

Urban Social Networks

Sensing, Modelling and Visualising Urban Mobility
and Copresence Networks

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Motivation

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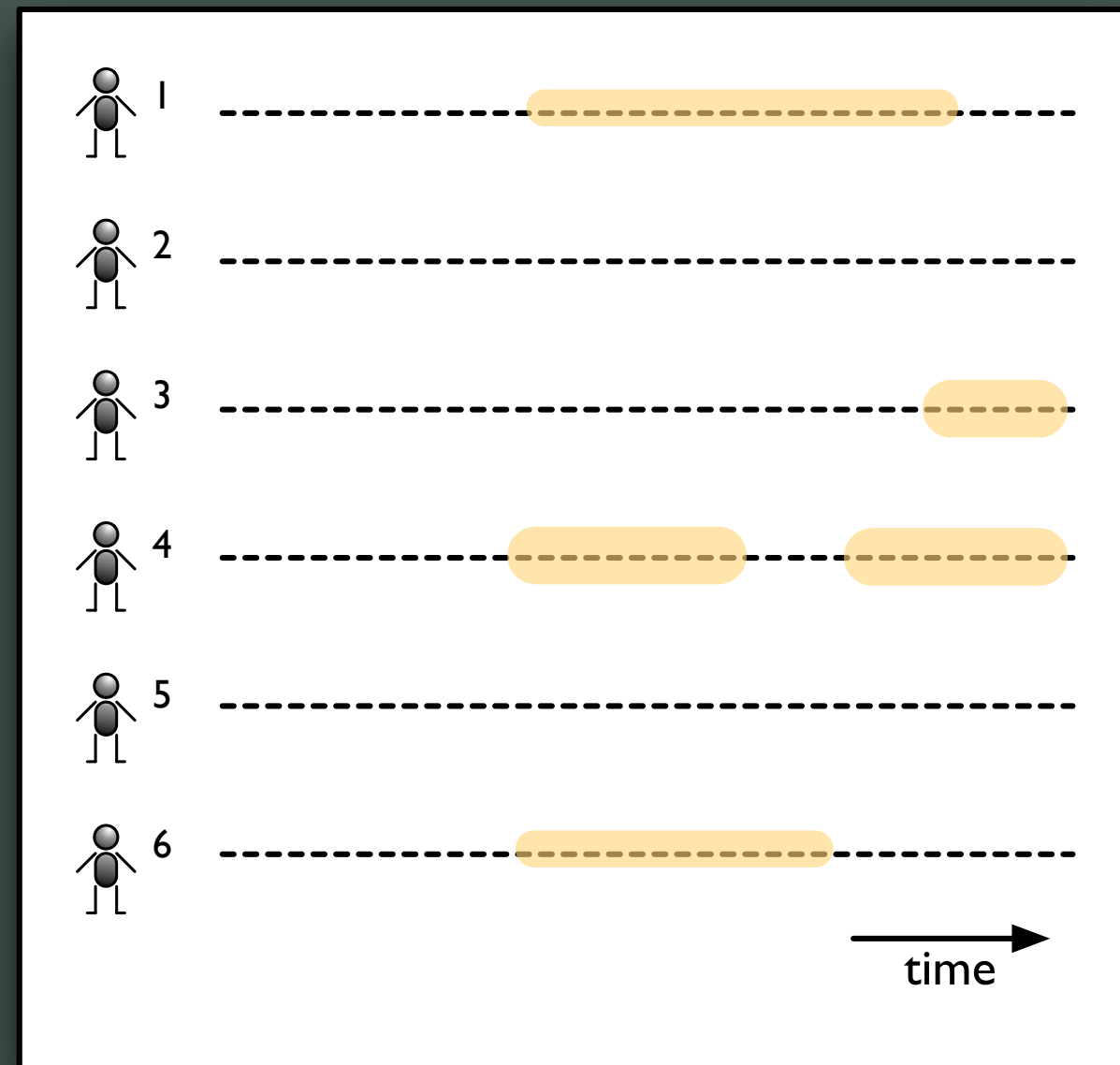
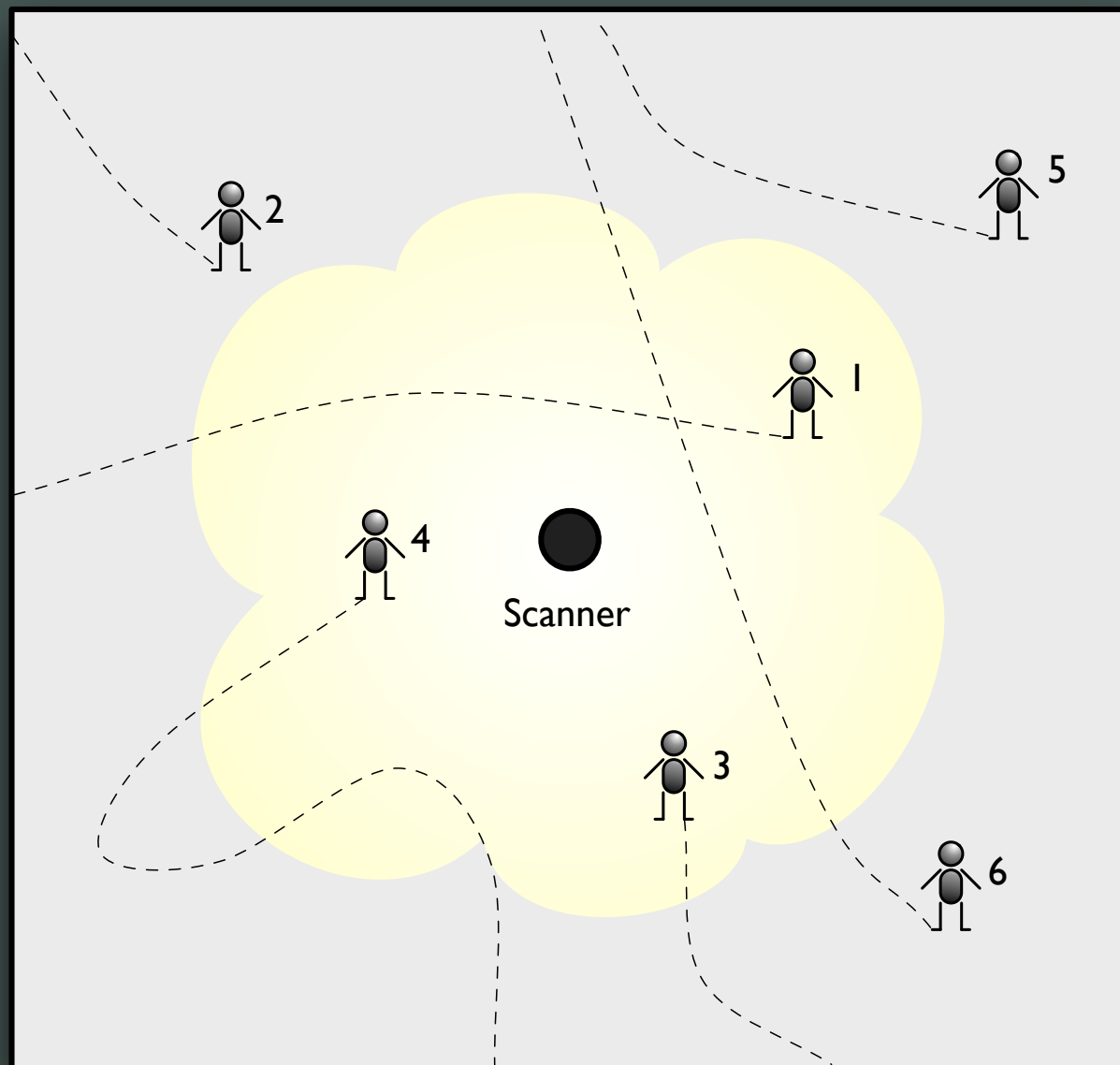
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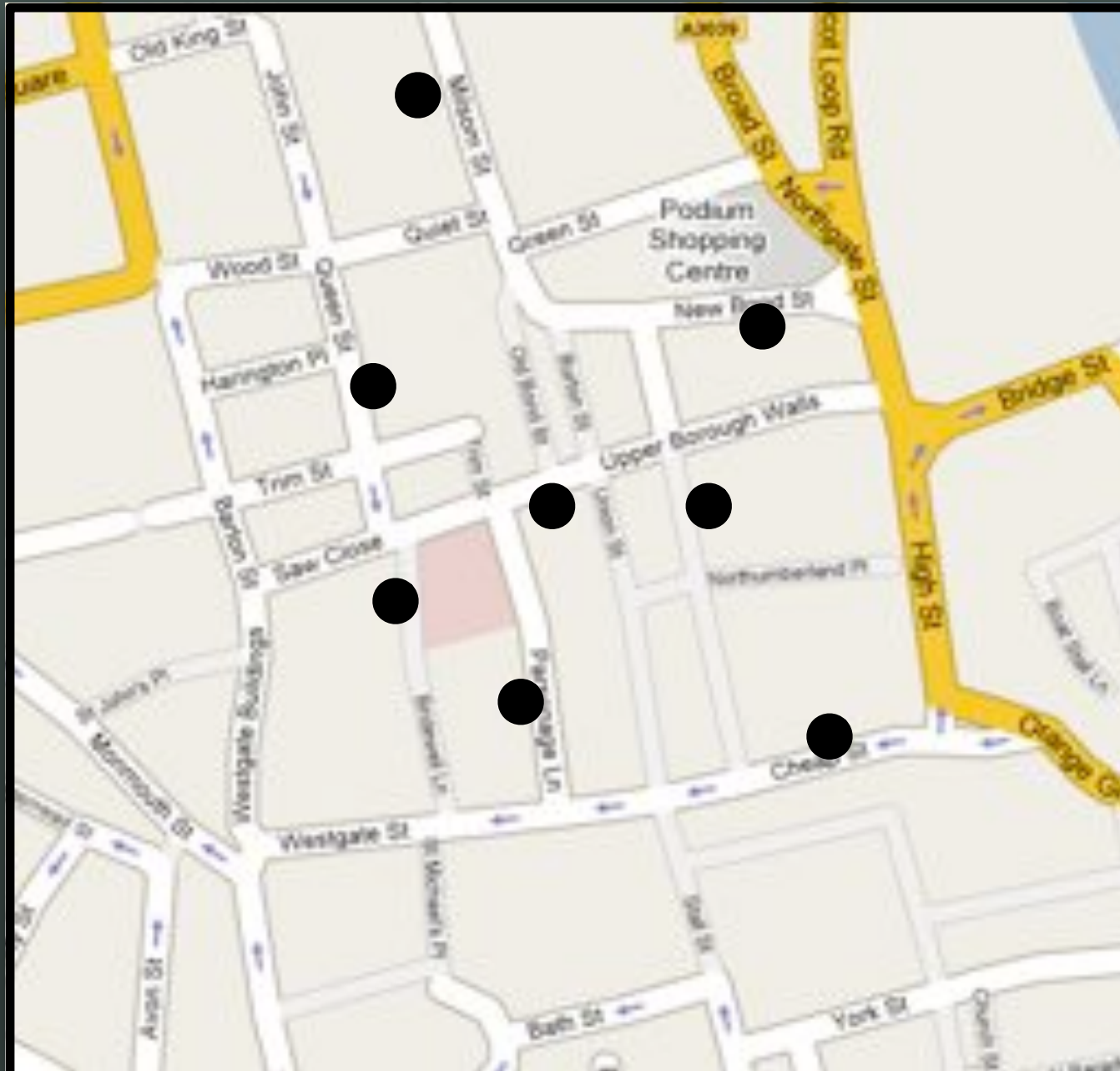
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- THE CITY IS THE SYSTEM

Data collection





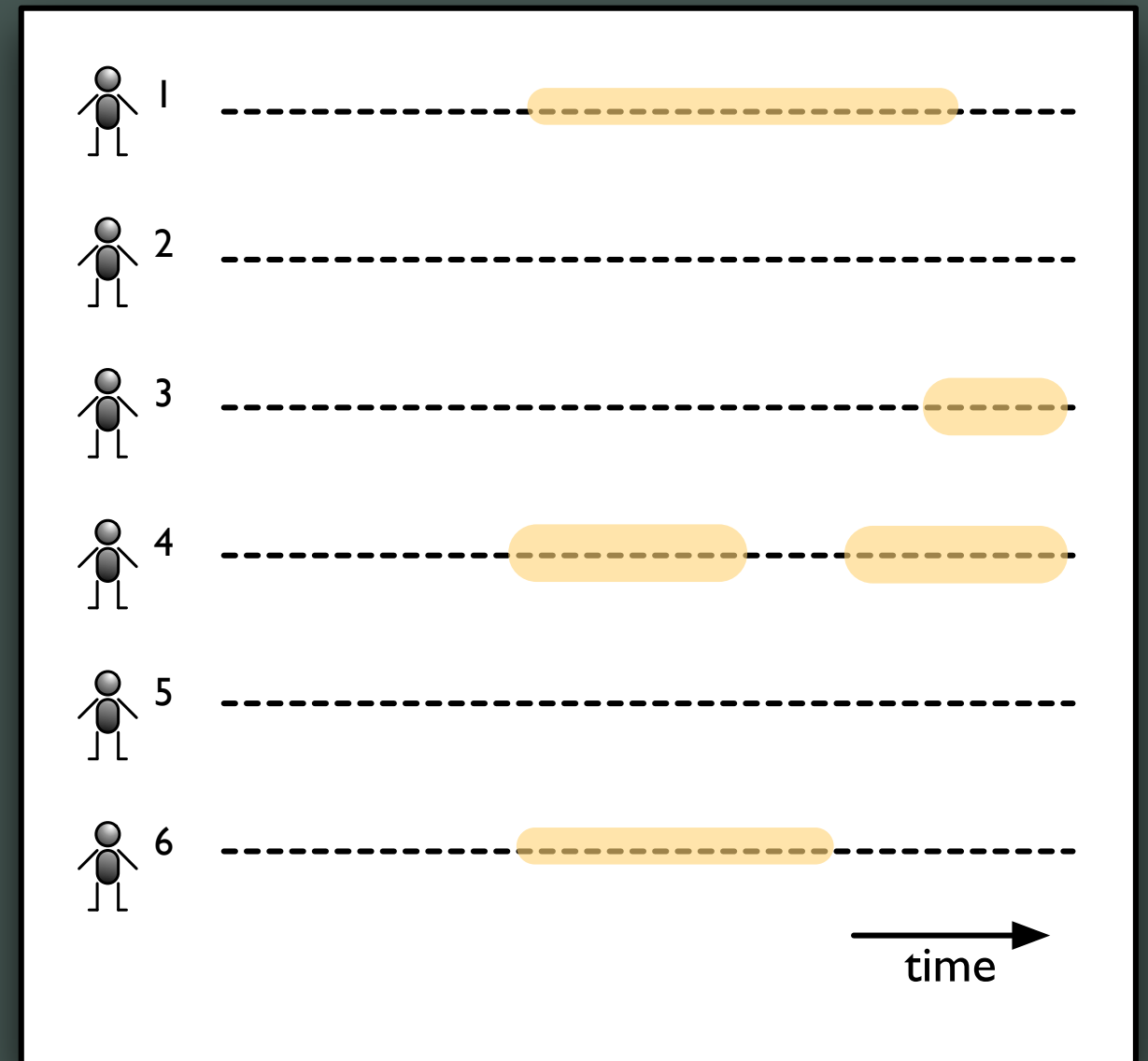
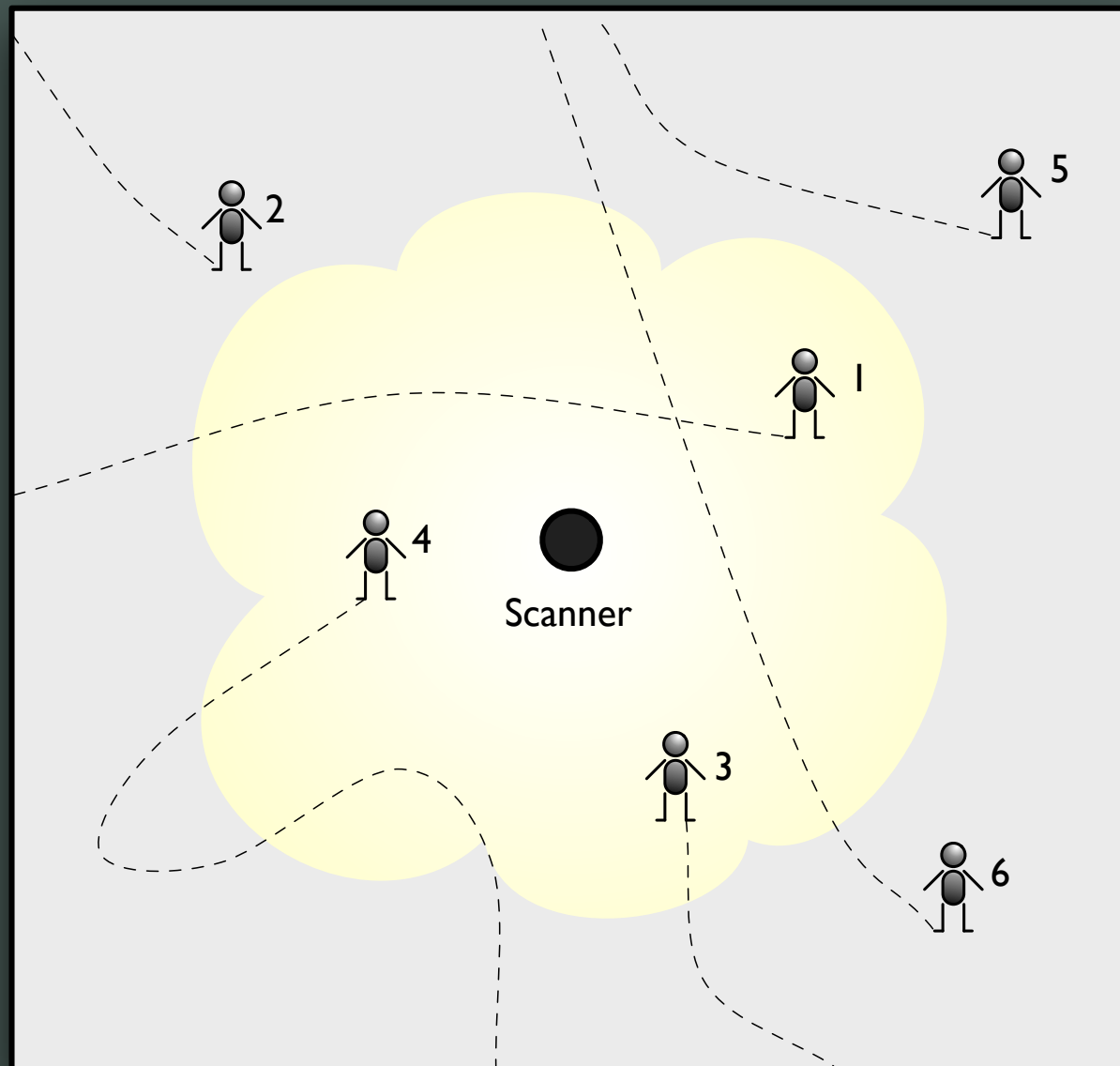
Collected data

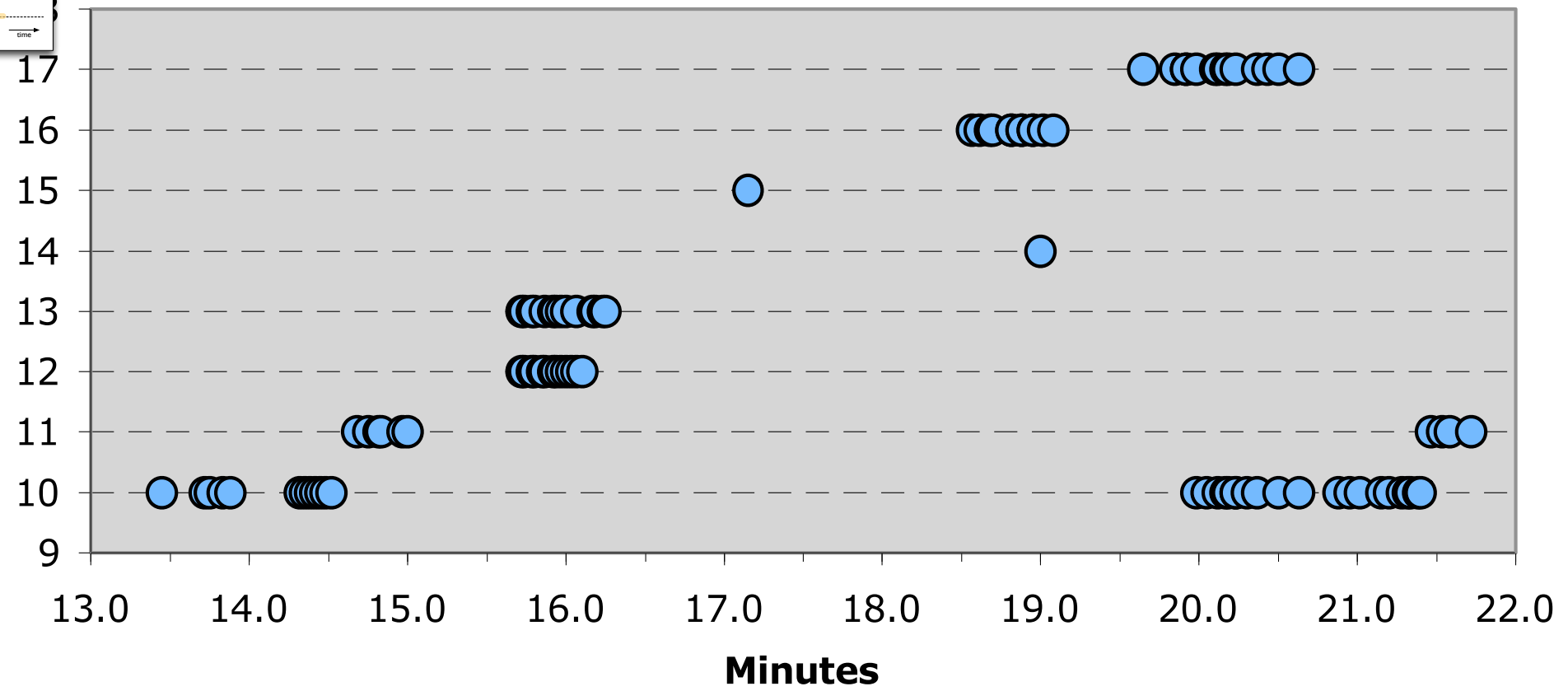
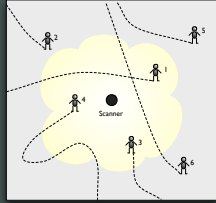
- 12 months
- 70 000 unique devices
- 3 000 000 unique data points

