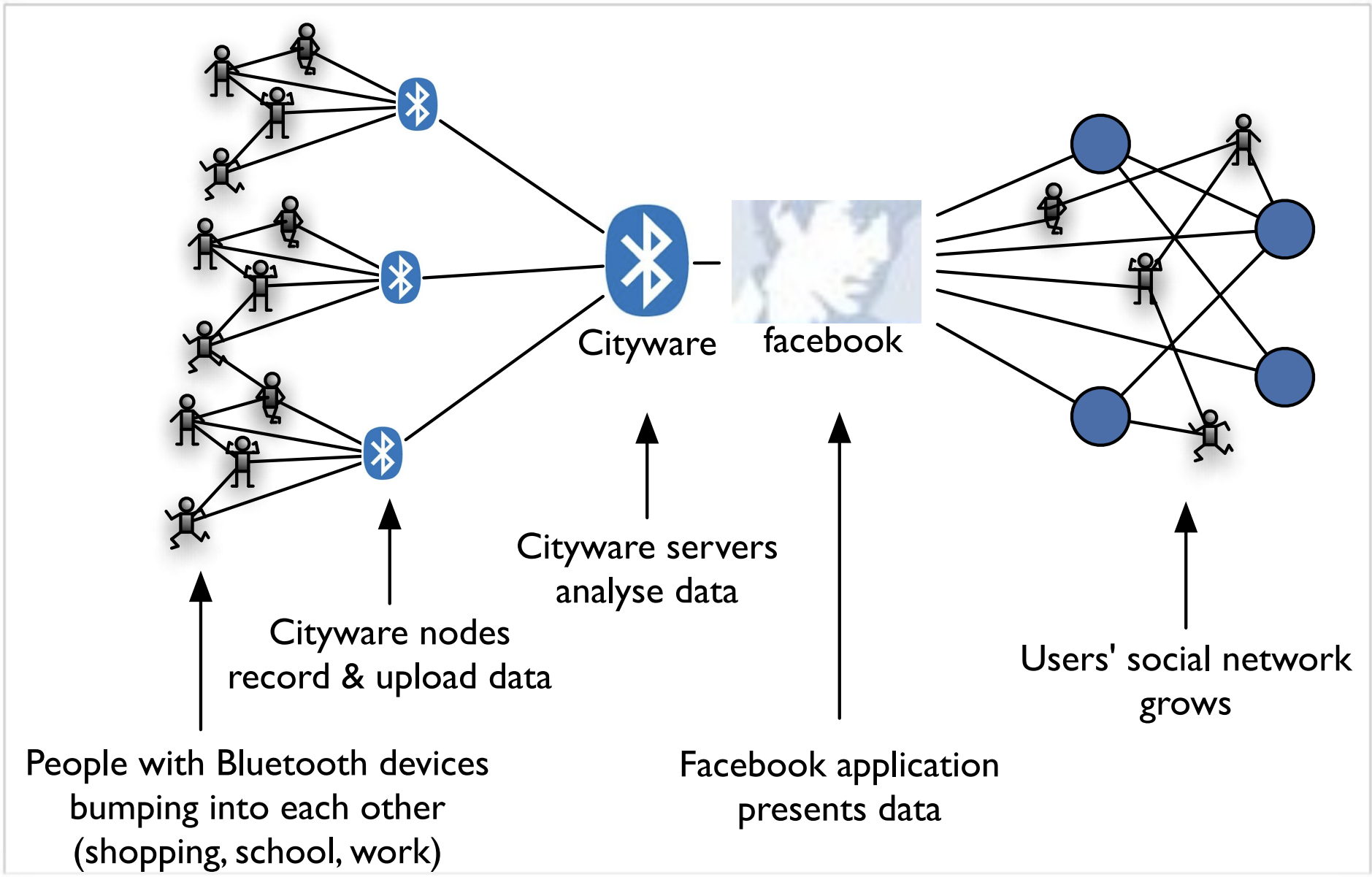


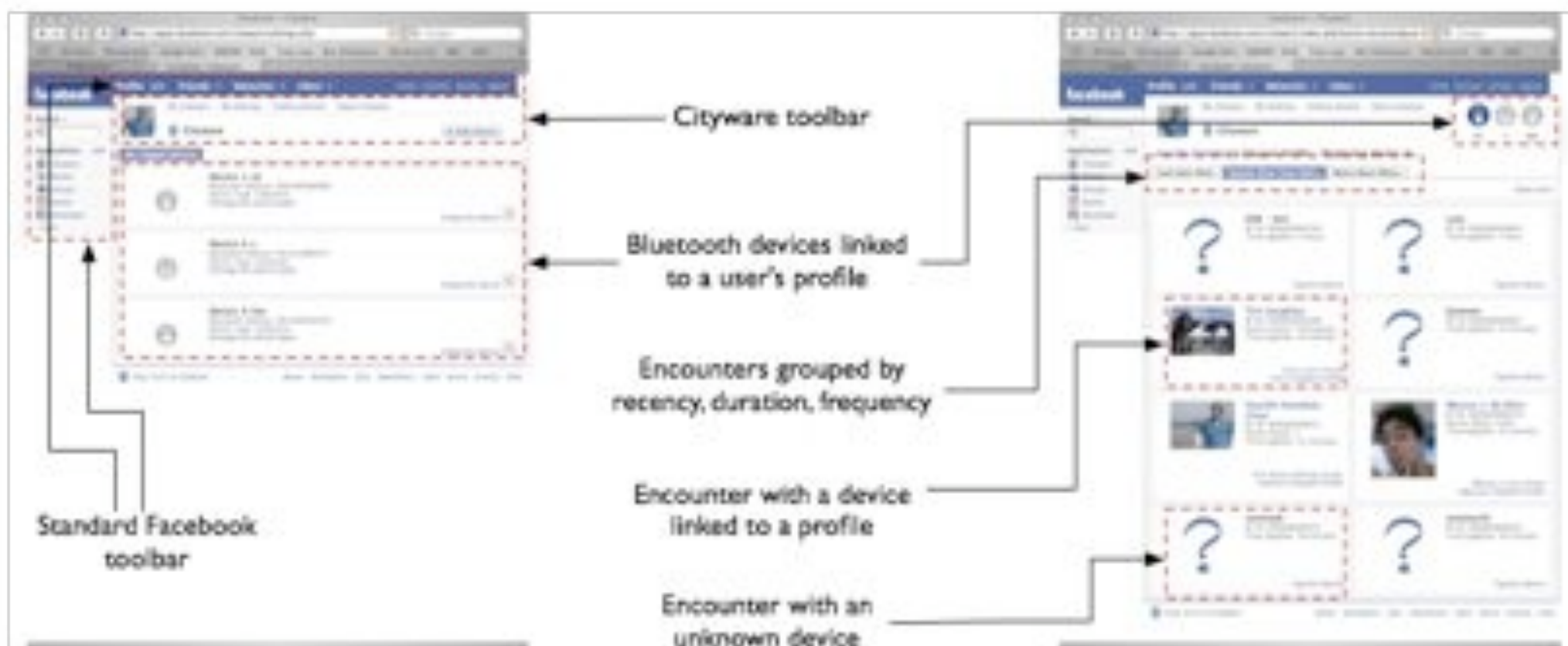


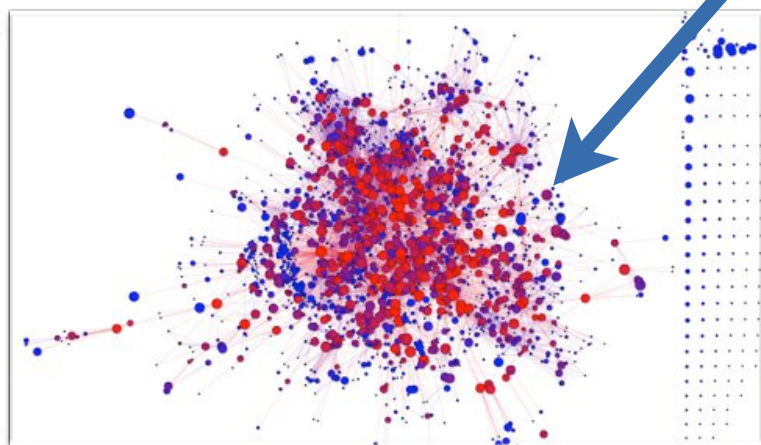












Facebook | Cityware

http://apps.facebook.com/cityware/index.php?active=duration&use Google

VK Home Photography Google docs ODEON - Bath Tube map Mac Wallpapers MacResearch NRG ACM

Google Facebook | Cityware

facebook Profile edit Friends Networks Inbox home account privacy logout

Cityware My Settings Getting Started About Cityware









Search Cityware

Applications Cityware Photos Groups Events Developer

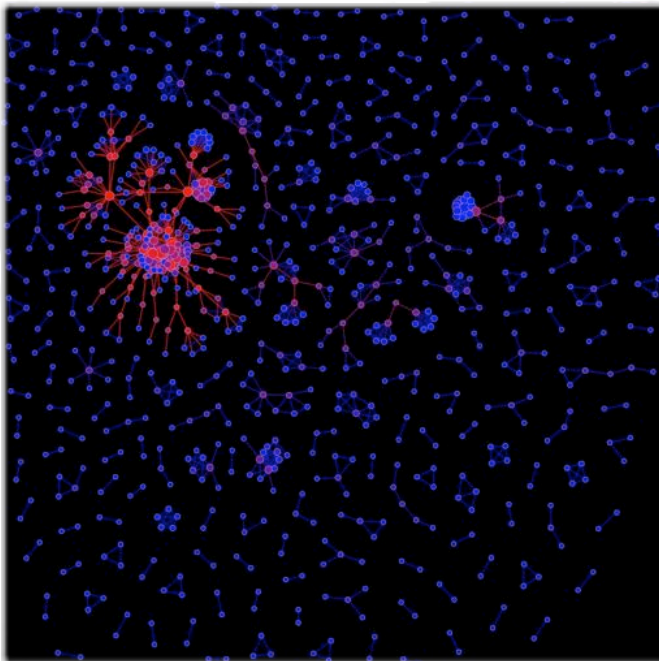
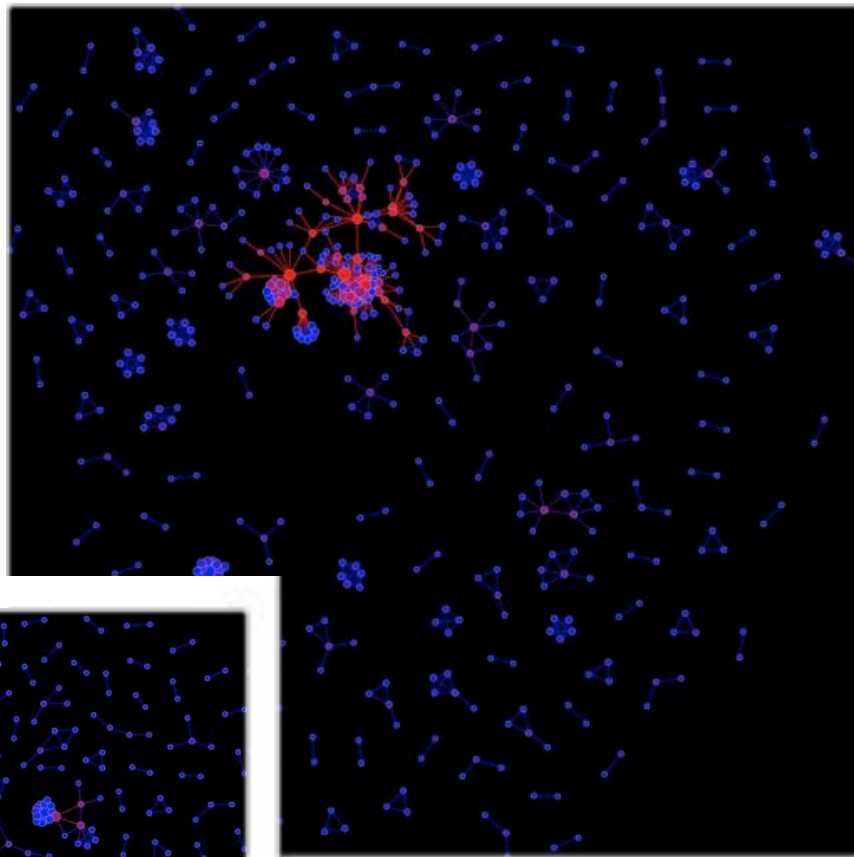
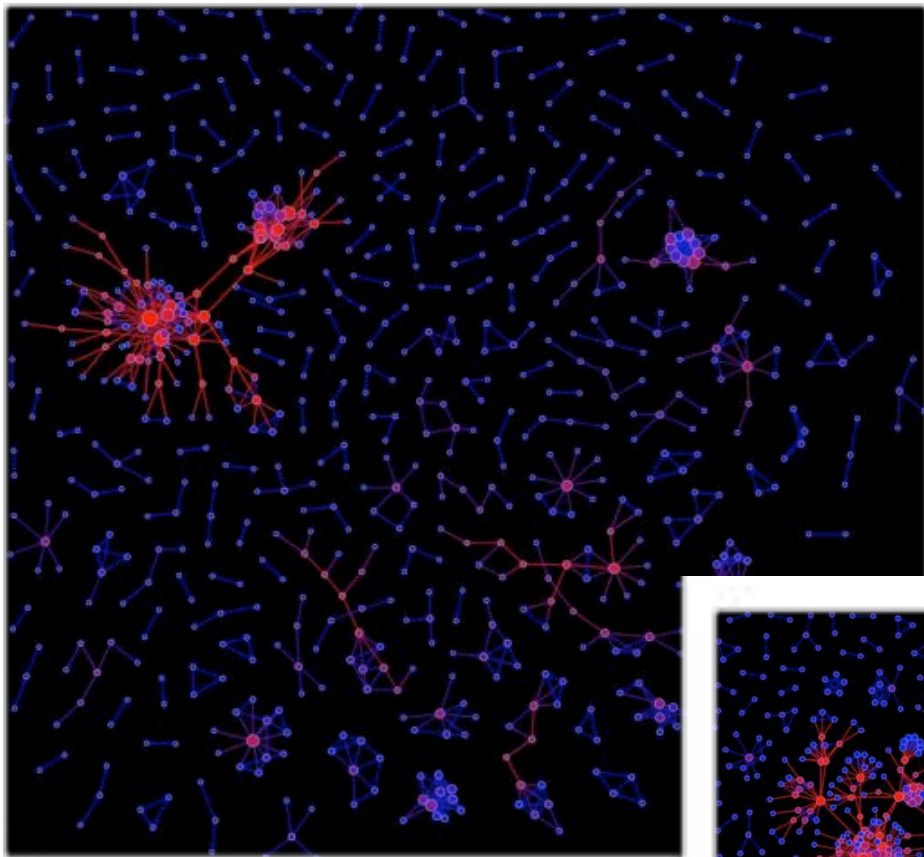
Kostakos's Cityware Profile - Displaying device: vk