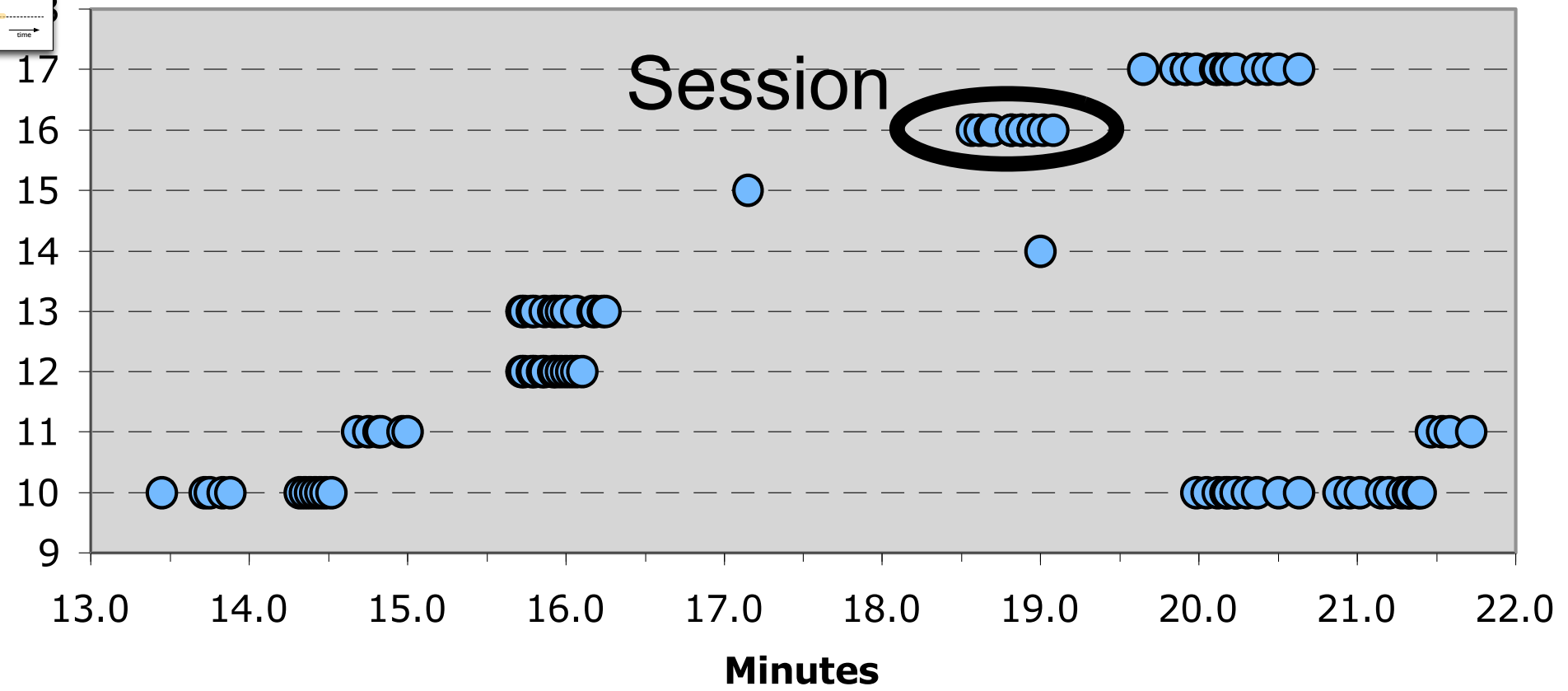
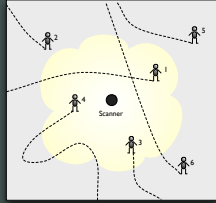
Analysis & Visualisation

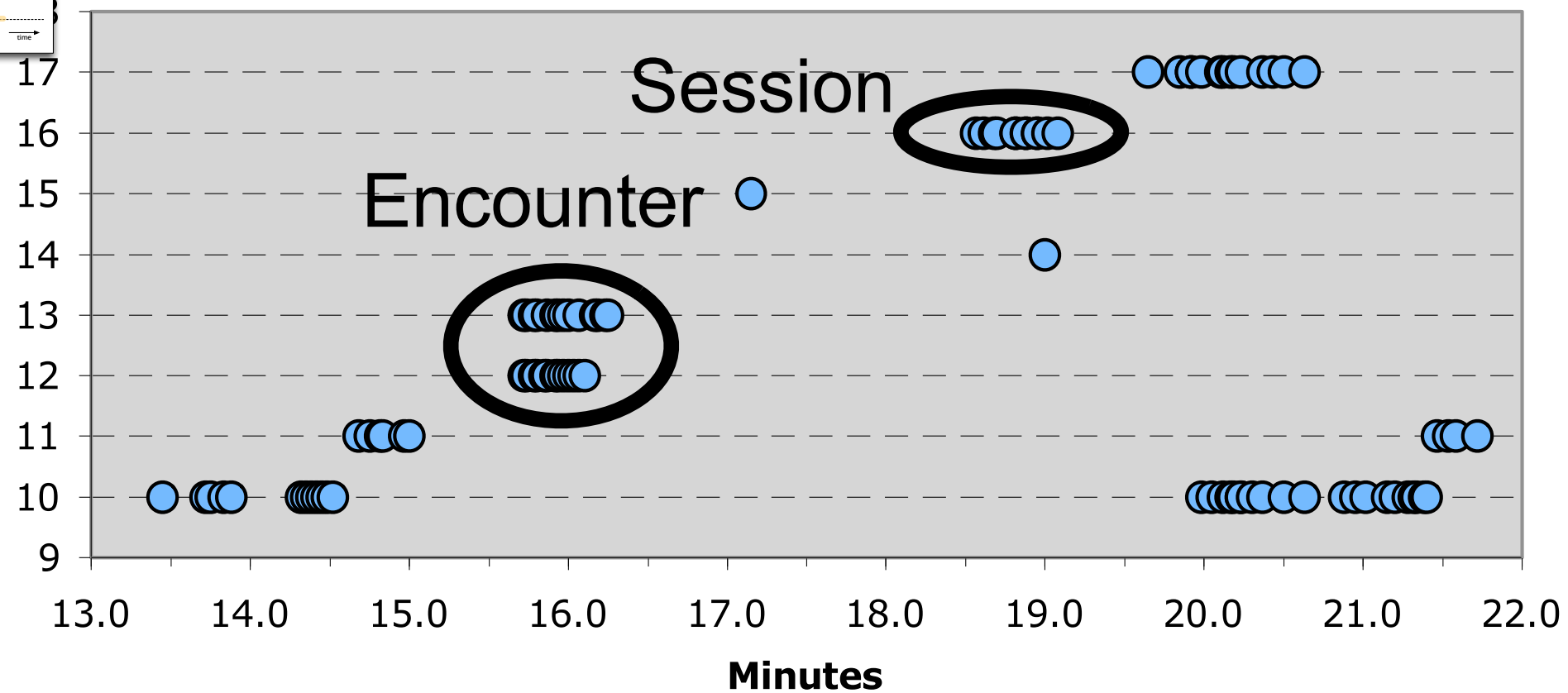
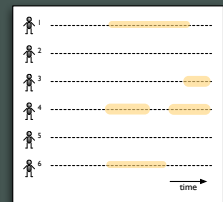
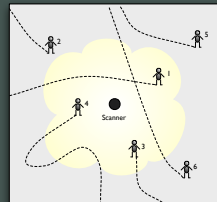
Main concepts

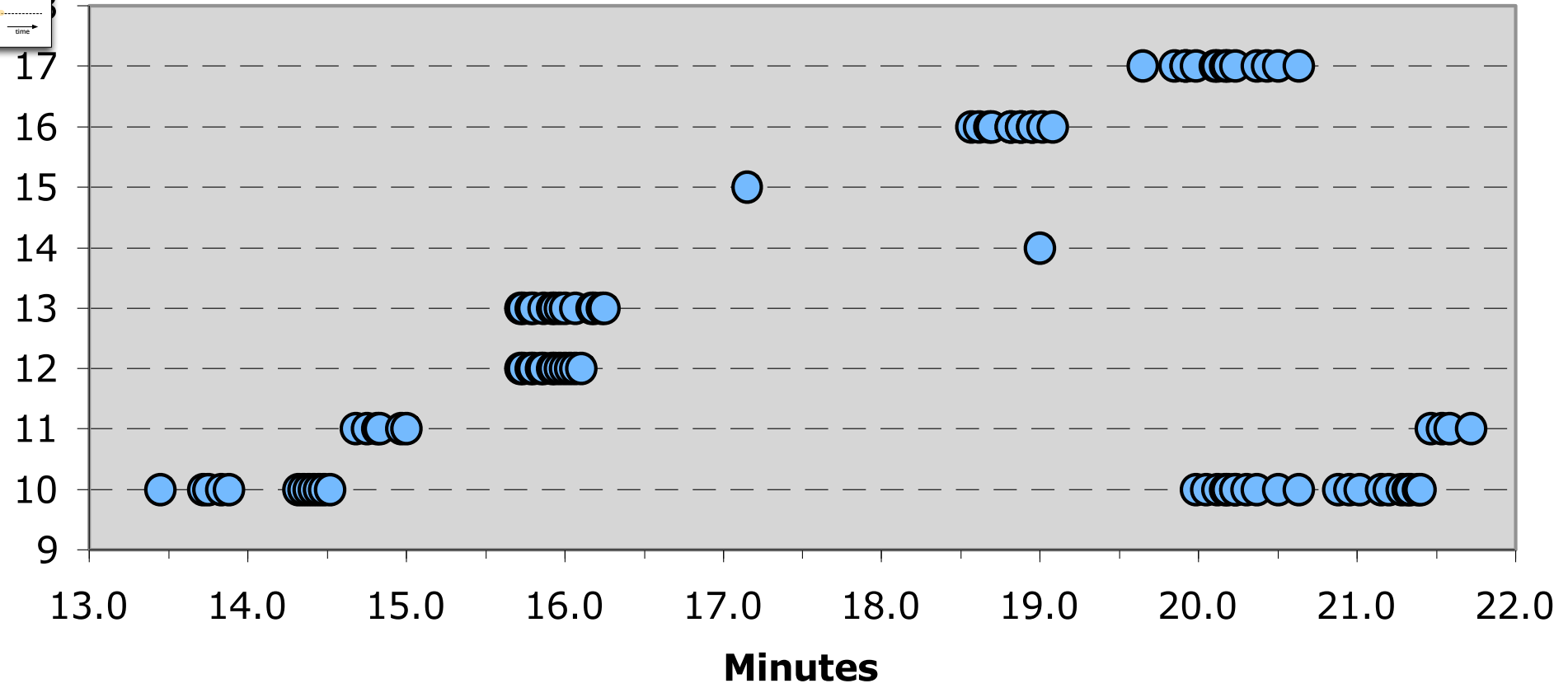
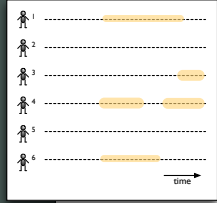
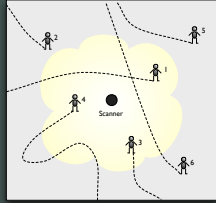
- Sessions
- Trails
- Encounters

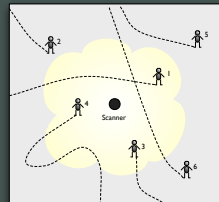




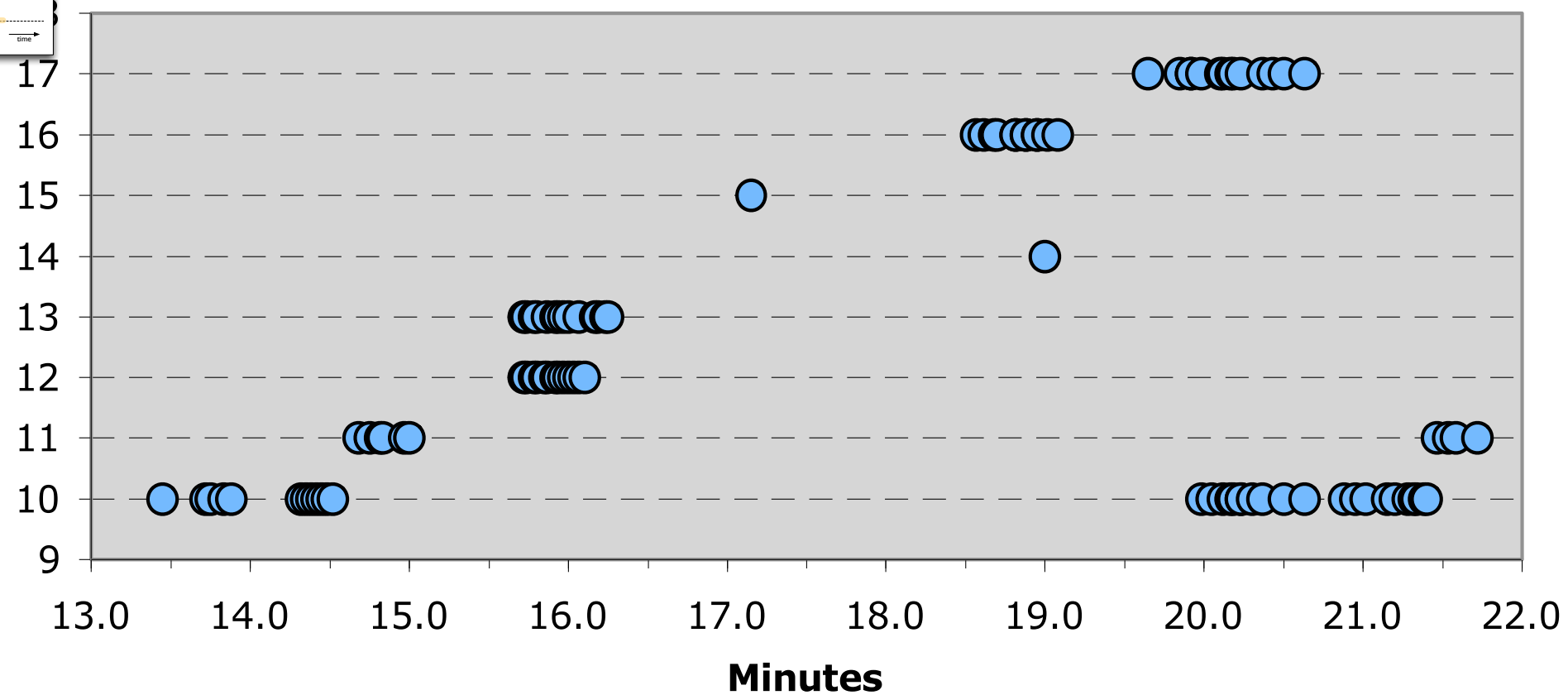


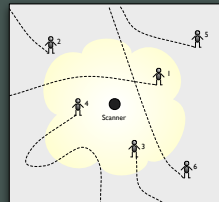




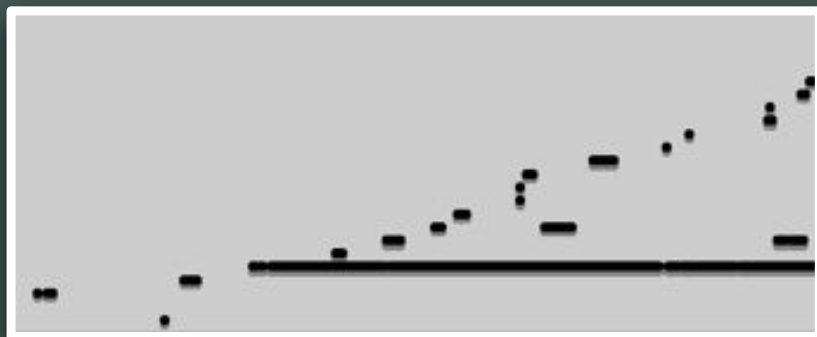
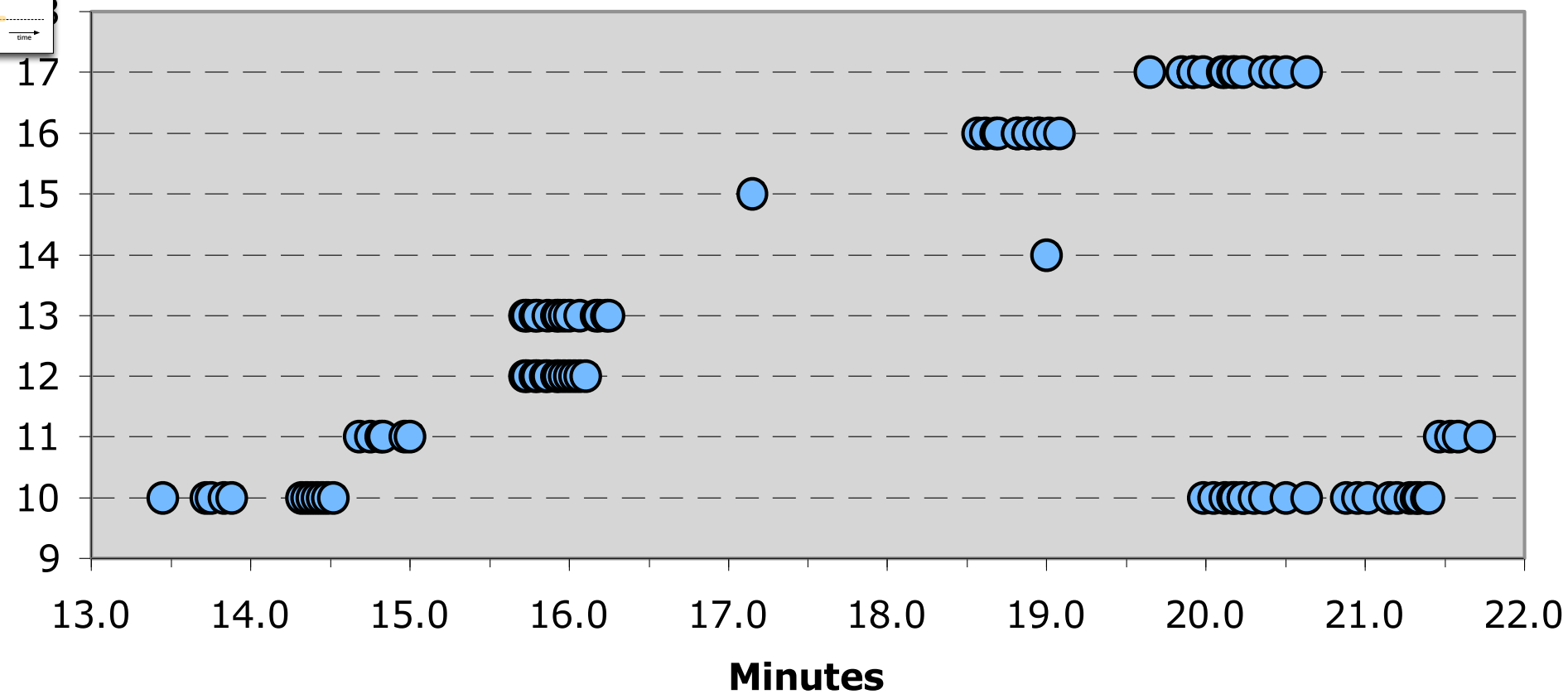


Location 1

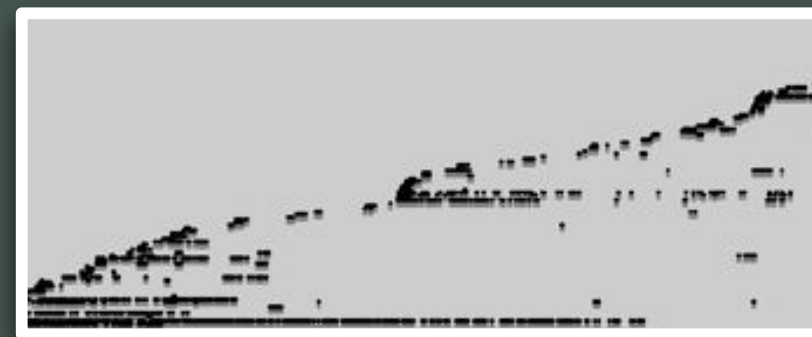




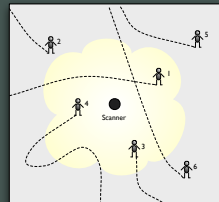
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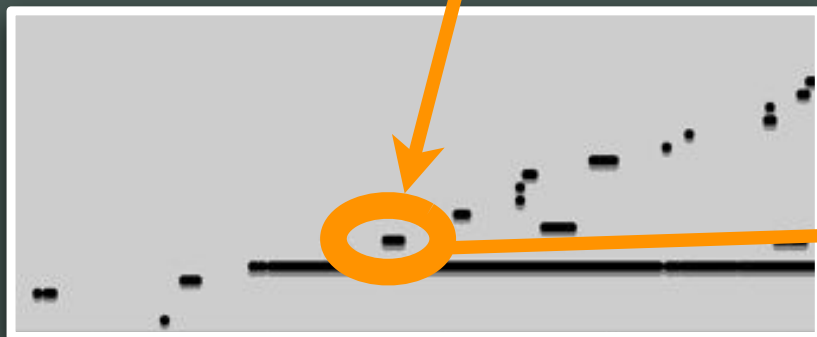
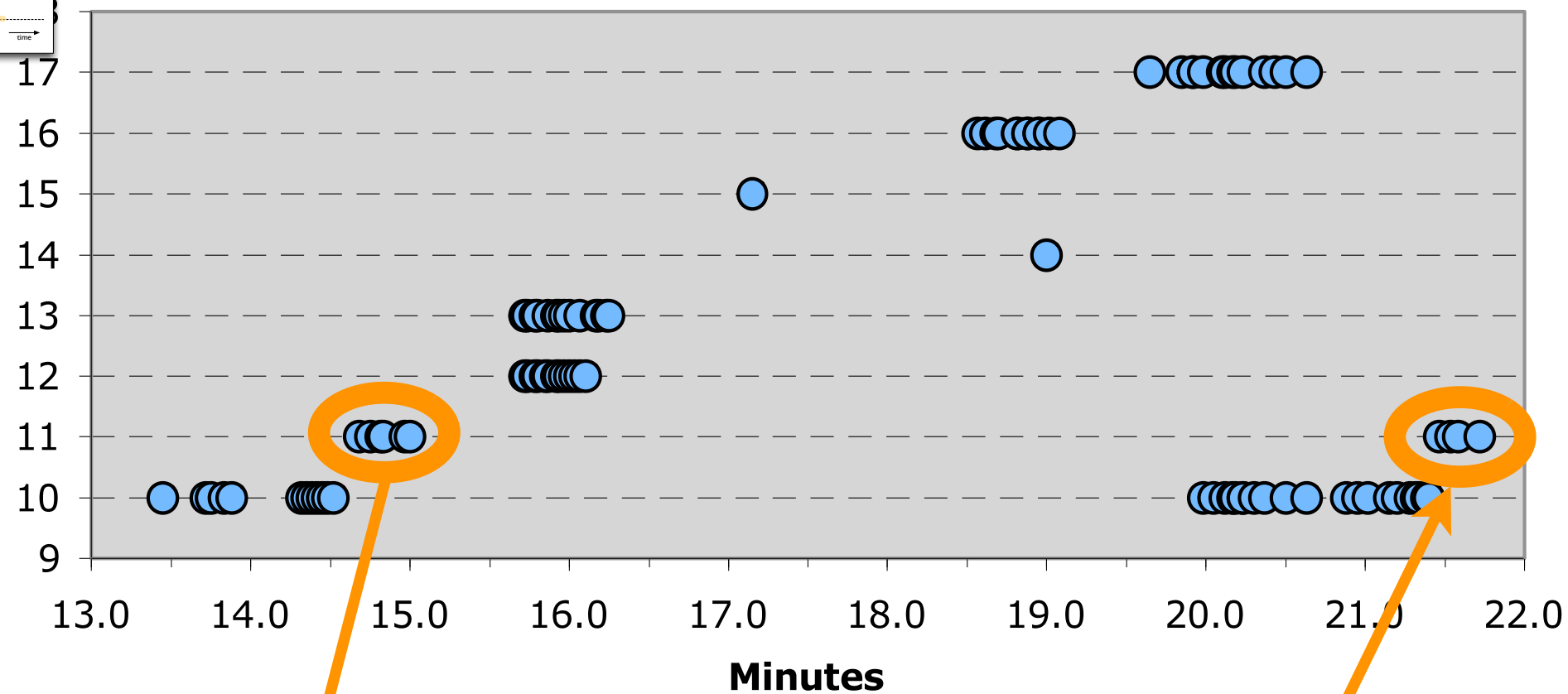
Location 2



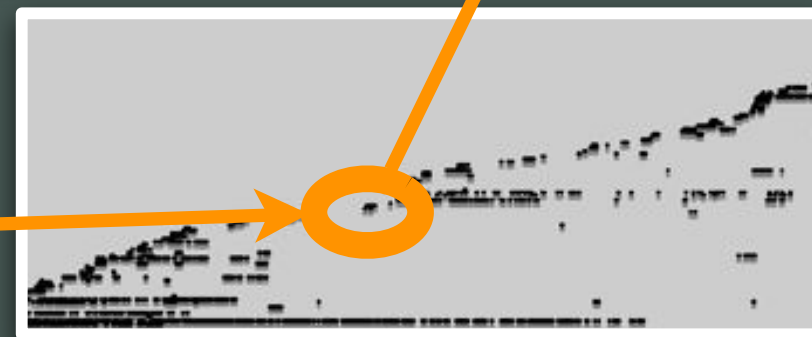
Location 3



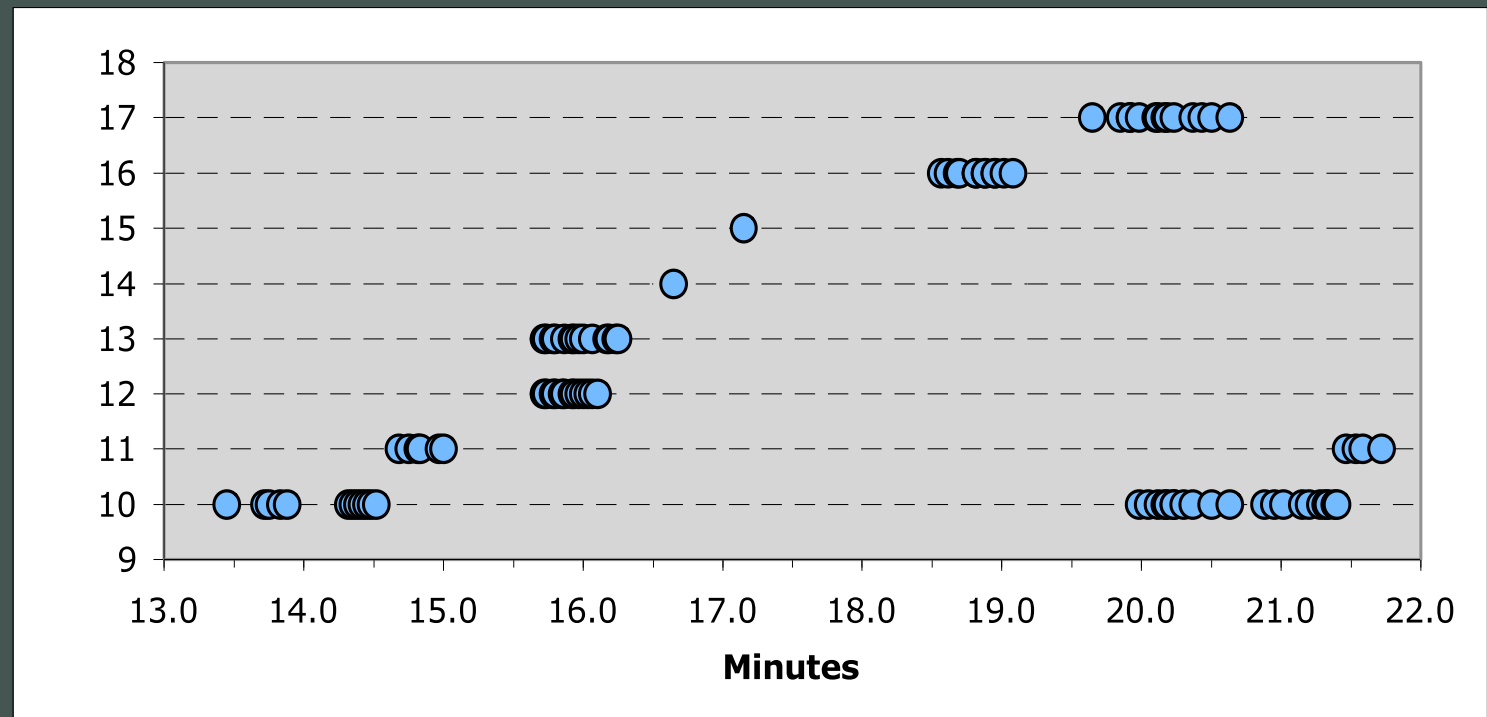
Location 1

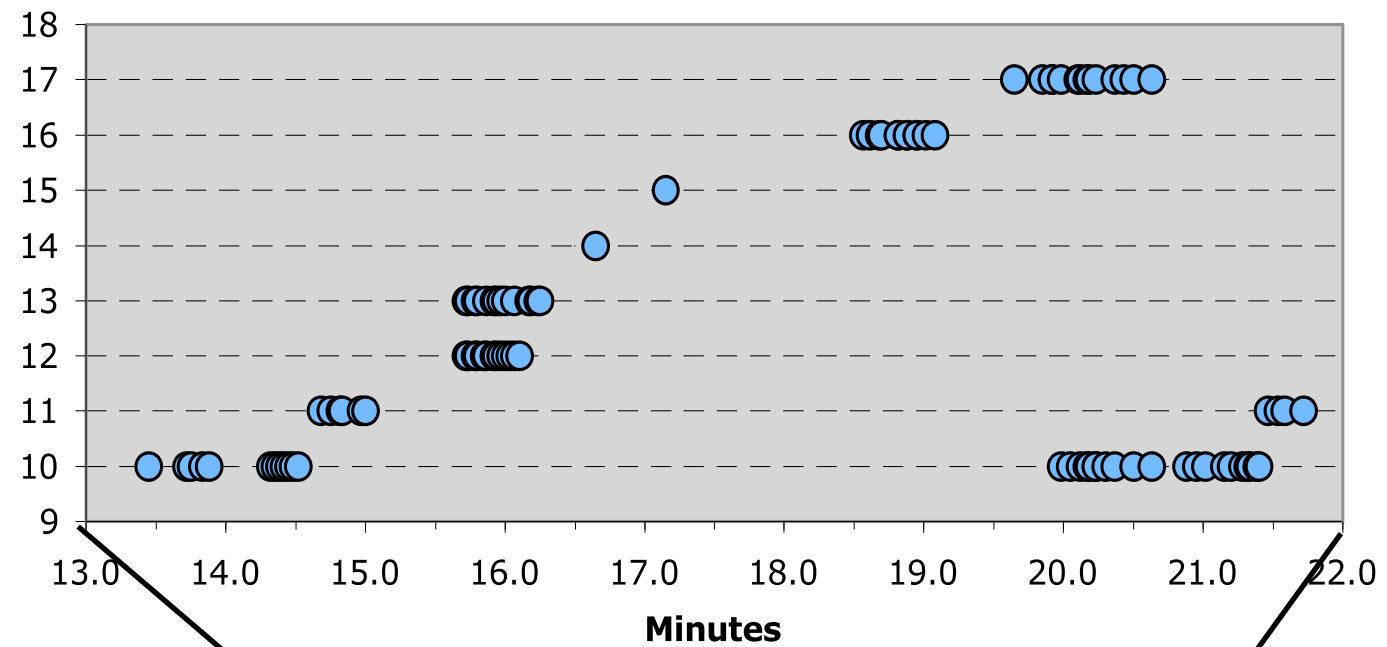


Location 2

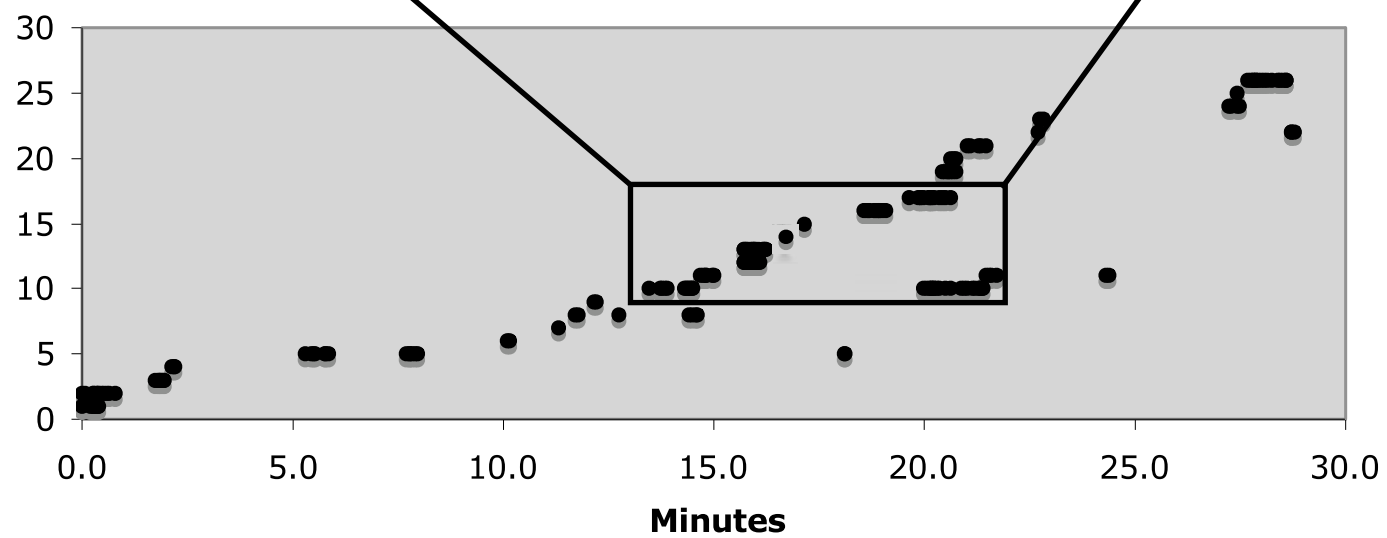


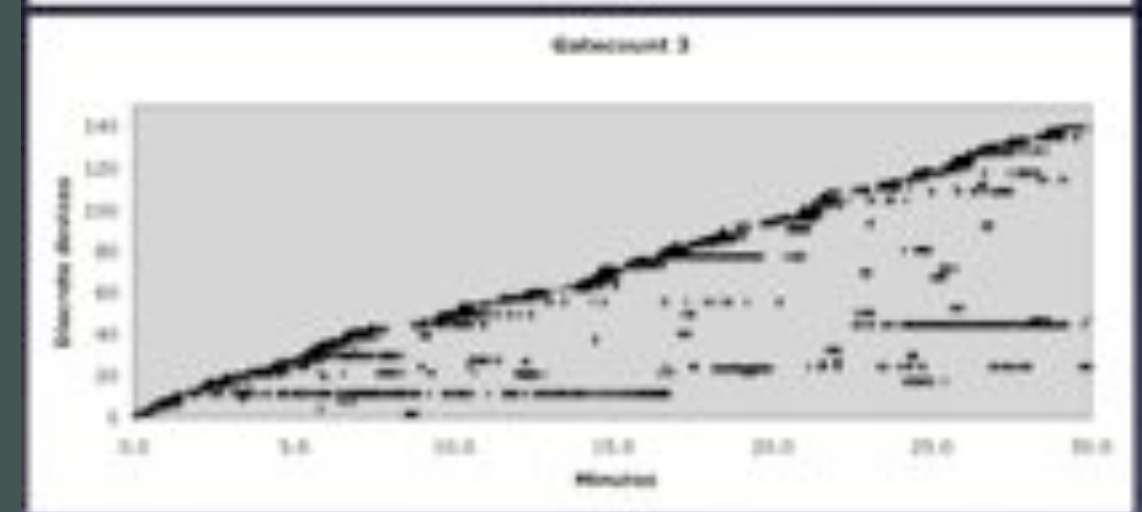
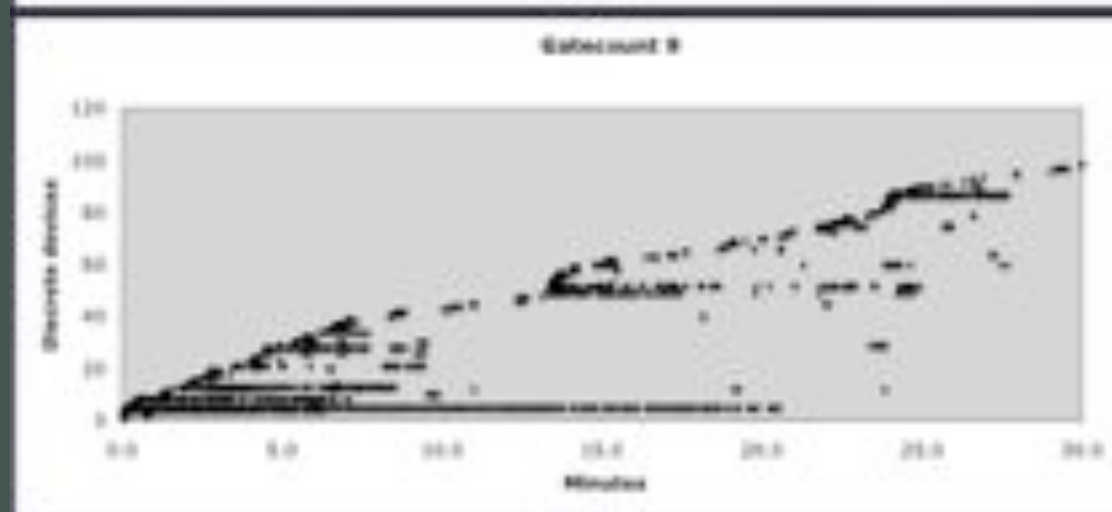
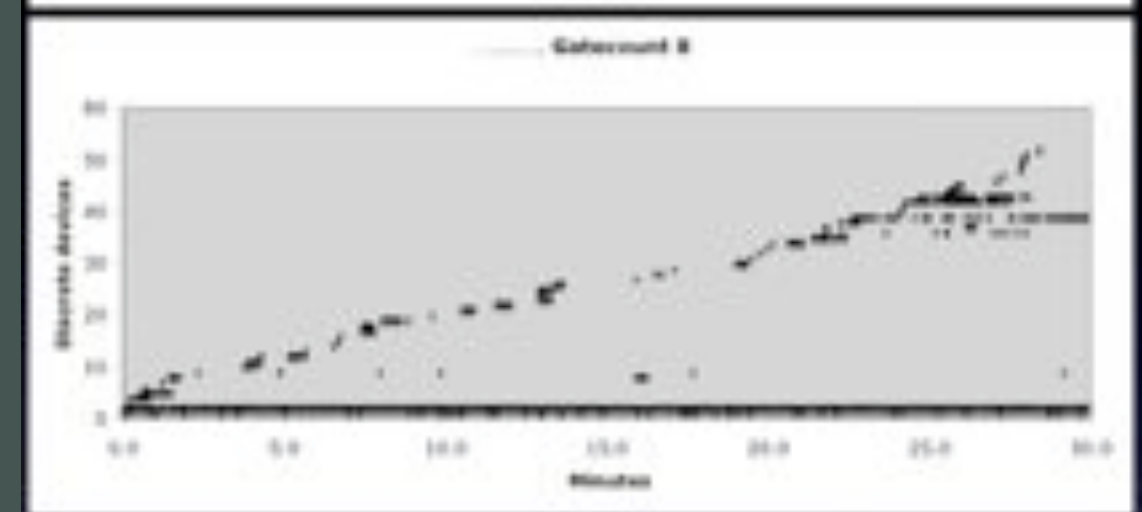
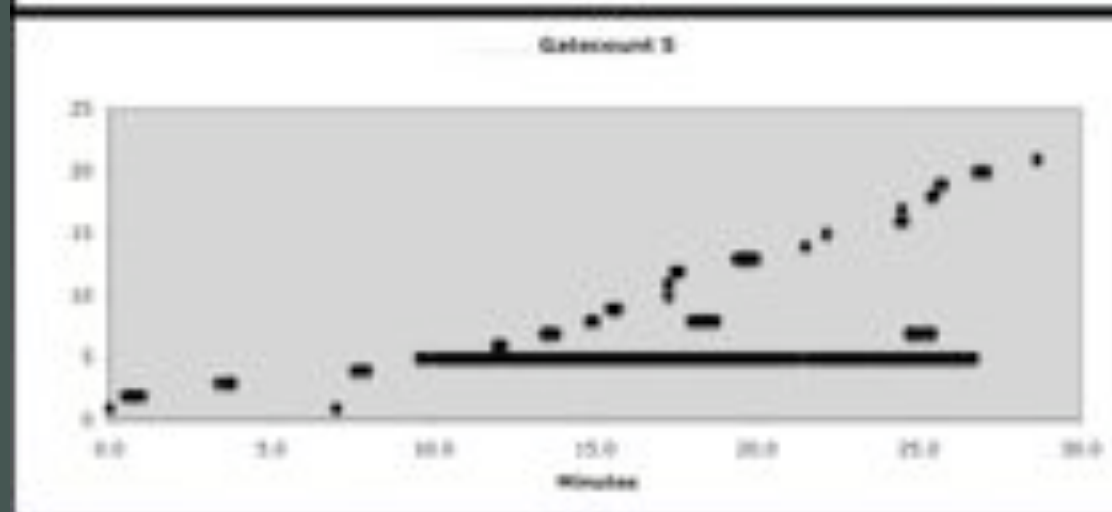
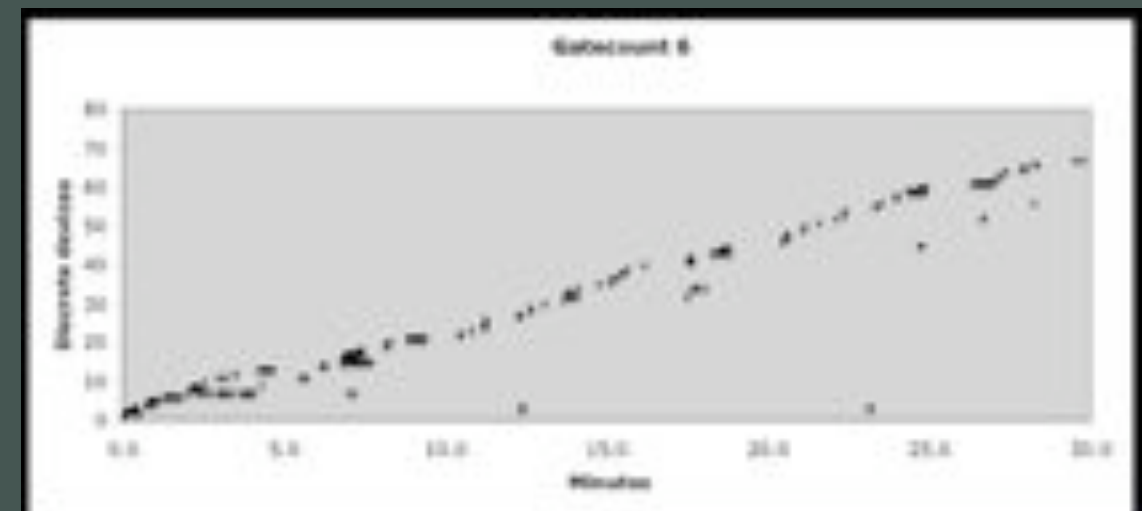
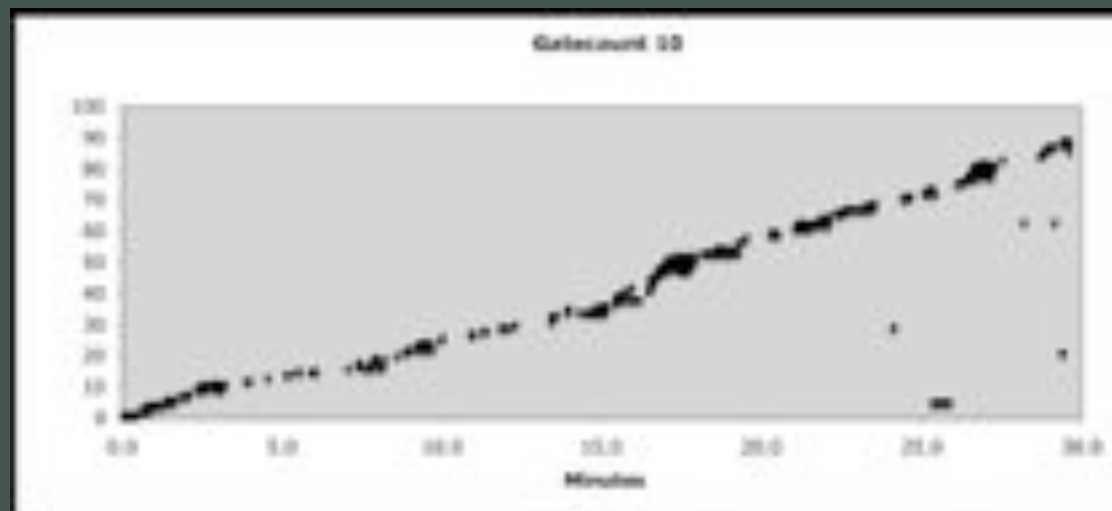
Location 3