Last Seen With... Spends Most Time With... Meets Most Often...

Show more

 CSR - bc4 BT ID: XXXXXXXXXX7A4 Time together: 2 hours Tag this device	 Lulu BT ID: XXXXXXXXXX82A Time together: 1 hour Tag this device
 Tim Coughlan BT ID: XXXXXXXXXX288 Device Name: TimsLaptop Time together: 34 minutes Tim is your friend Tim's Cityware Profile	 Eamonn BT ID: XXXXXXXXXX837 Time together: 53 minutes Tag this device
 Vassilis Kostakos (You) BT ID: XXXXXXXXXXFC1 Device Name: v Time together: 51 minutes This device belongs to you Vassilis's Cityware Profile	 Marcus L. Da Silva BT ID: XXXXXXXXXX2C9 Device Name: Vicky Time together: 45 minutes Marcus is your friend Marcus's Cityware Profile
 minime9 BT ID: XXXXXXXXXXE73 Time together: 44 minutes Tag this device	 minime10 BT ID: XXXXXXXXXXD1E Time together: 44 minutes Tag this device

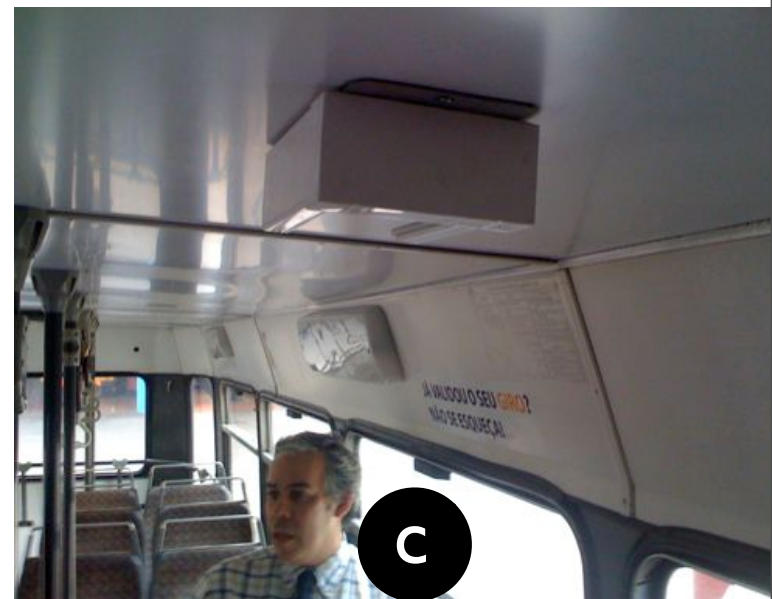
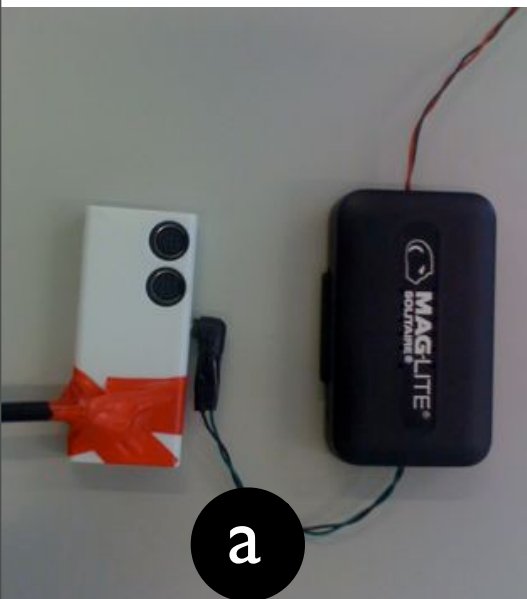
Page built by Cityware about developers jobs advertisers polls terms privacy help