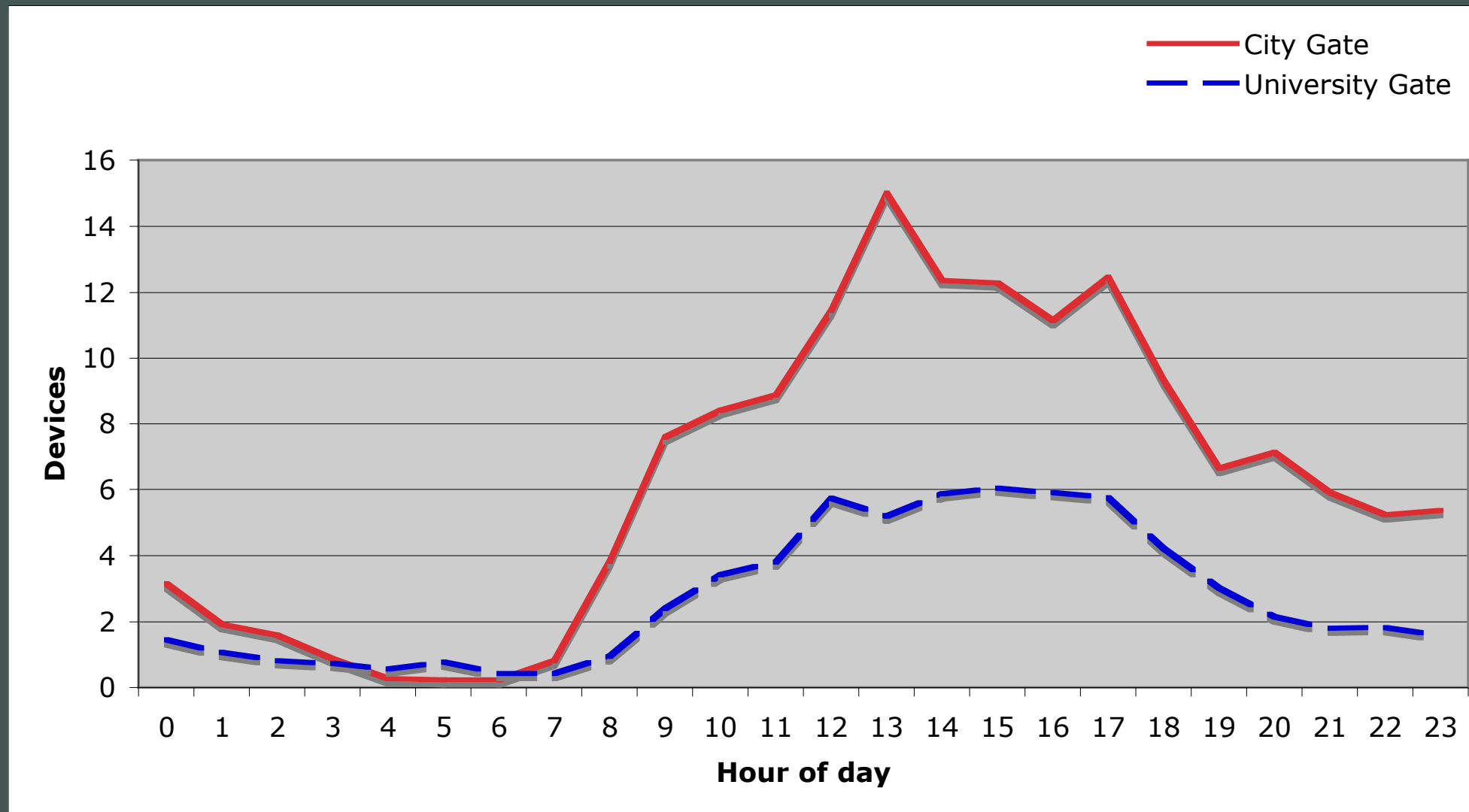


Mobile Gatecount 1





Flow of people









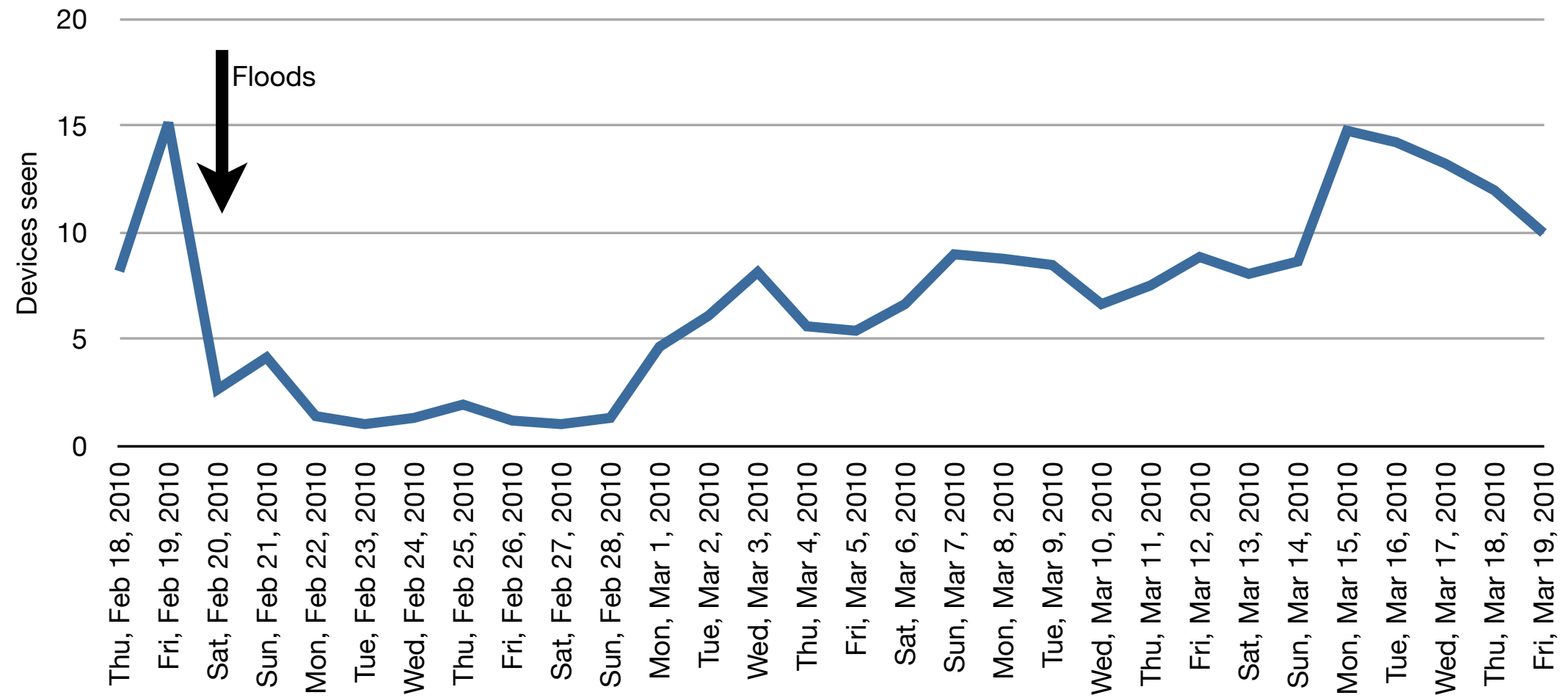
Monday, 31 May 2010



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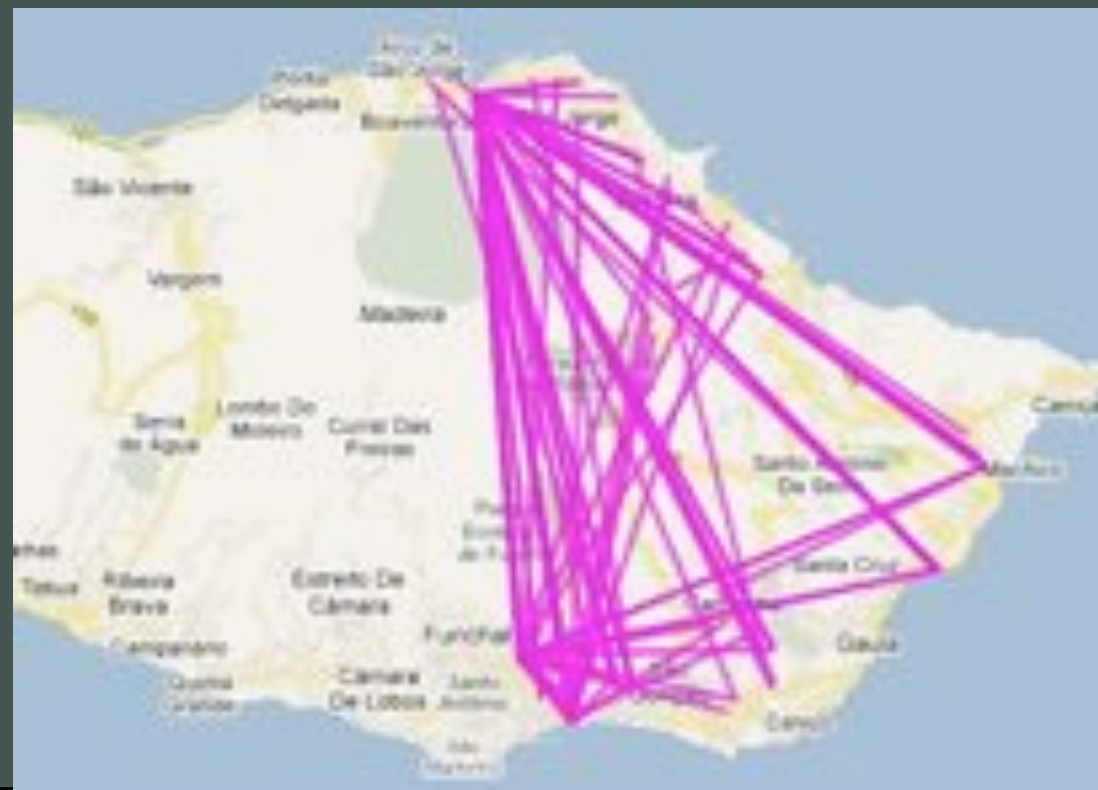
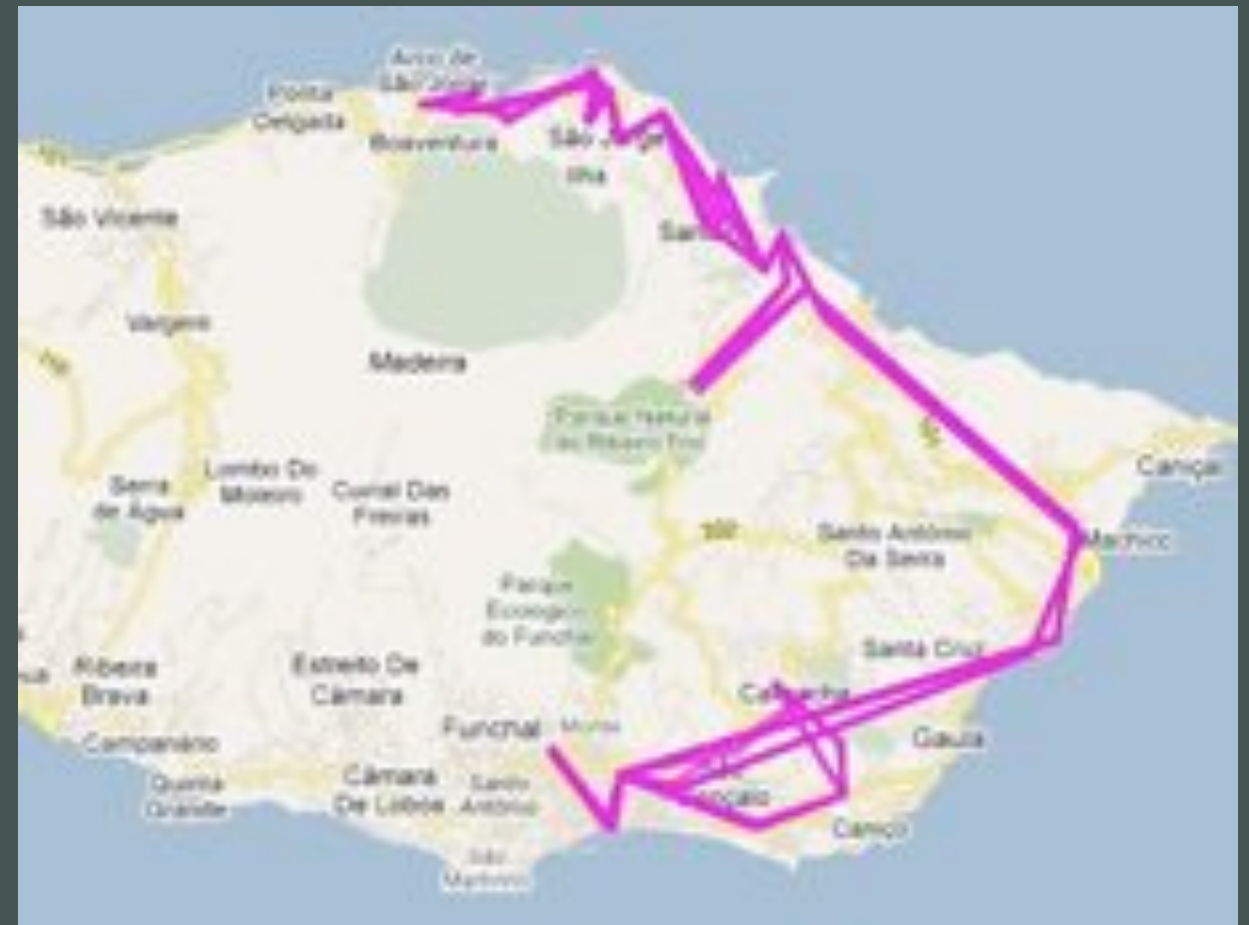


Avenida - Recovery

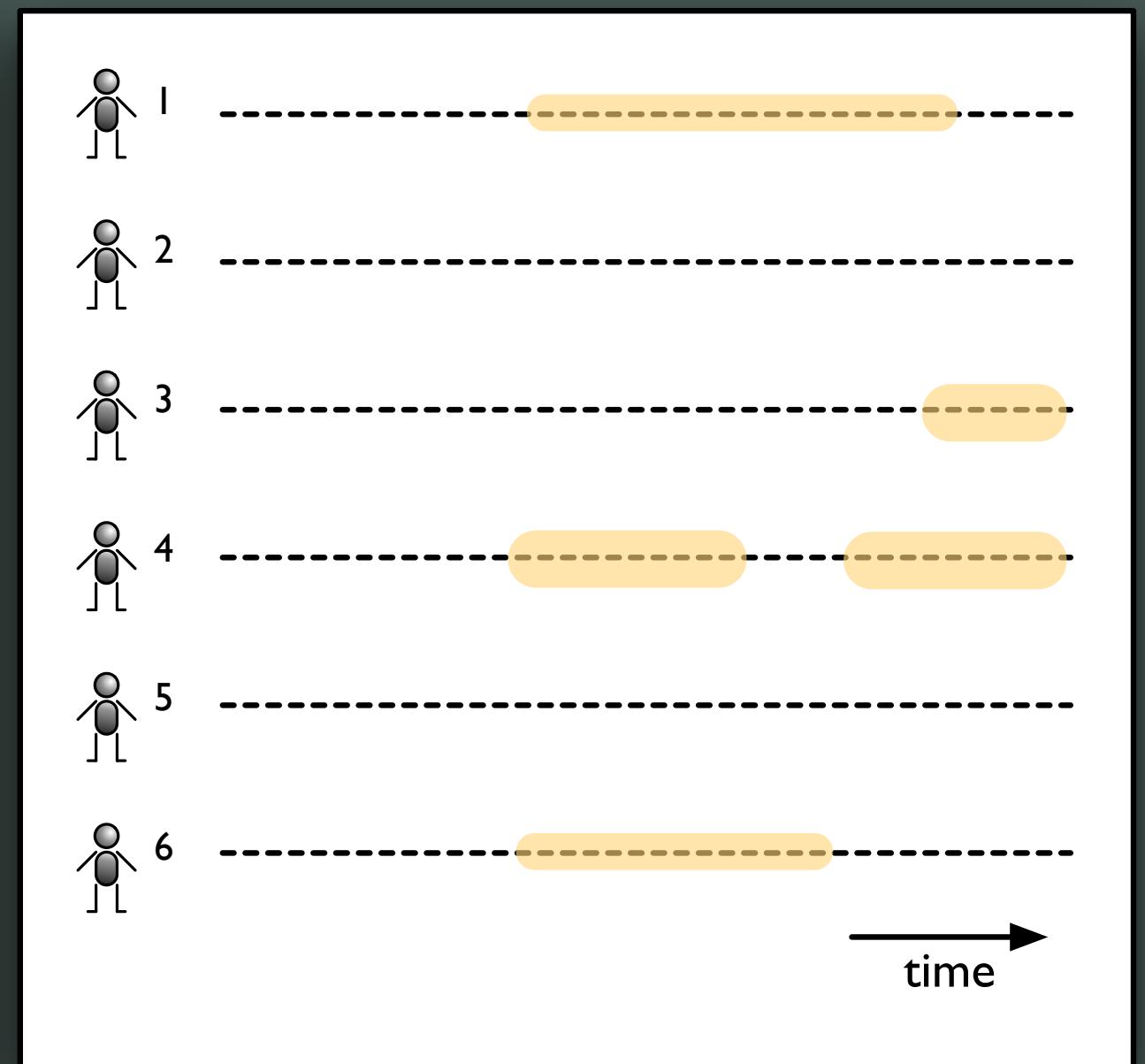
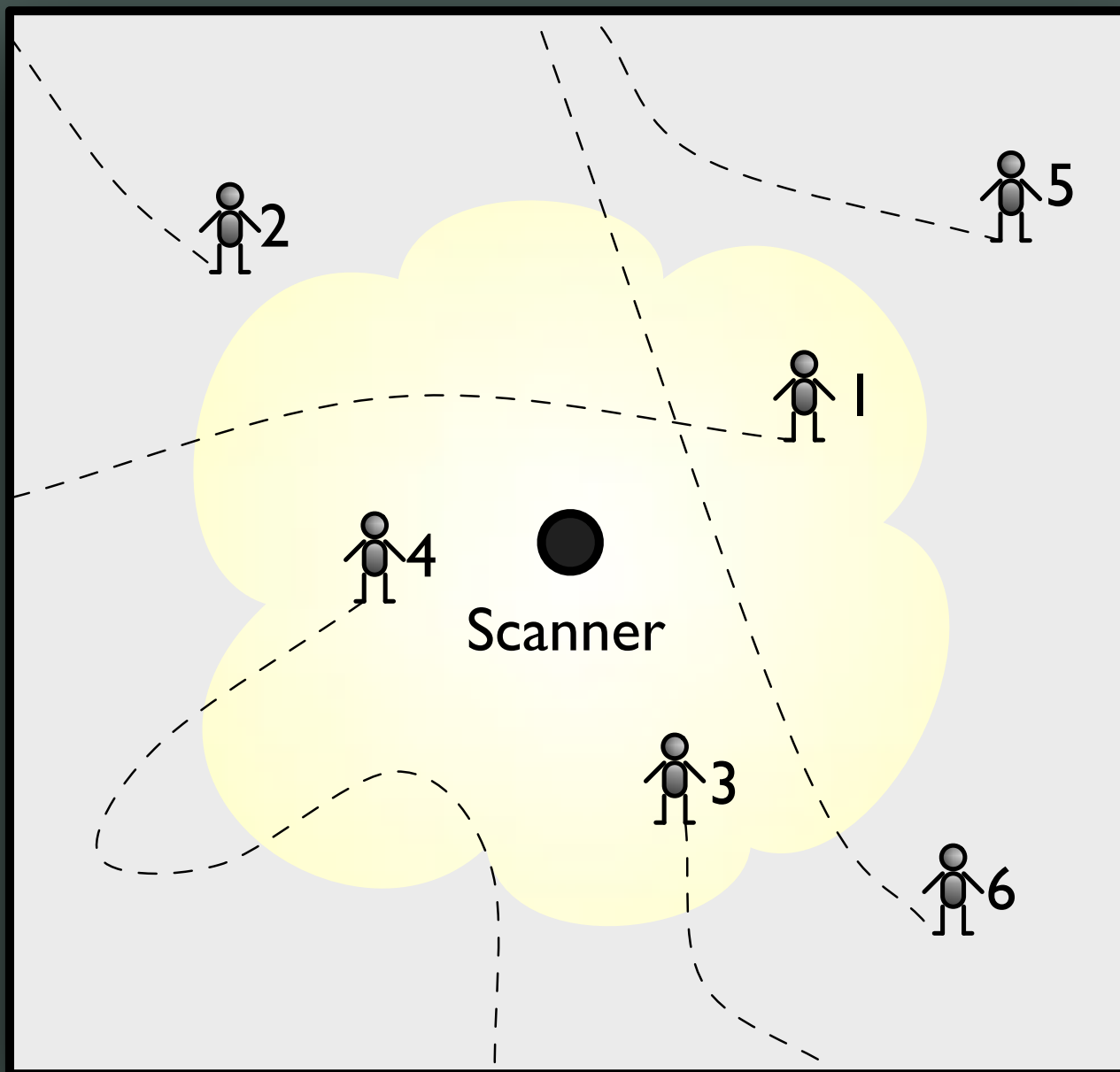


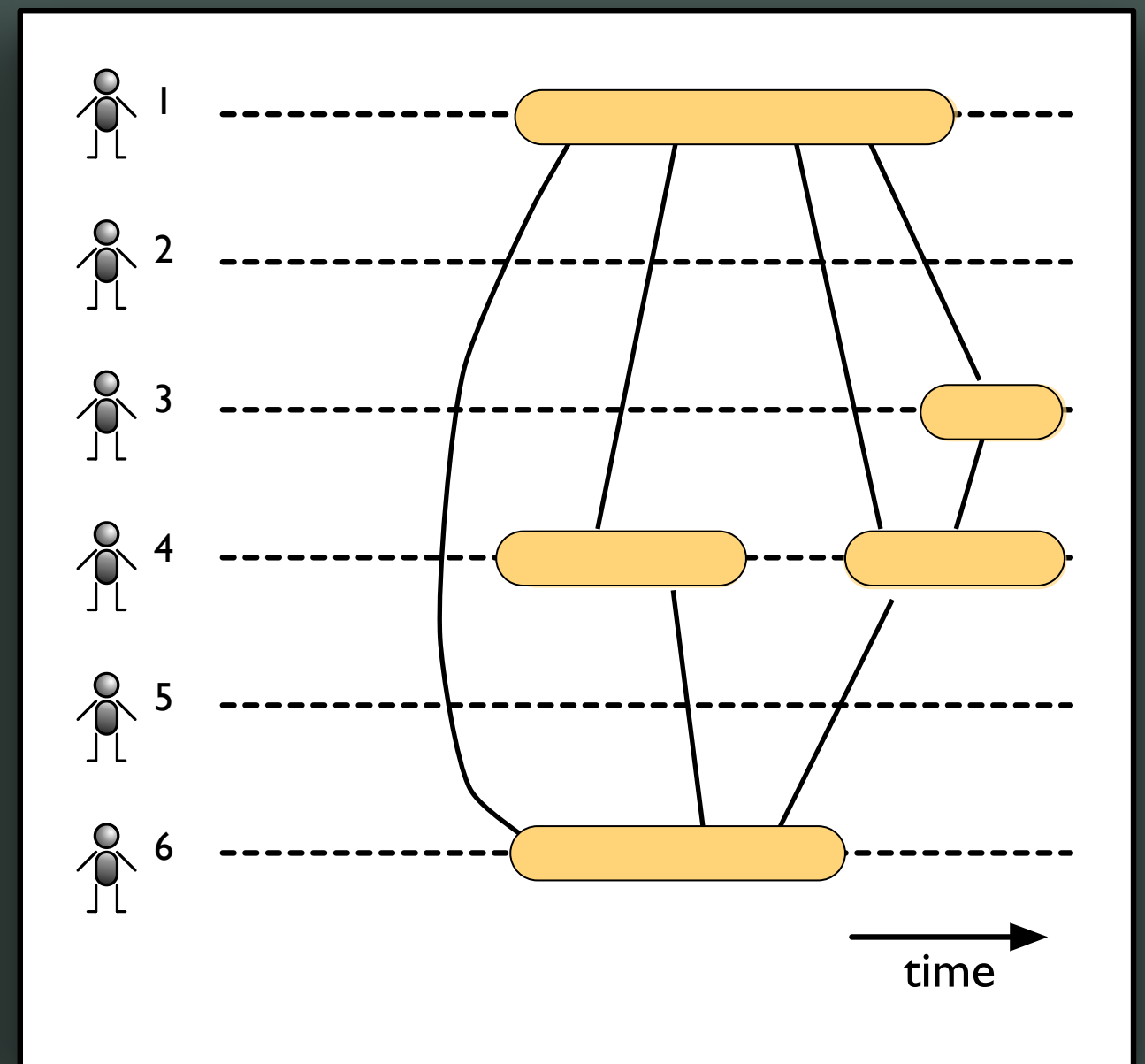
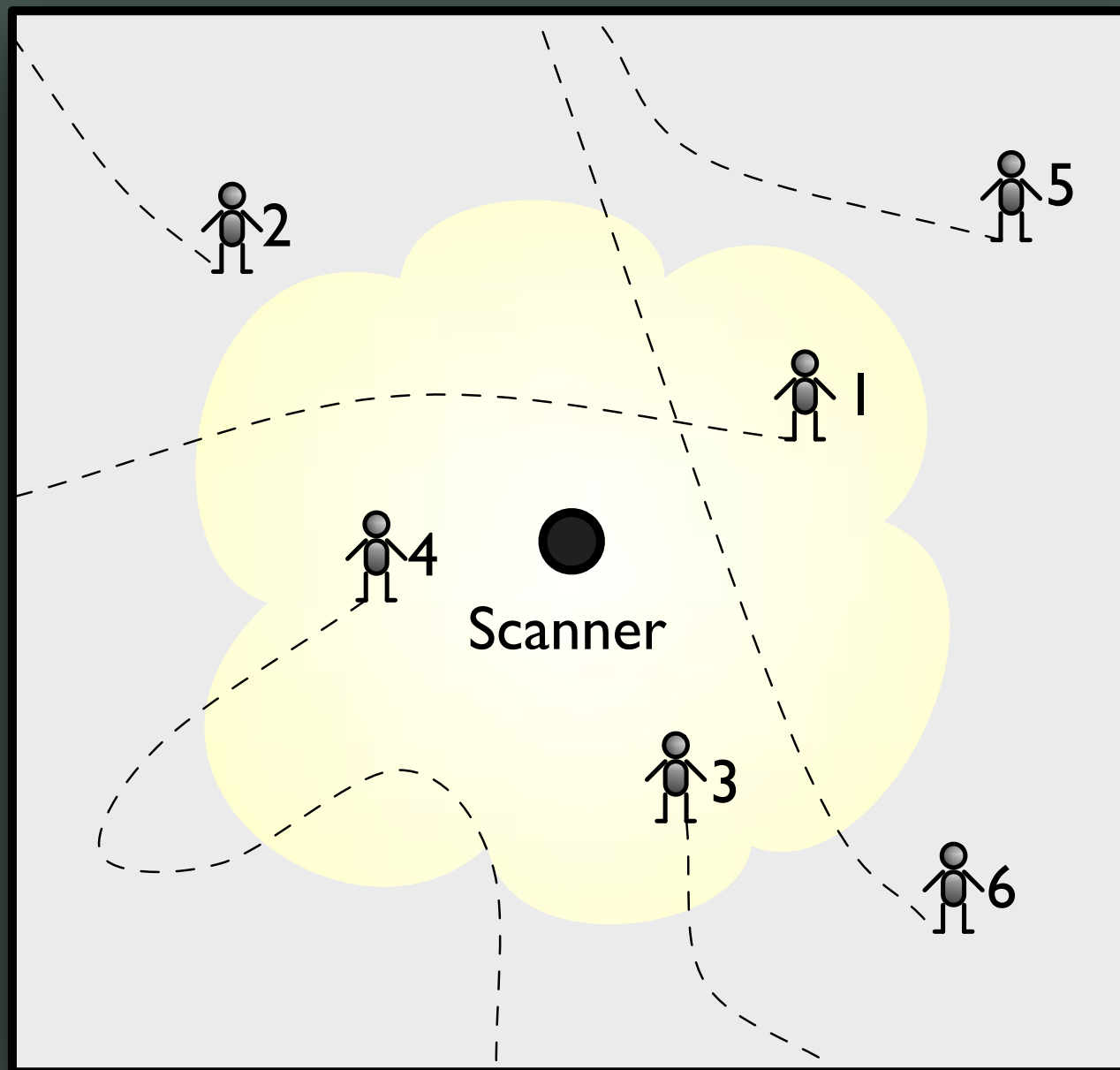


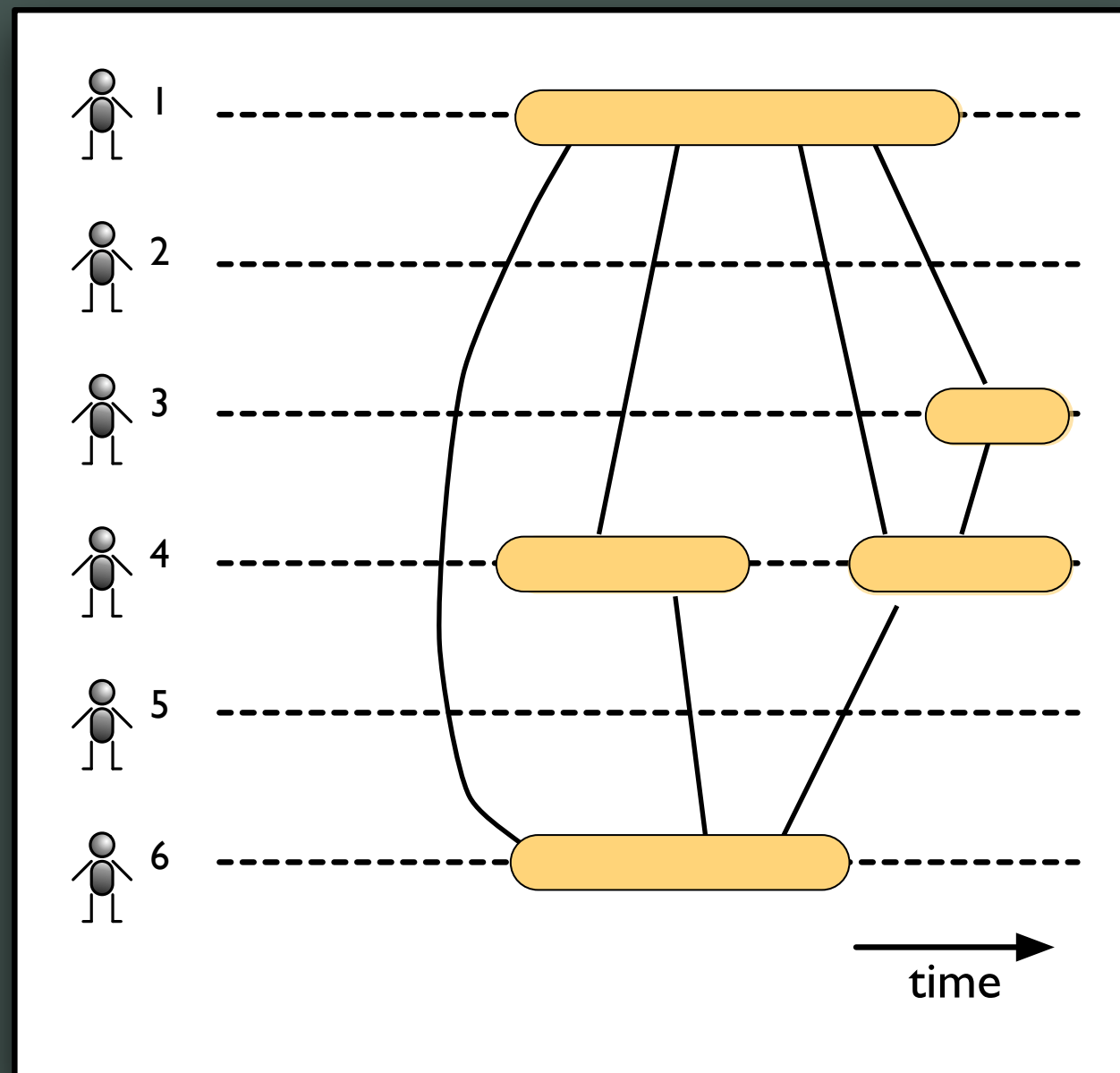


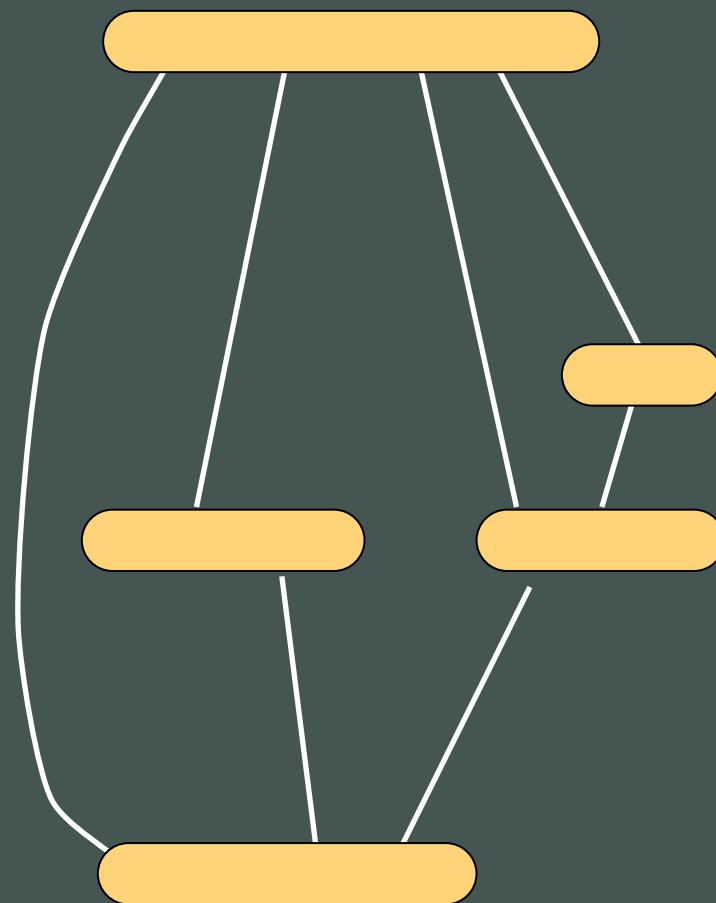


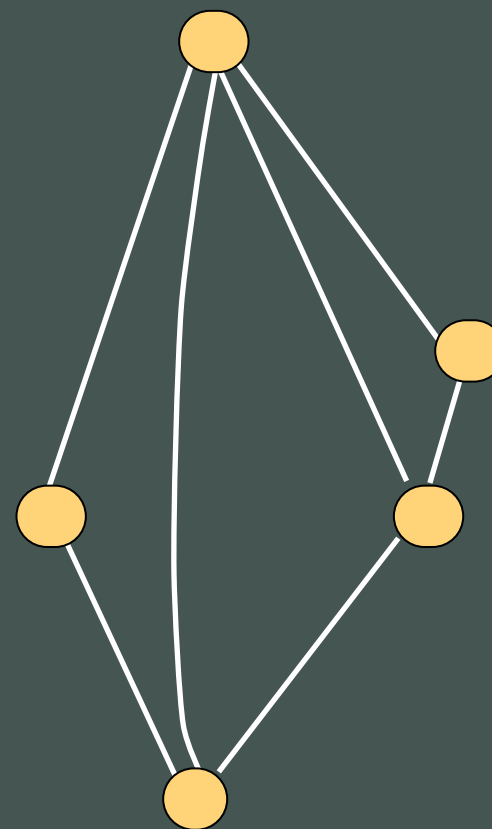
Urban Networks of Encounter

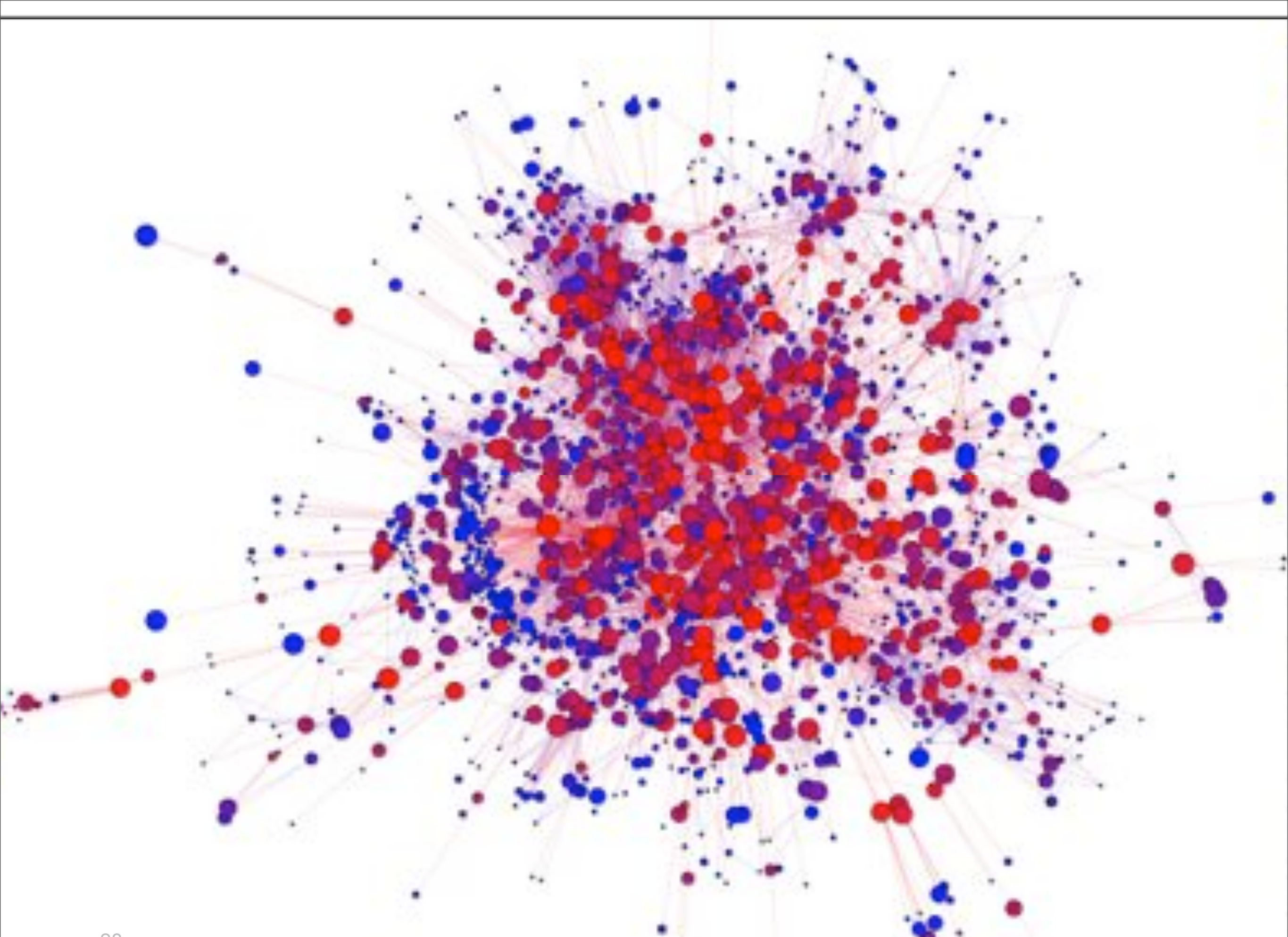






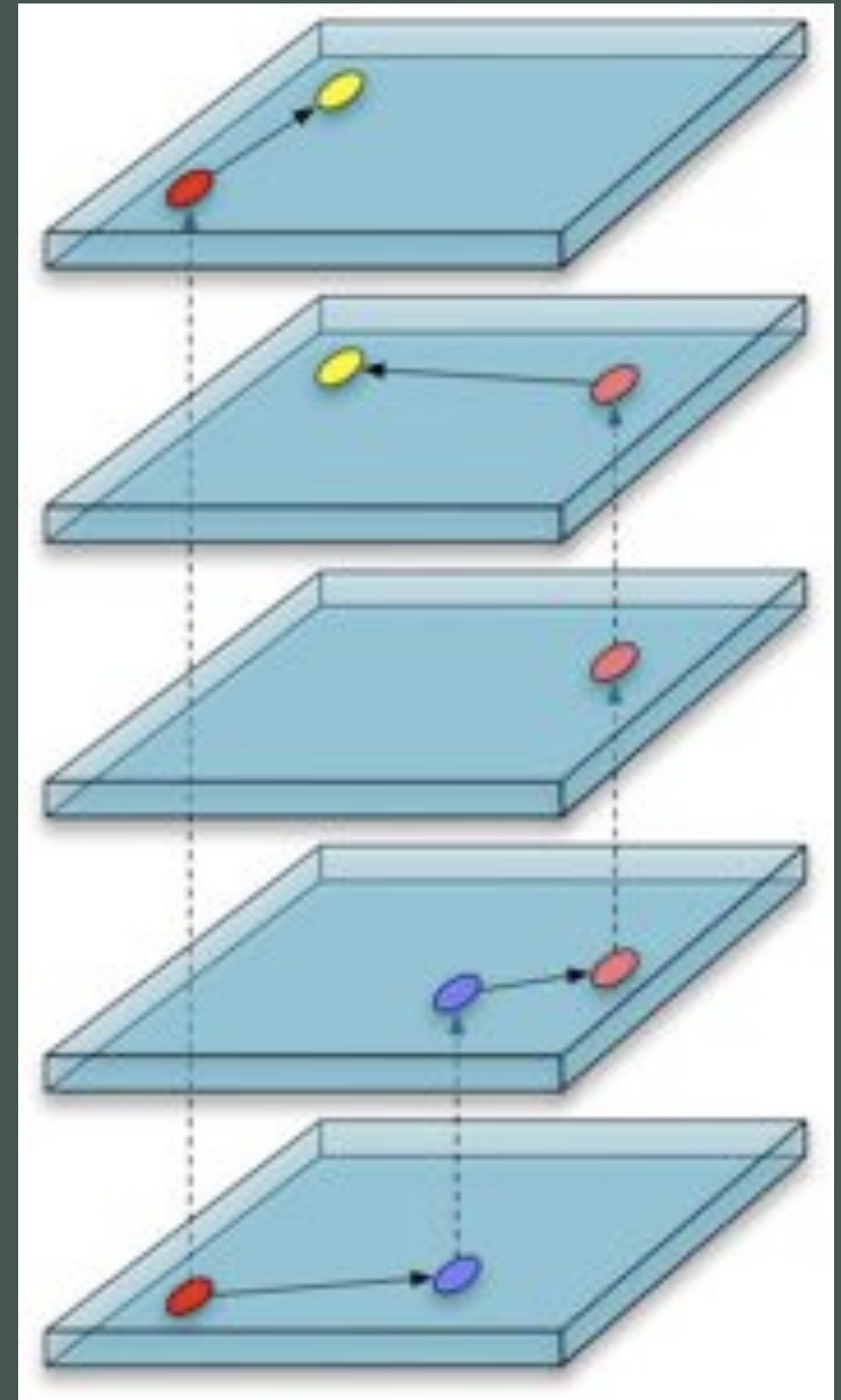
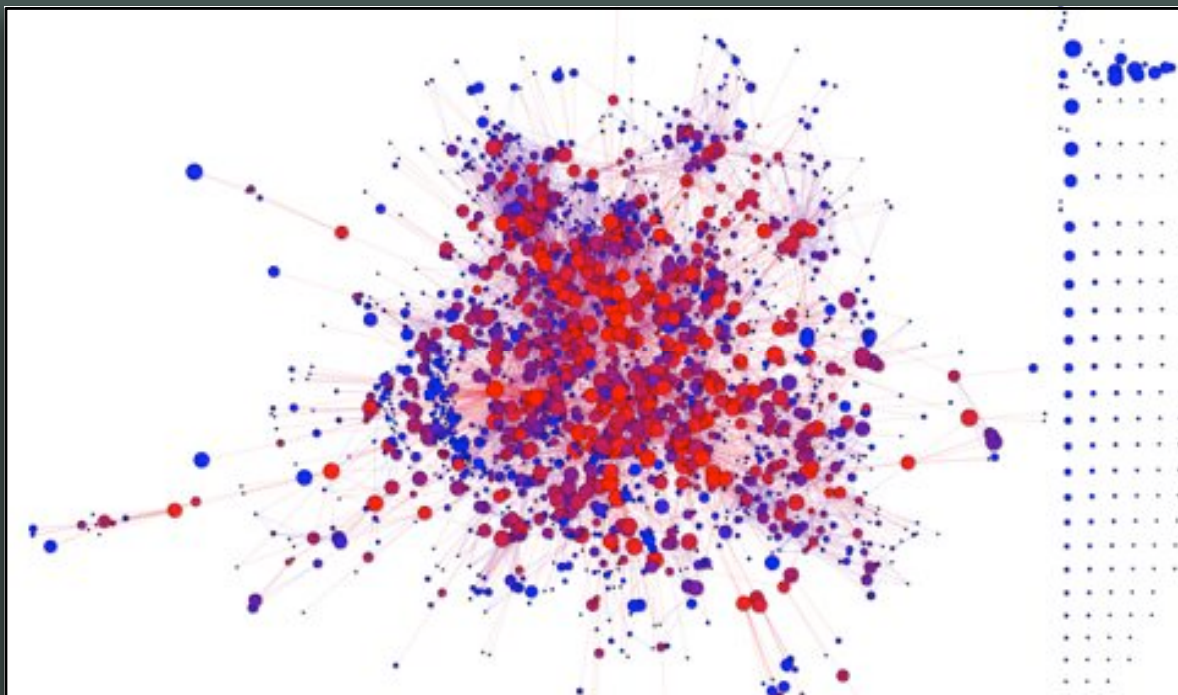