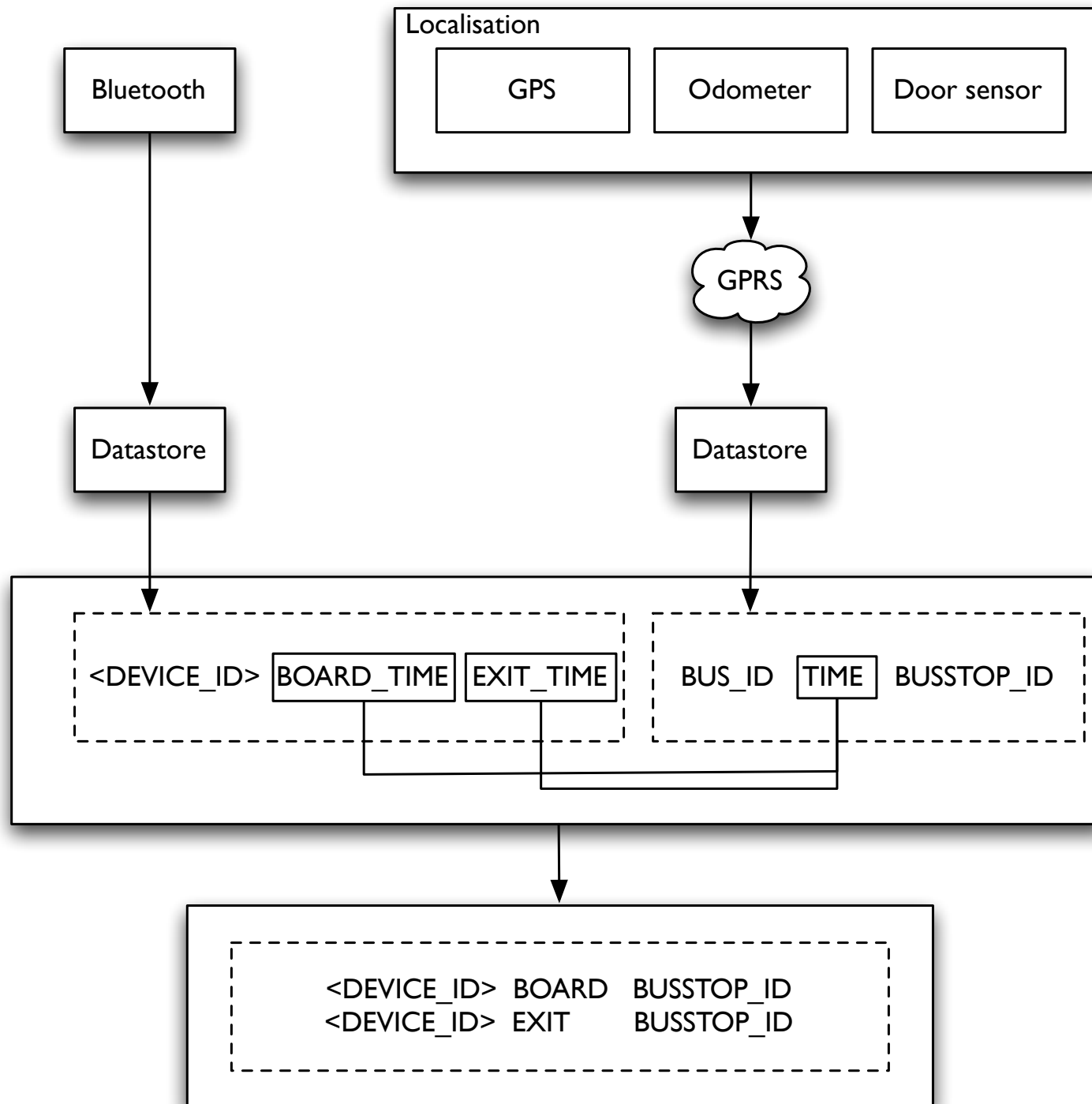


Cityware on buses

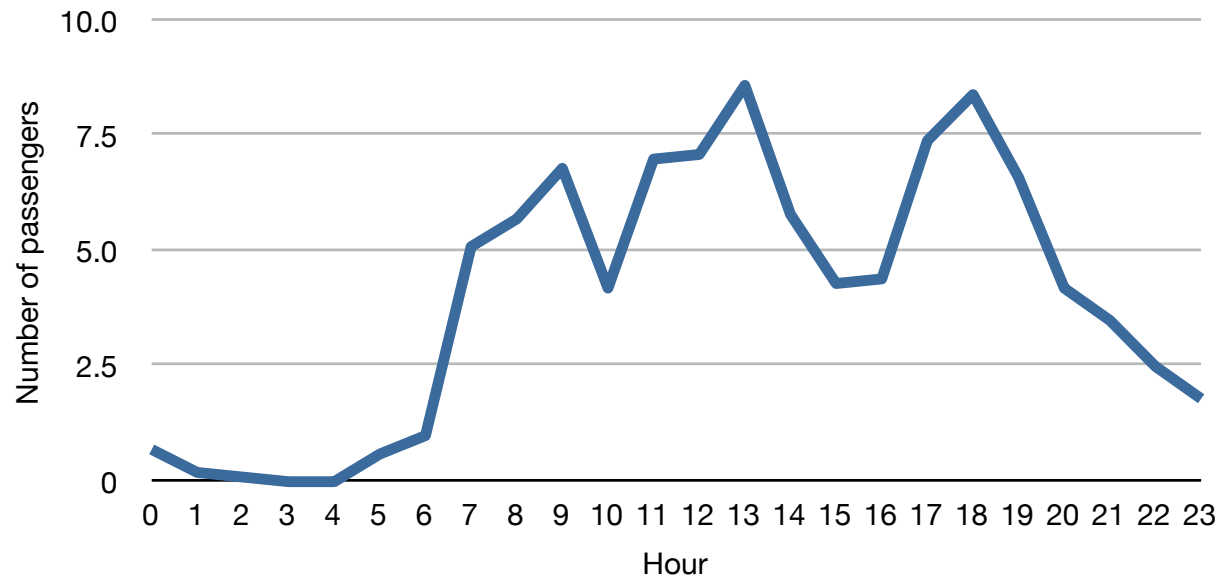
Main idea

- How do people use the bus service?
- Where to they board the bus?
- **Where do they get off the bus?**