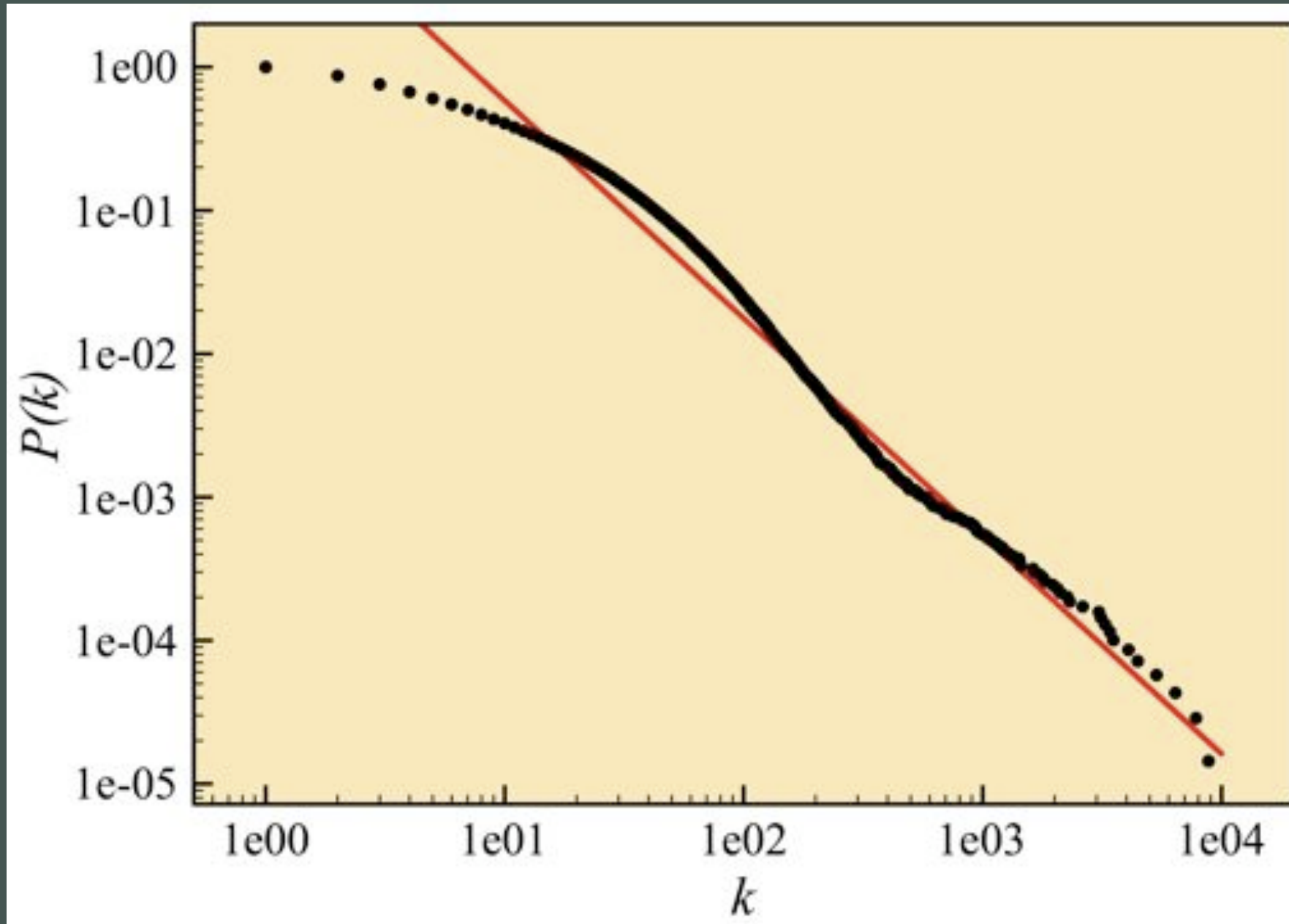


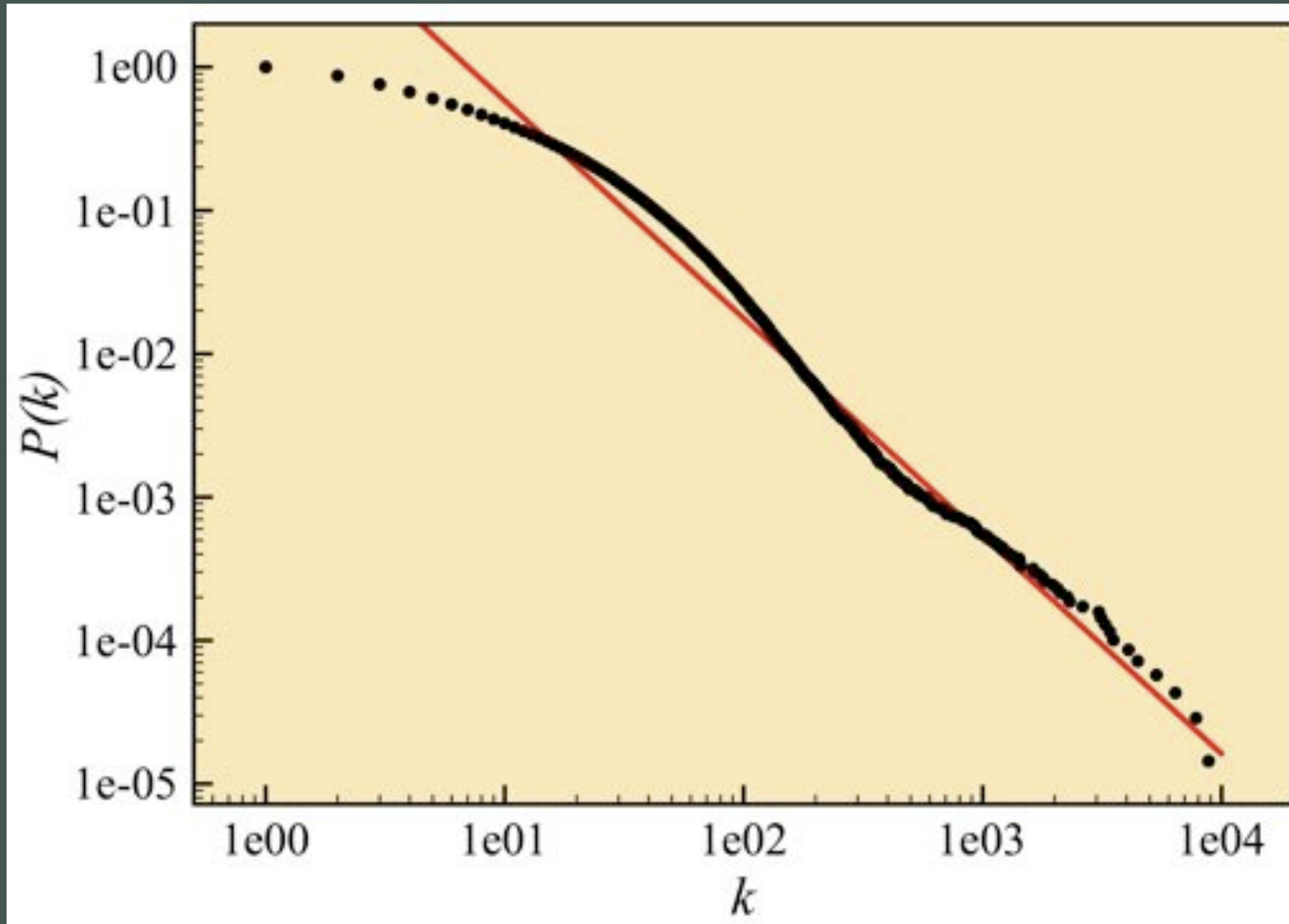


Considering time

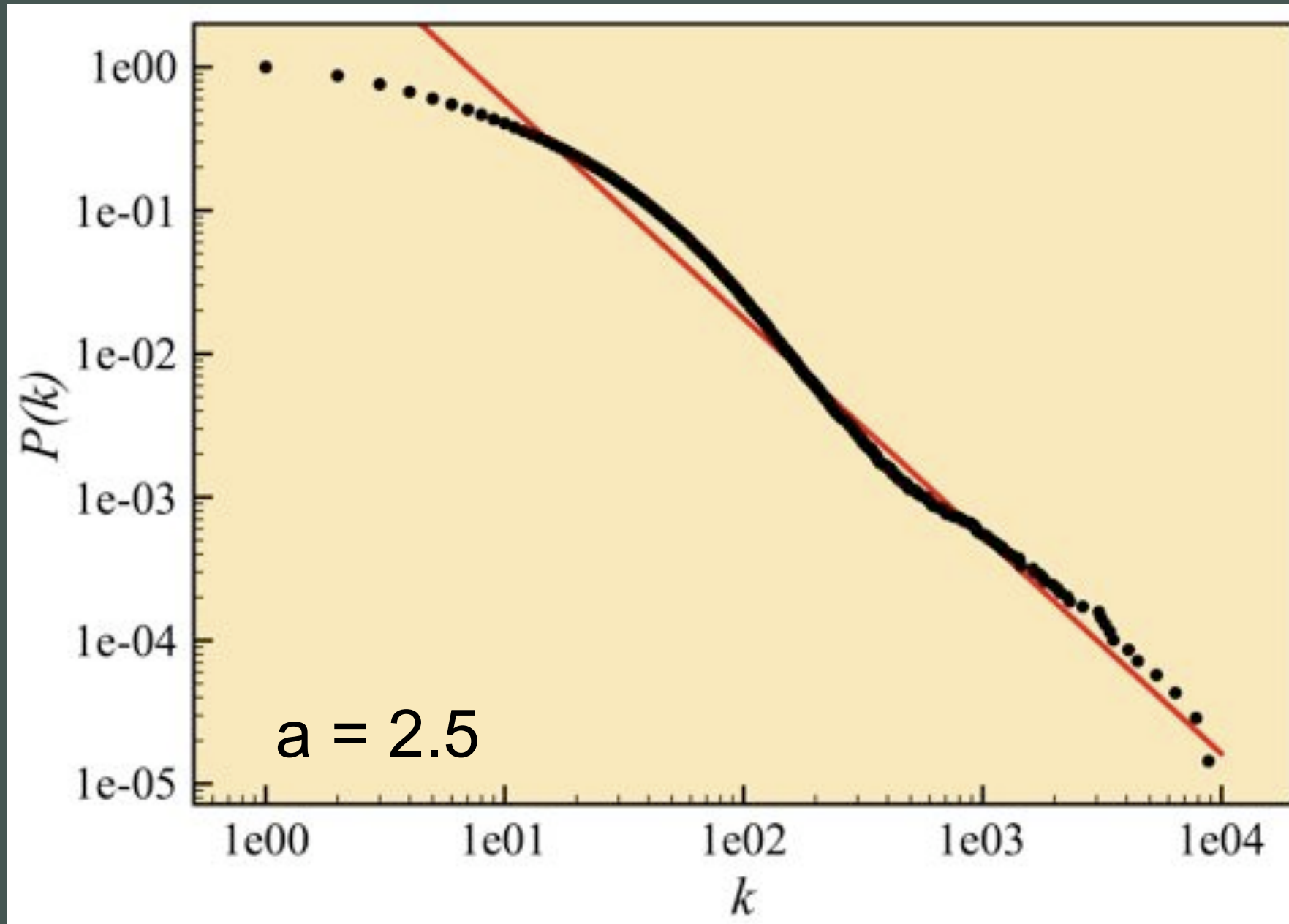


Results

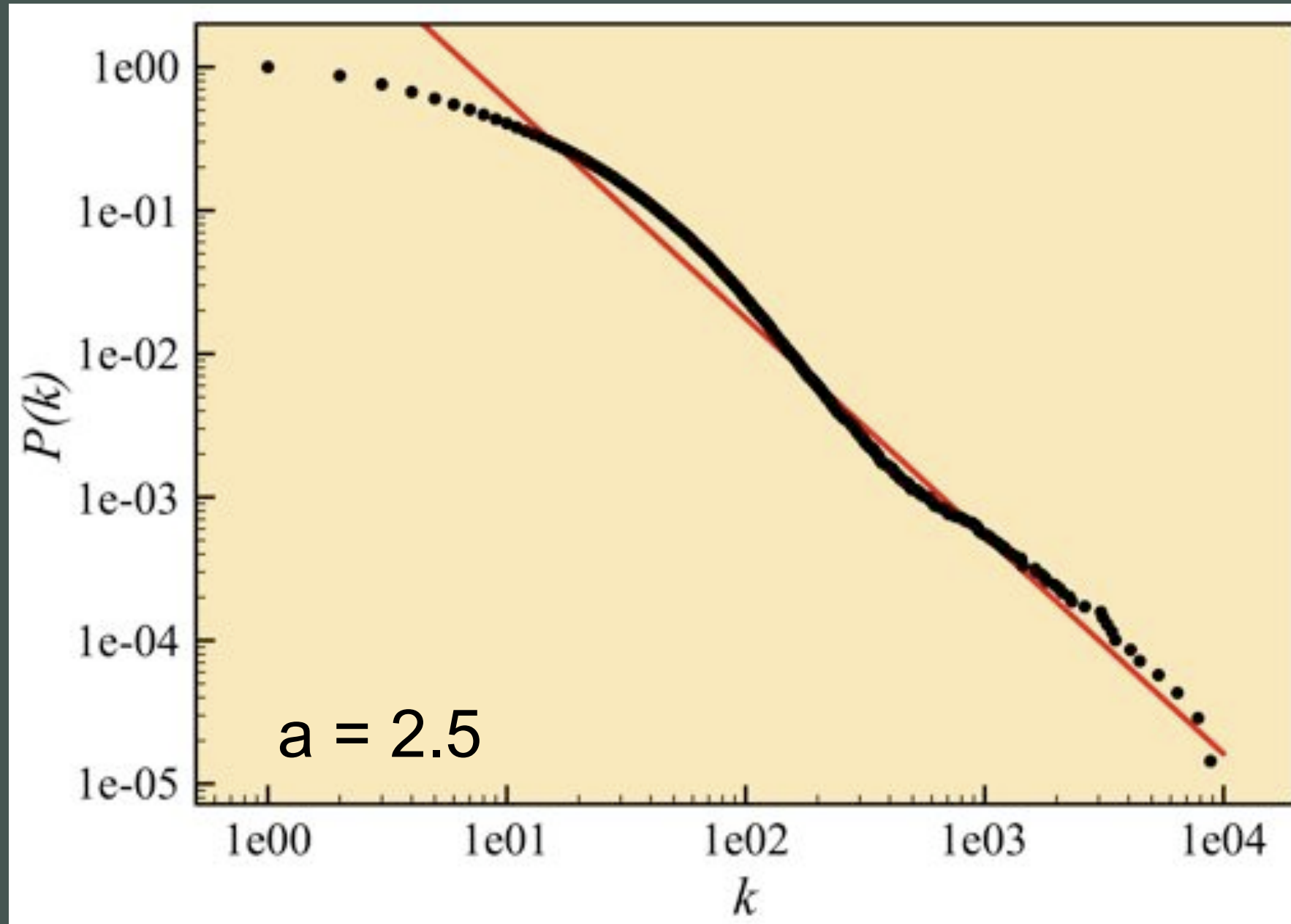




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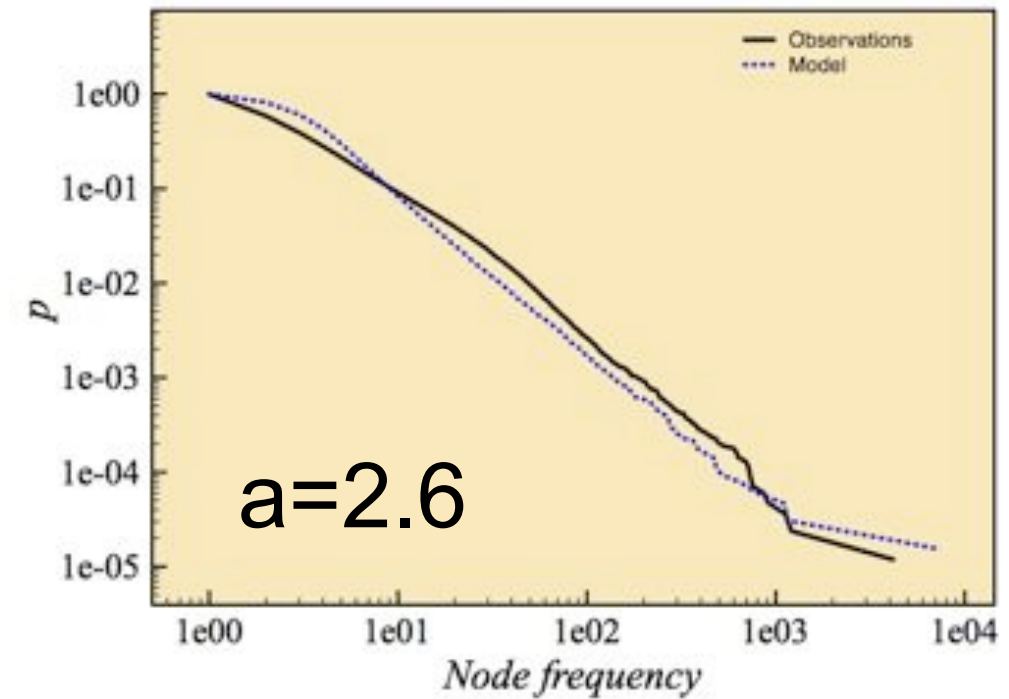
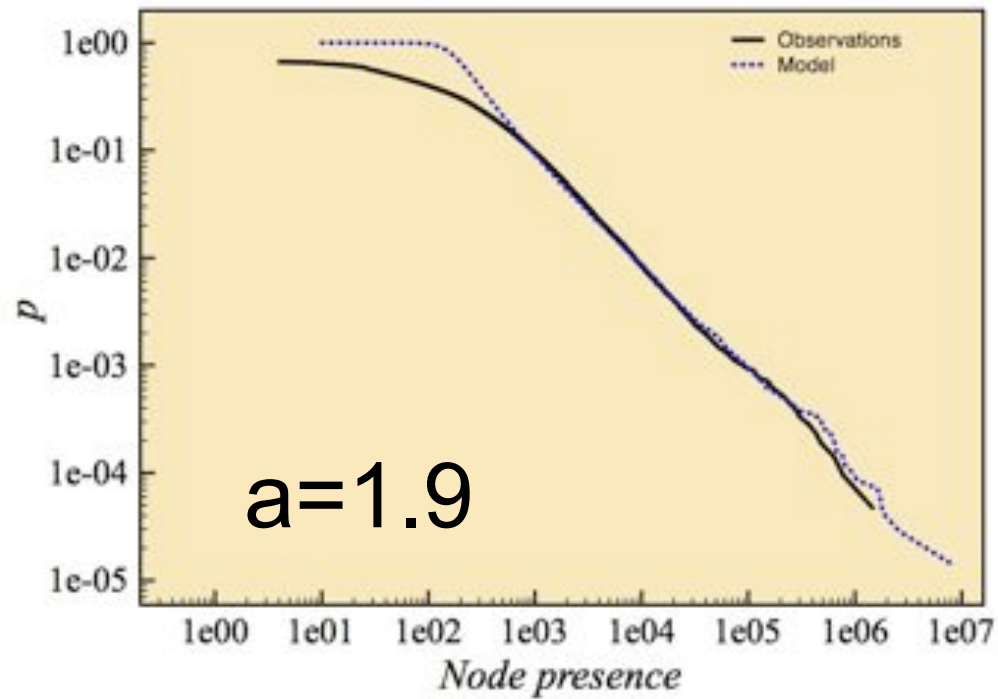
$$y = x^{-a}$$

Probability of encountering more than 10 people is $10^{-2.5}$

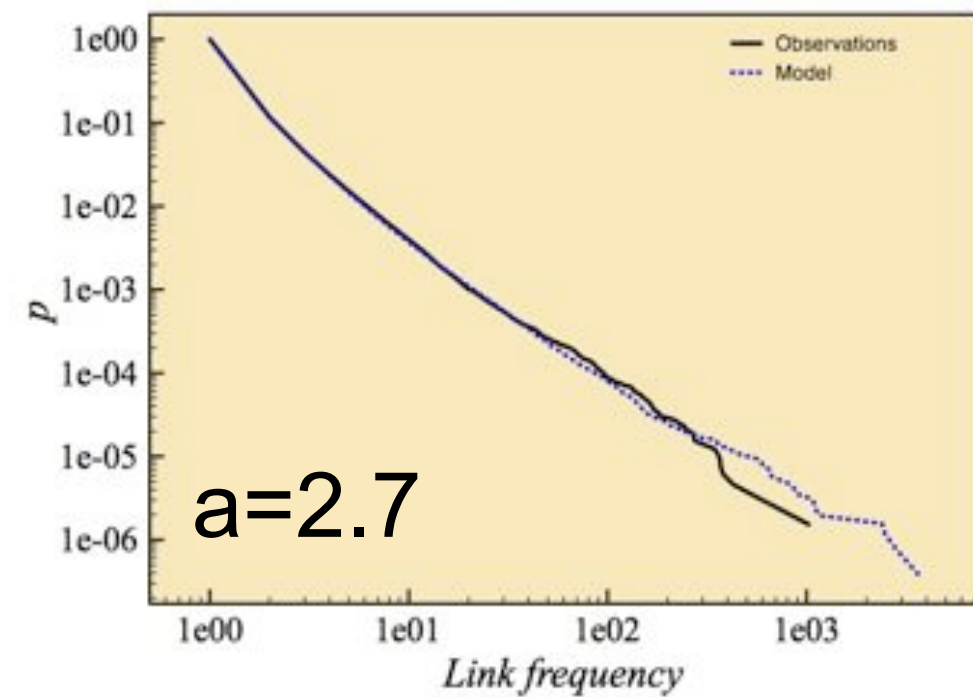
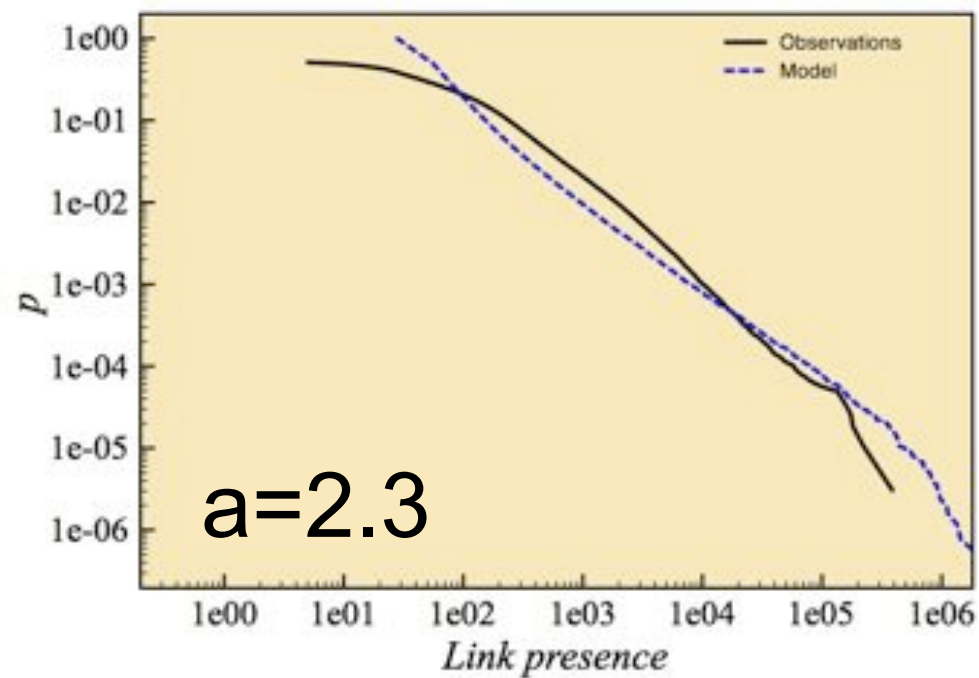
Duration

Frequency

Sessions



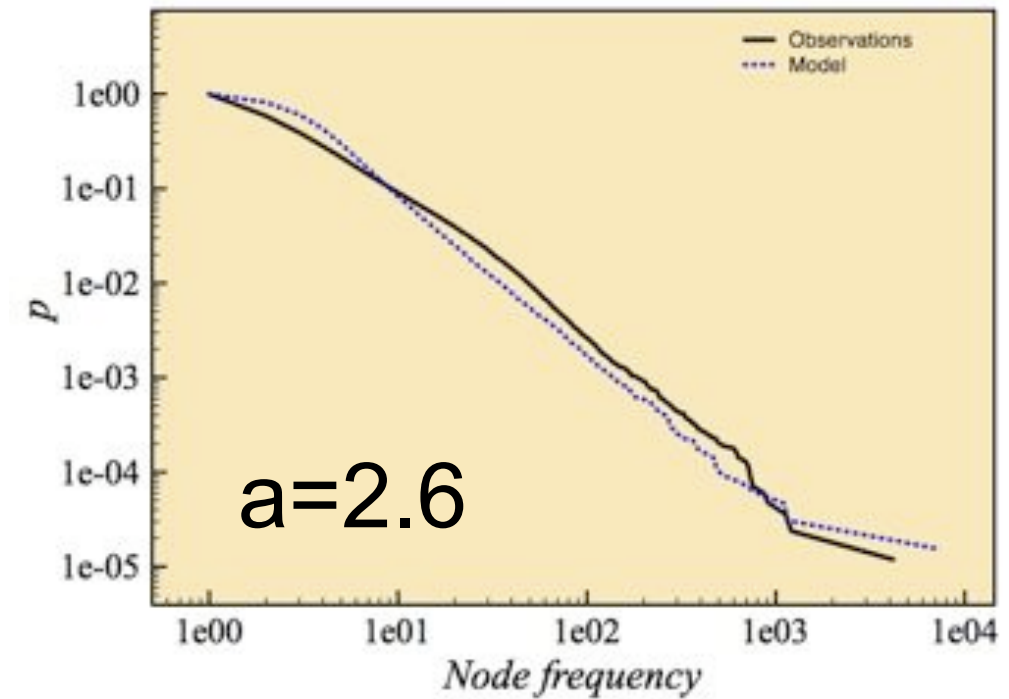
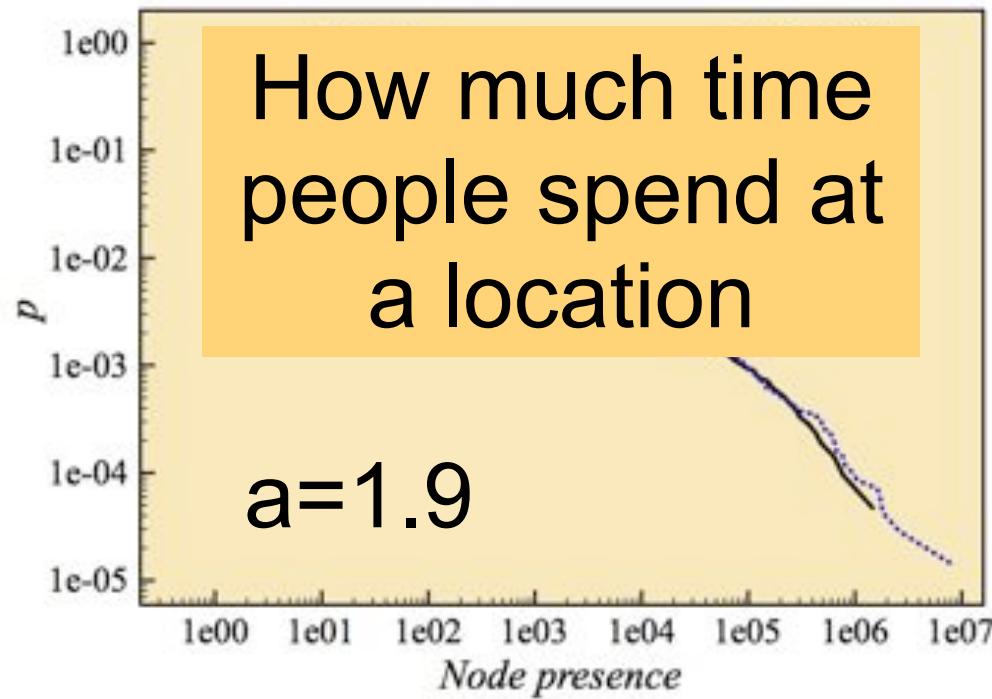
Encounters



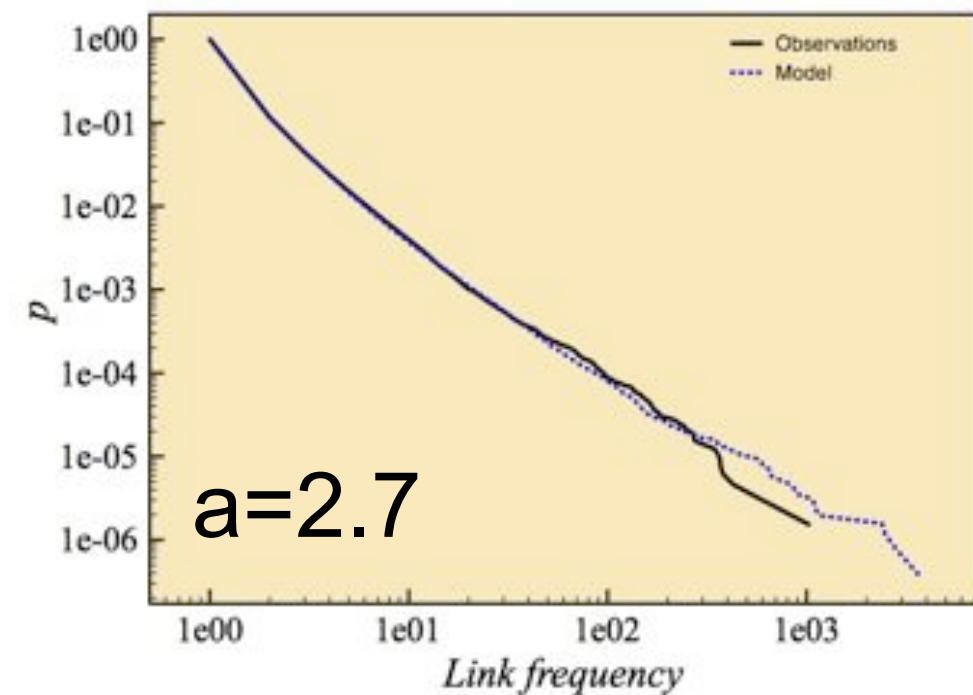
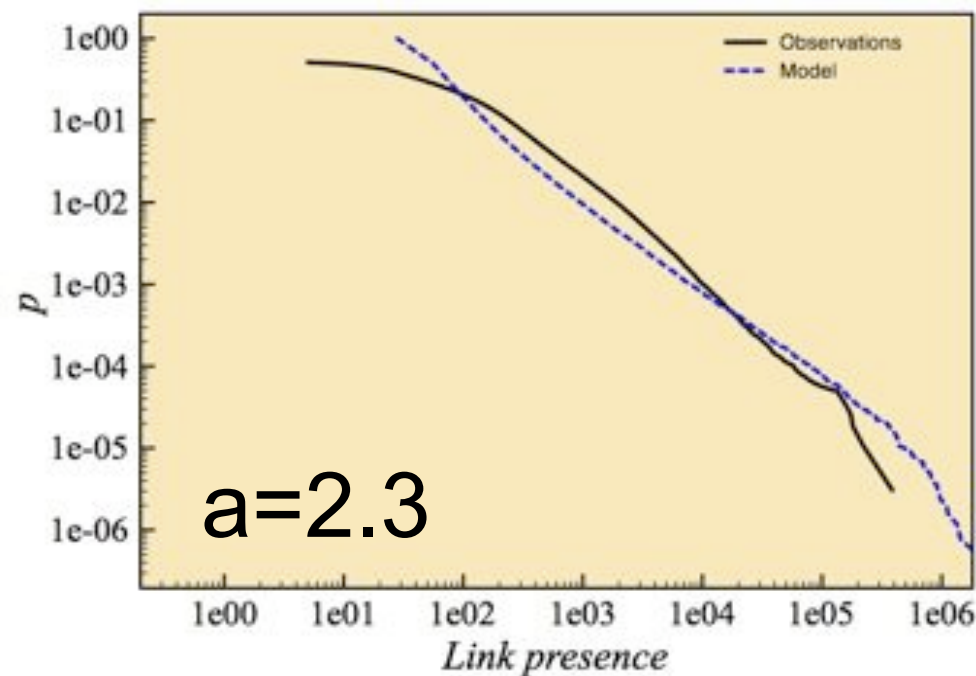
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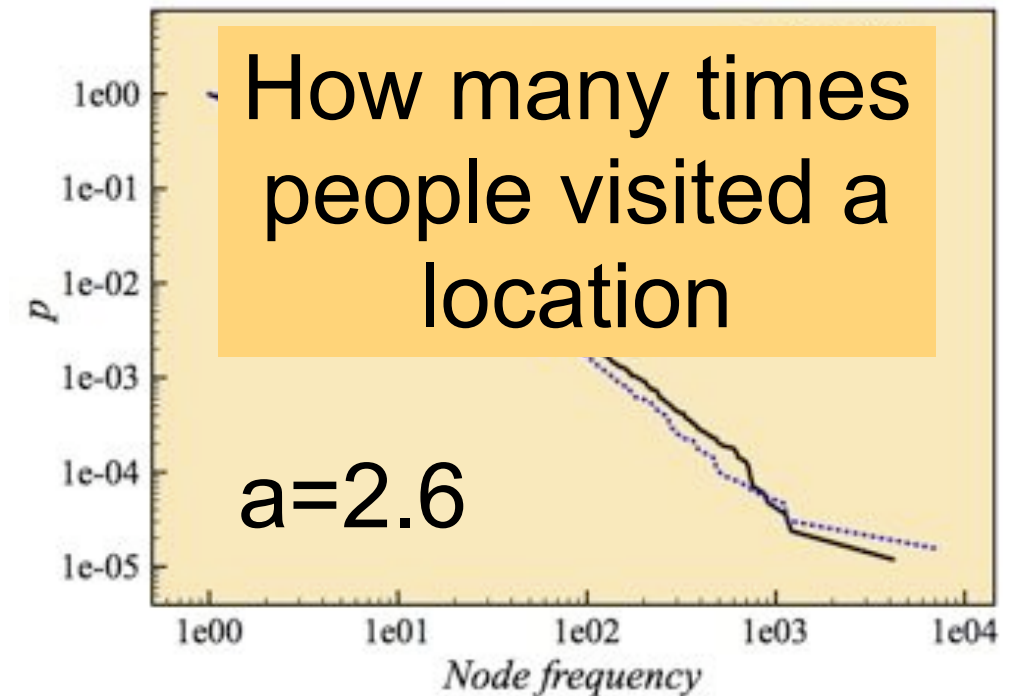
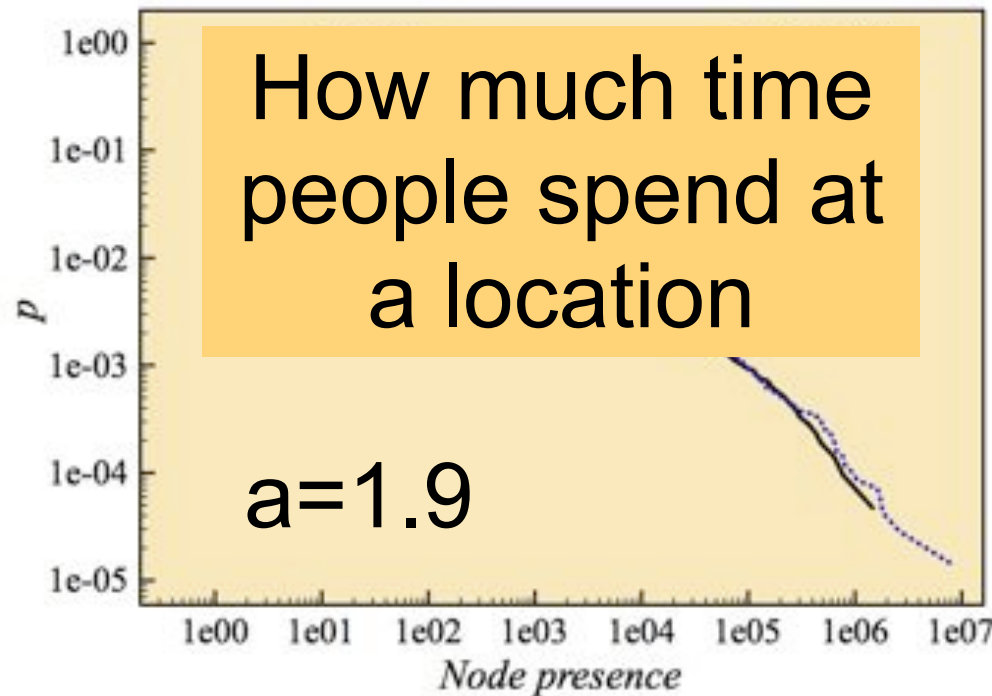
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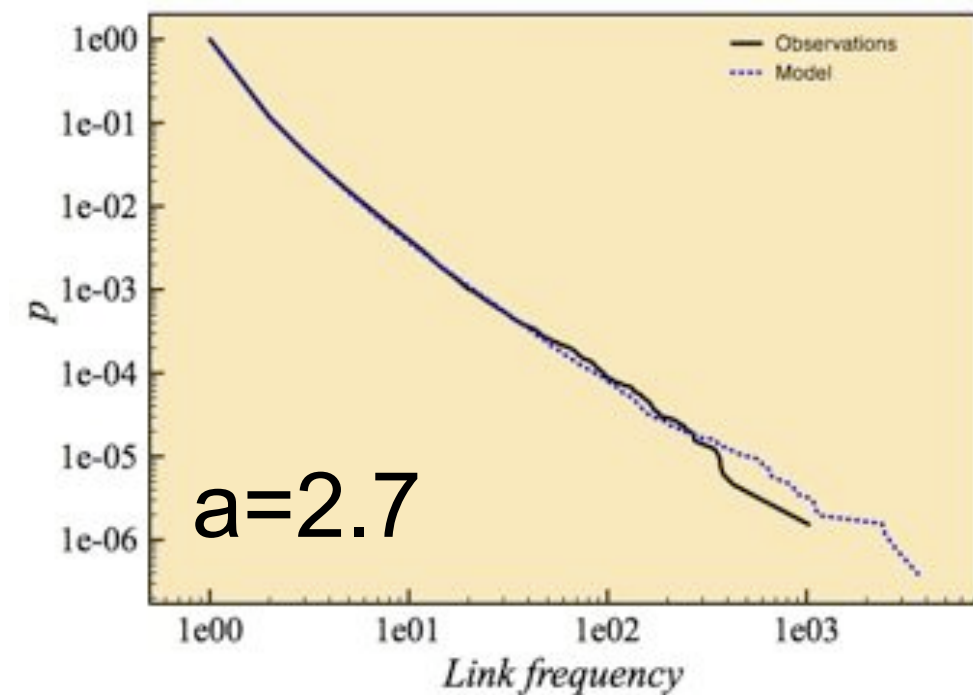
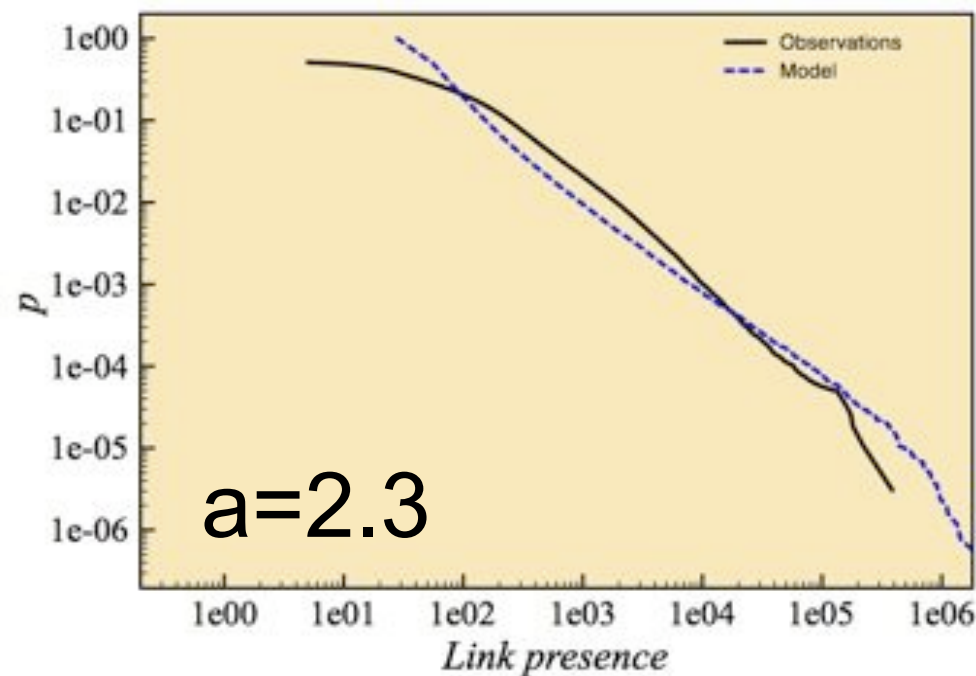
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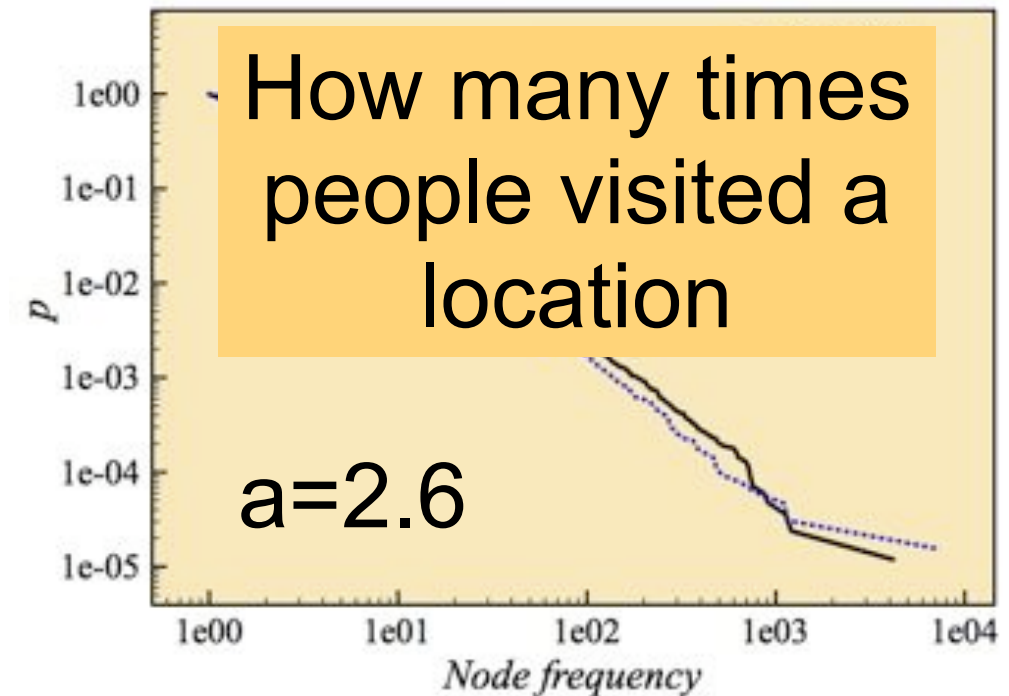
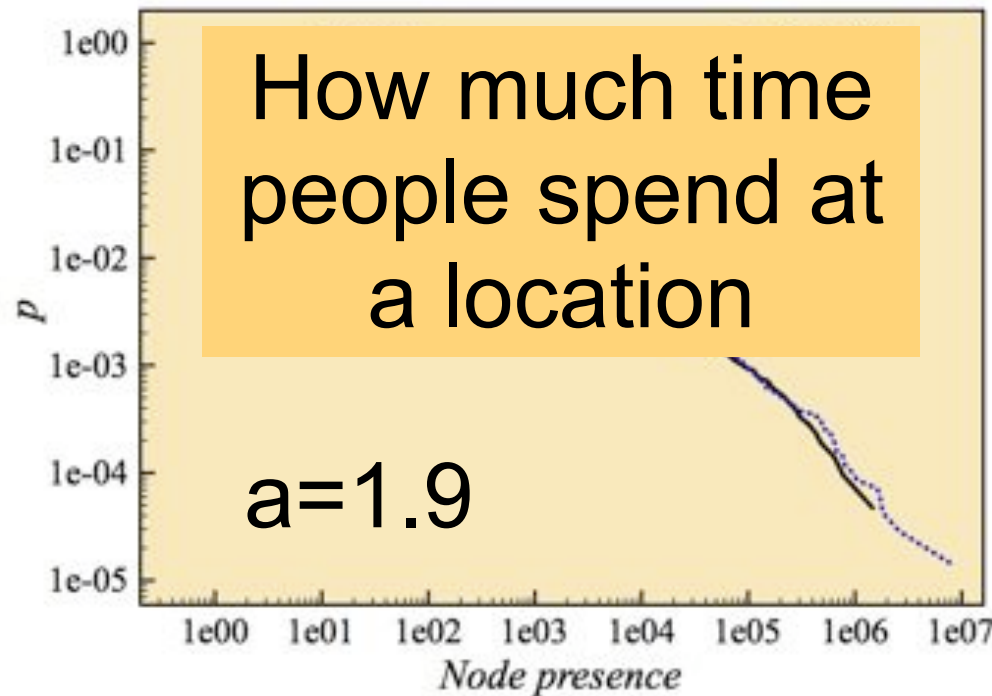
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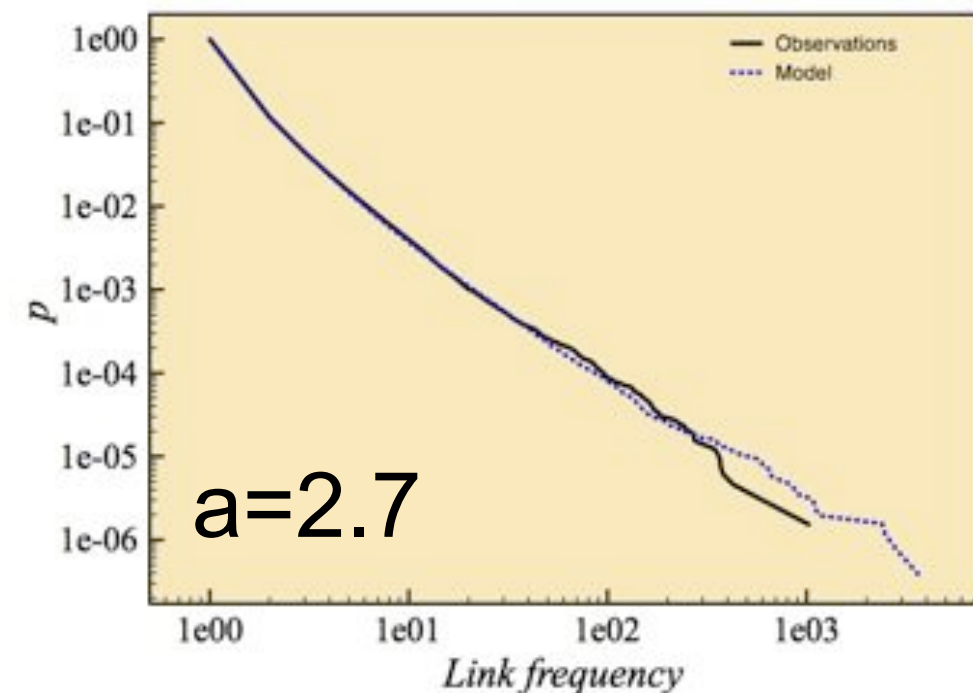
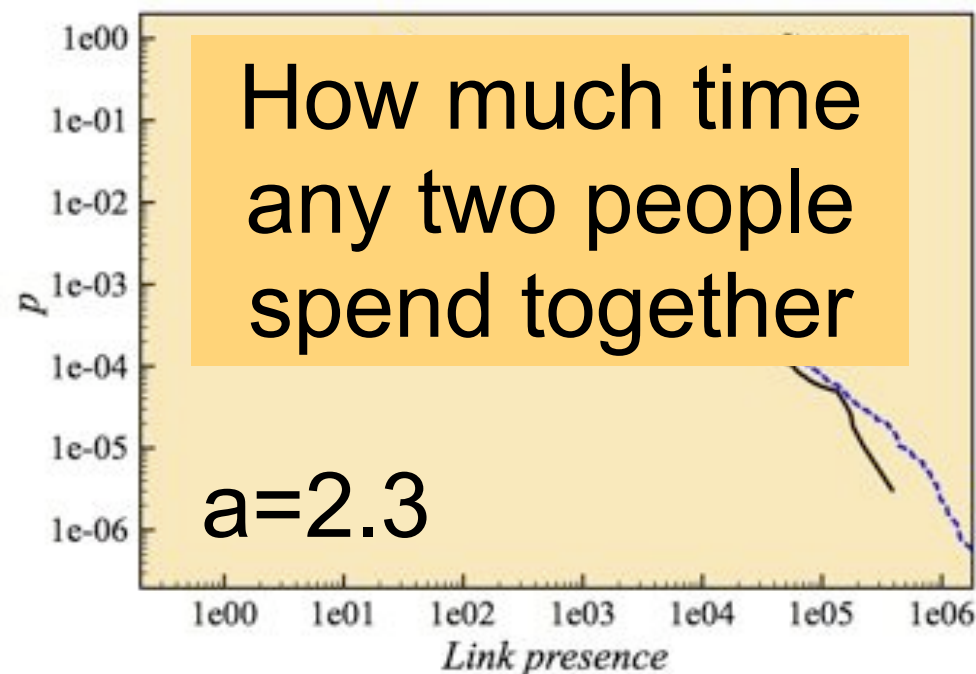
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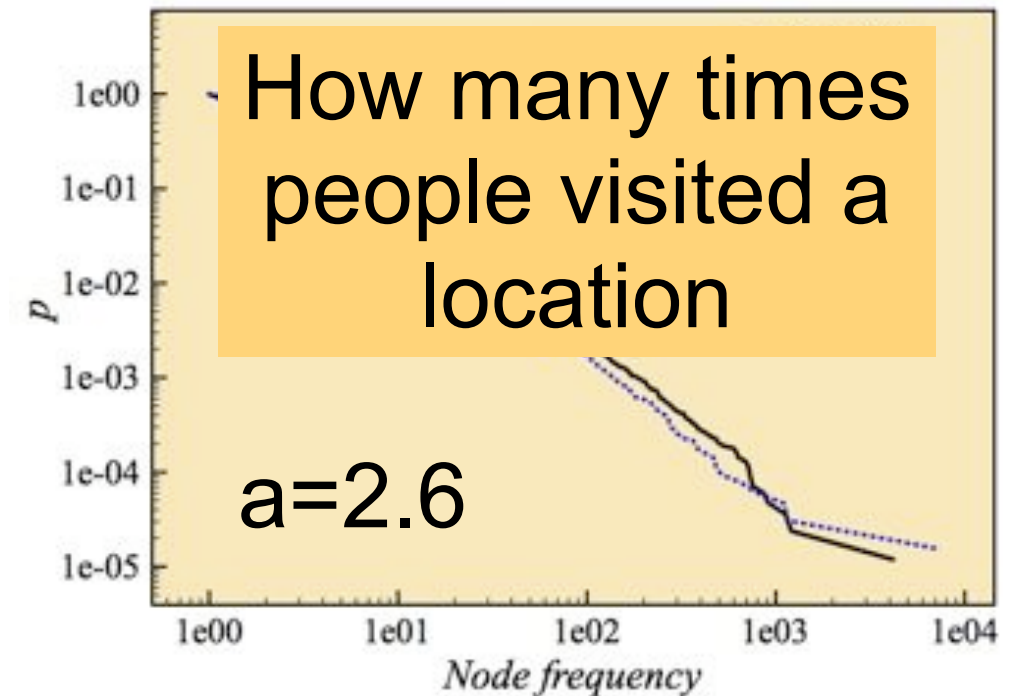