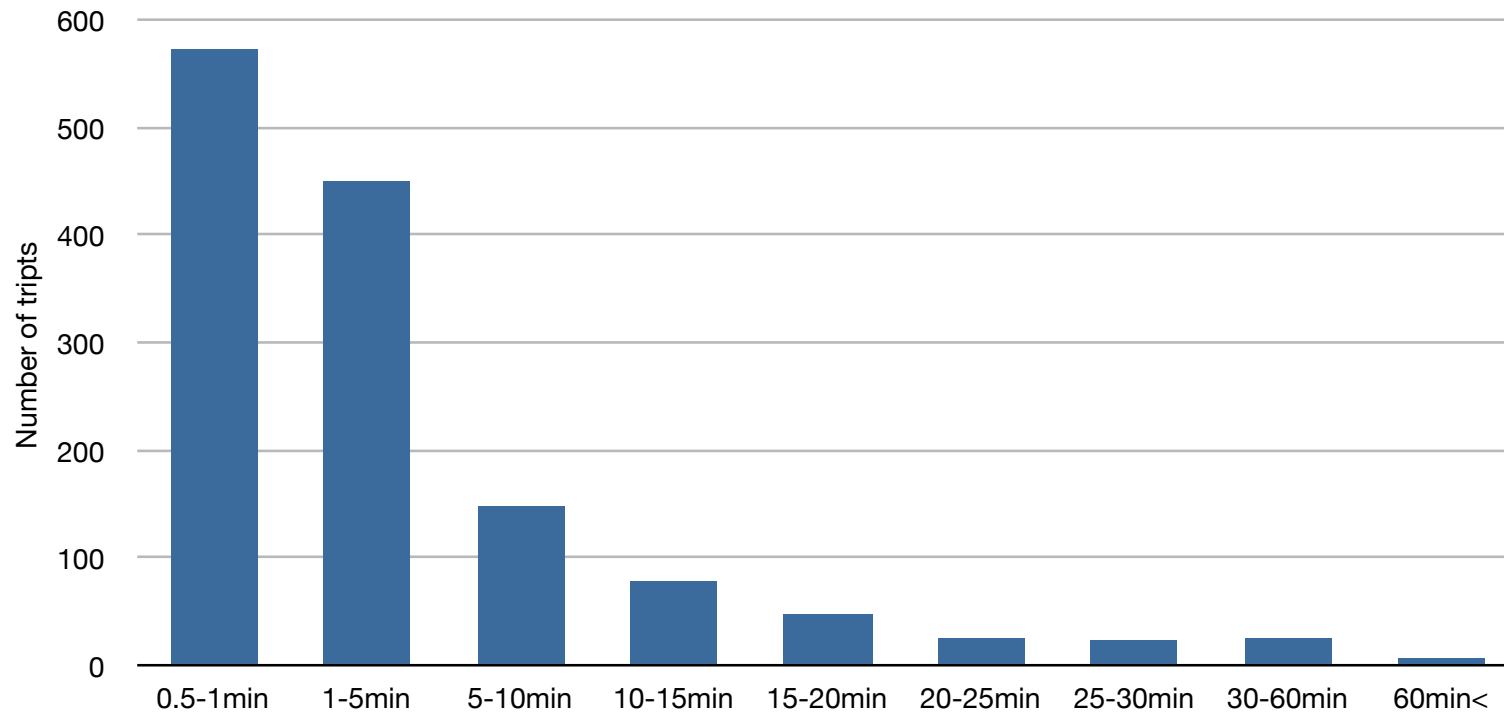




Bus occupancy per hour



Duration of passenger trips



Conclusions

- Current trends on the web point to more **information**, more **customisation**, more **socialisation**
- Many application take advantage of Bluetooth in order to play with physical and digital space
 - Bluetooth is a partially-embodied technology
- The interplay of physical and digital can tell us a lot about people & space.

Thank you

Vassilis Kostakos
vassilis @ cmu . edu

[http :// www . labuse . org](http://www.labuse.org)