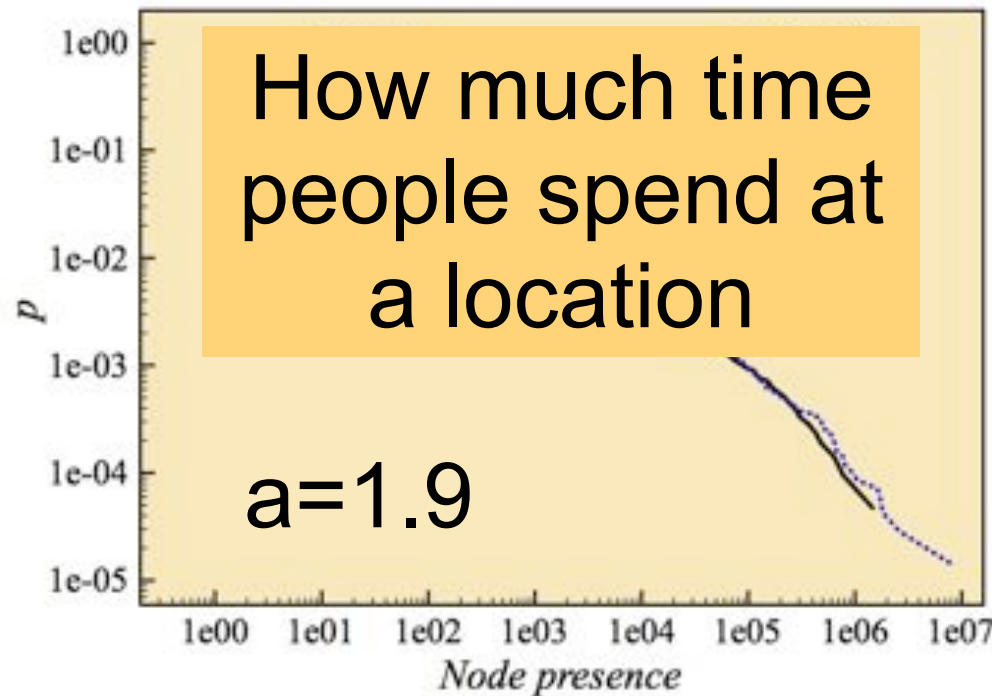
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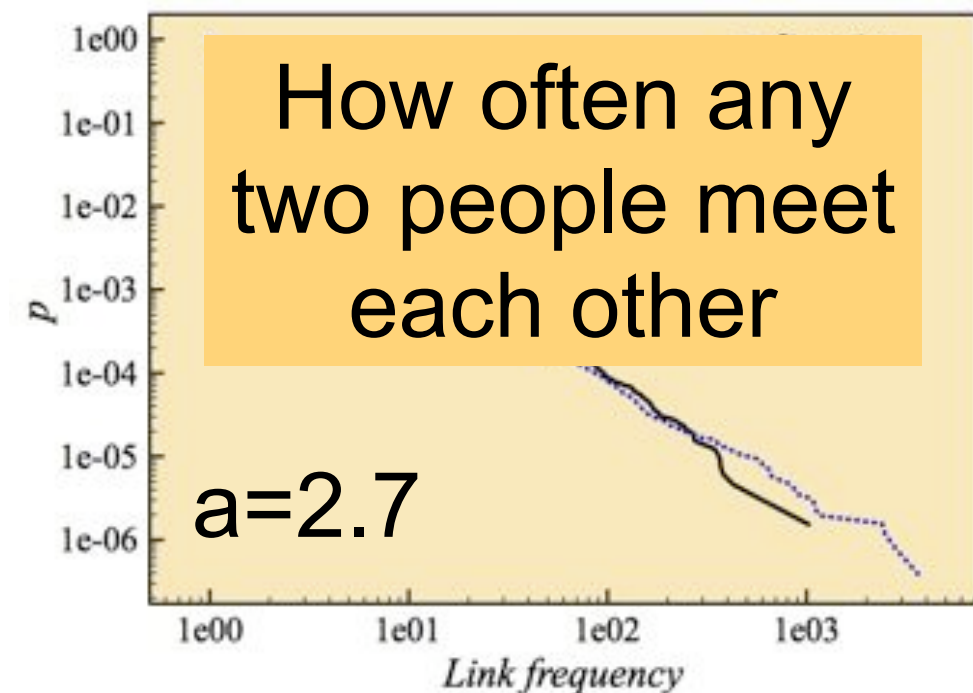
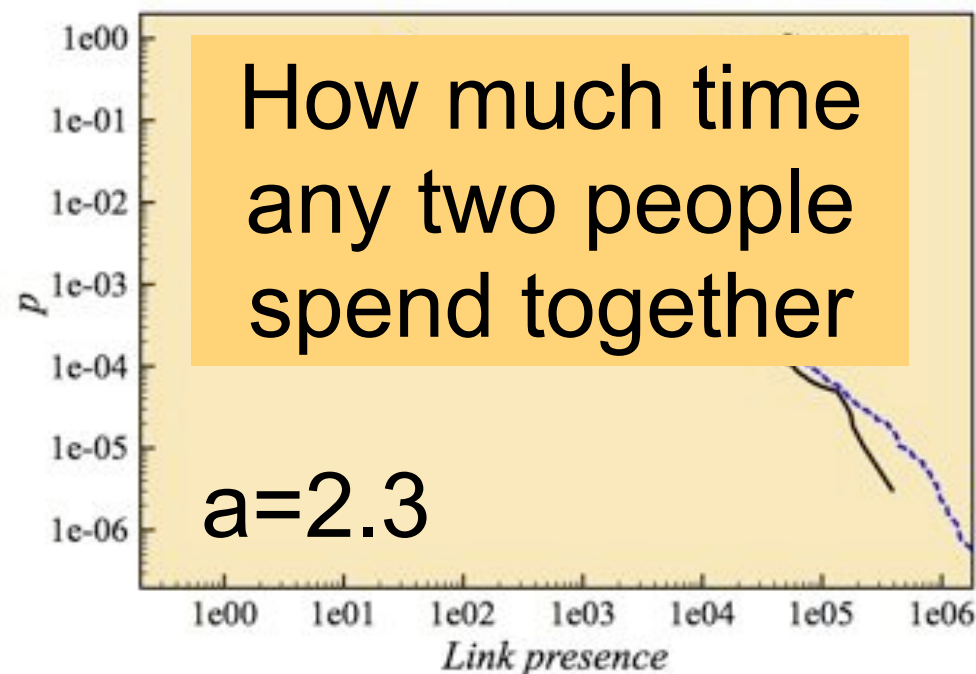
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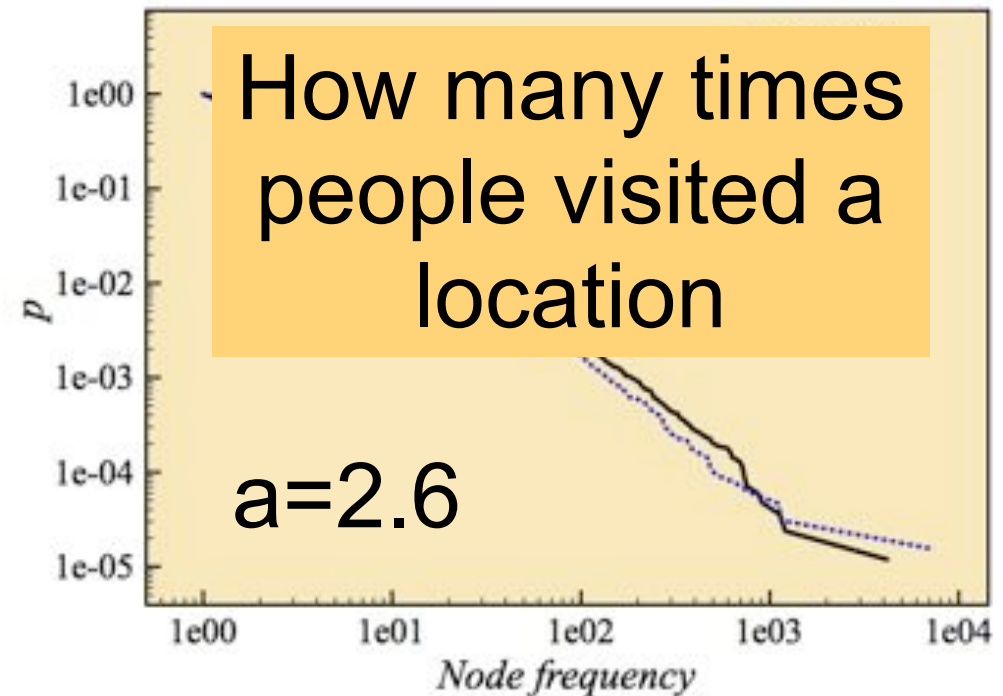
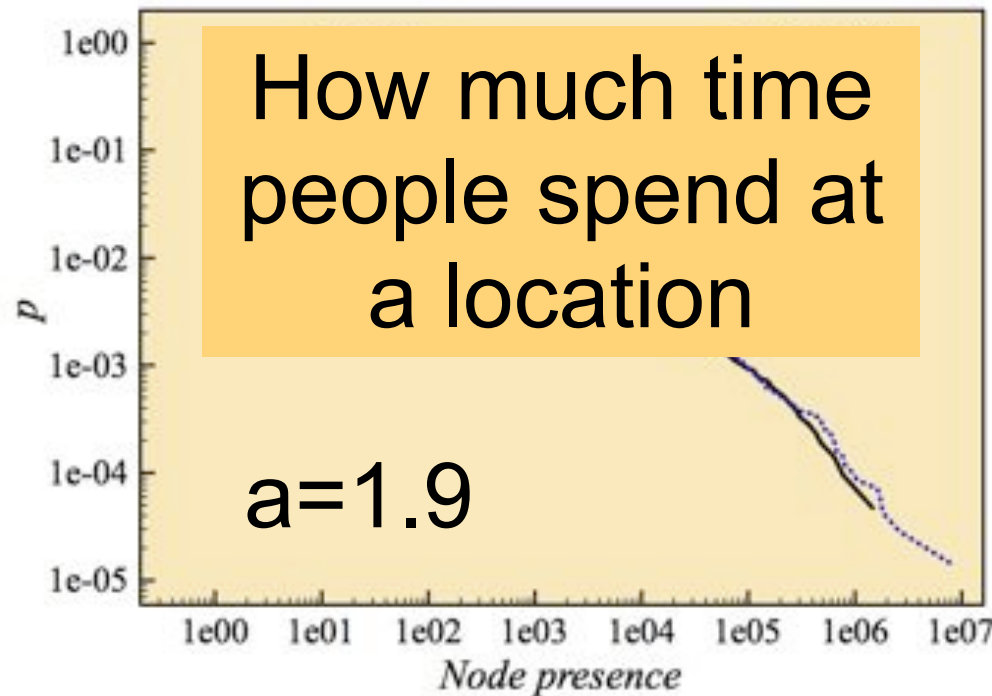
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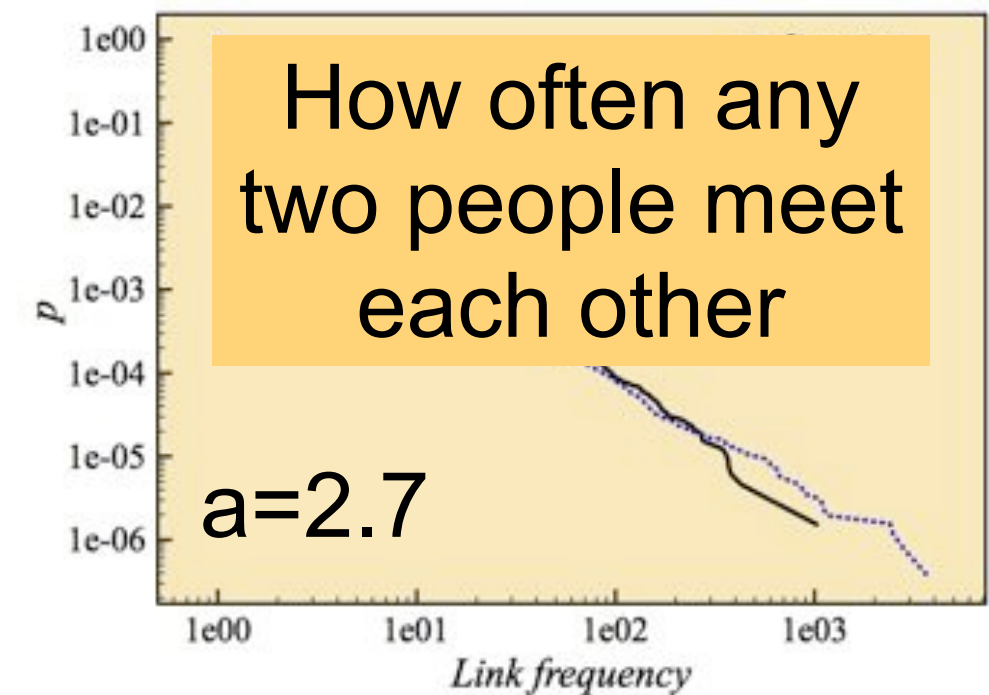
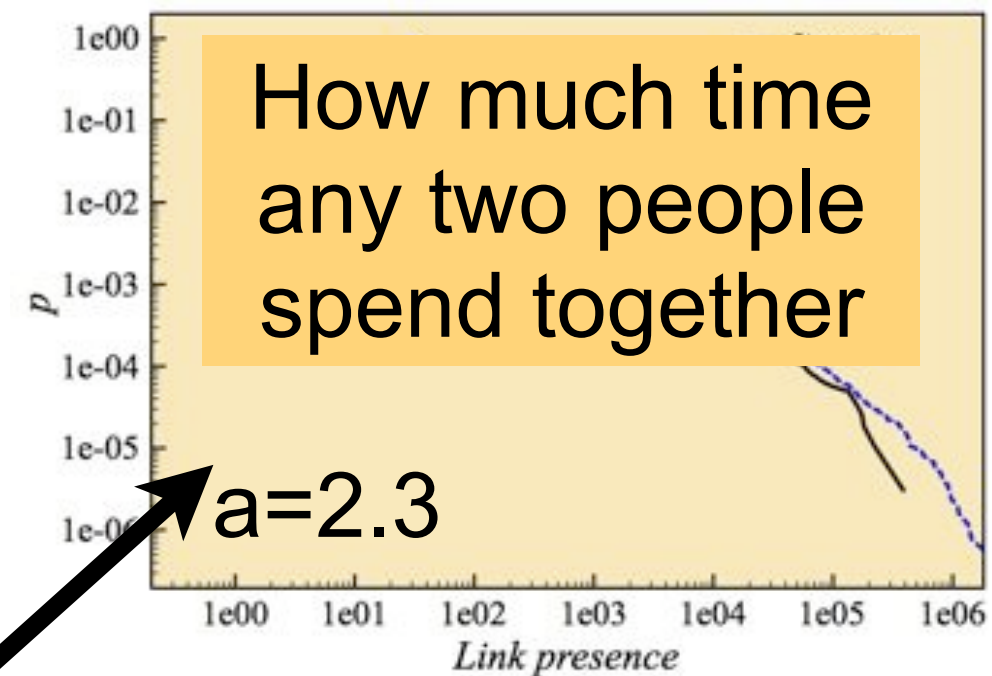
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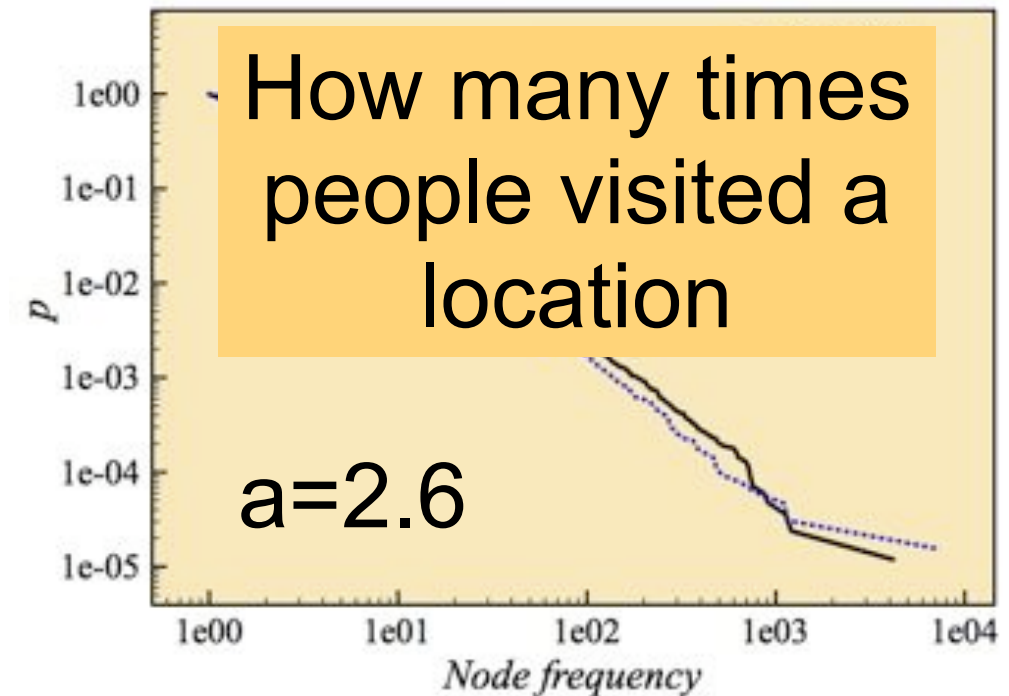
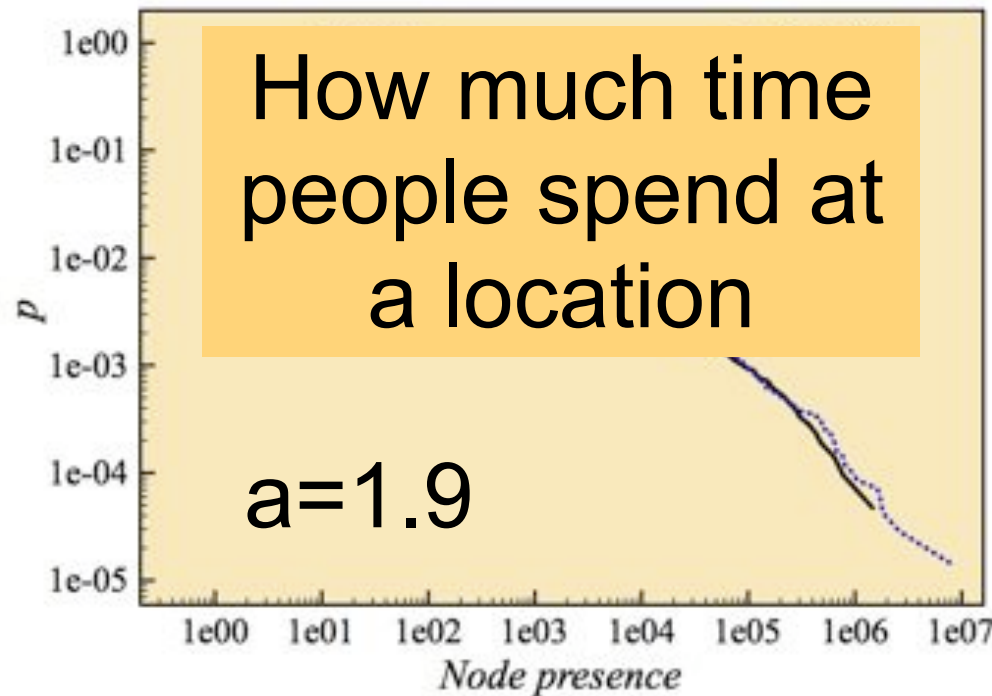
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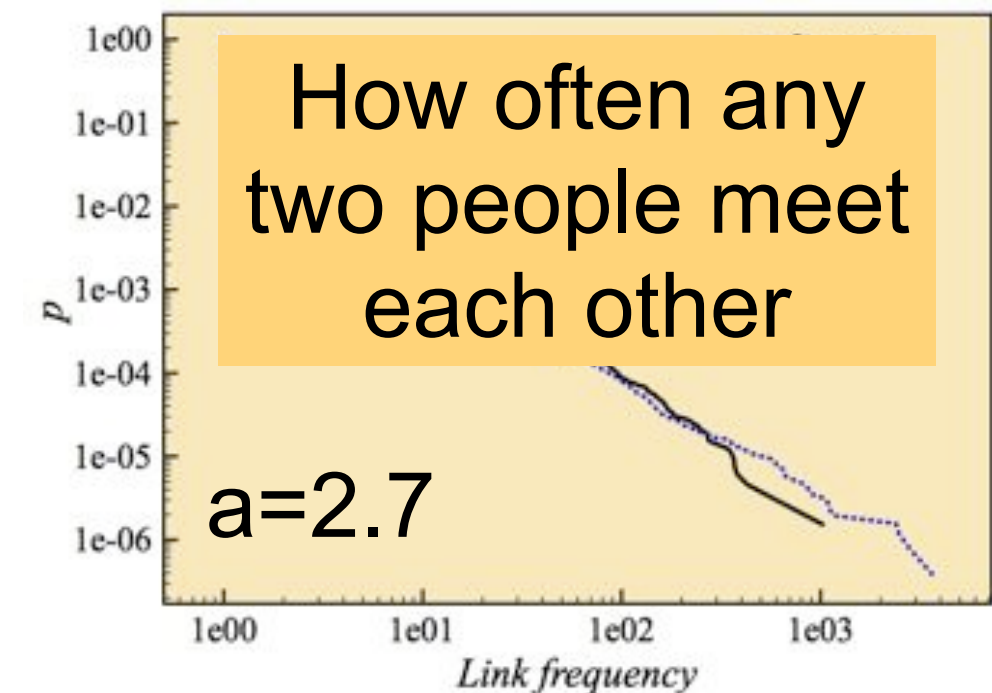
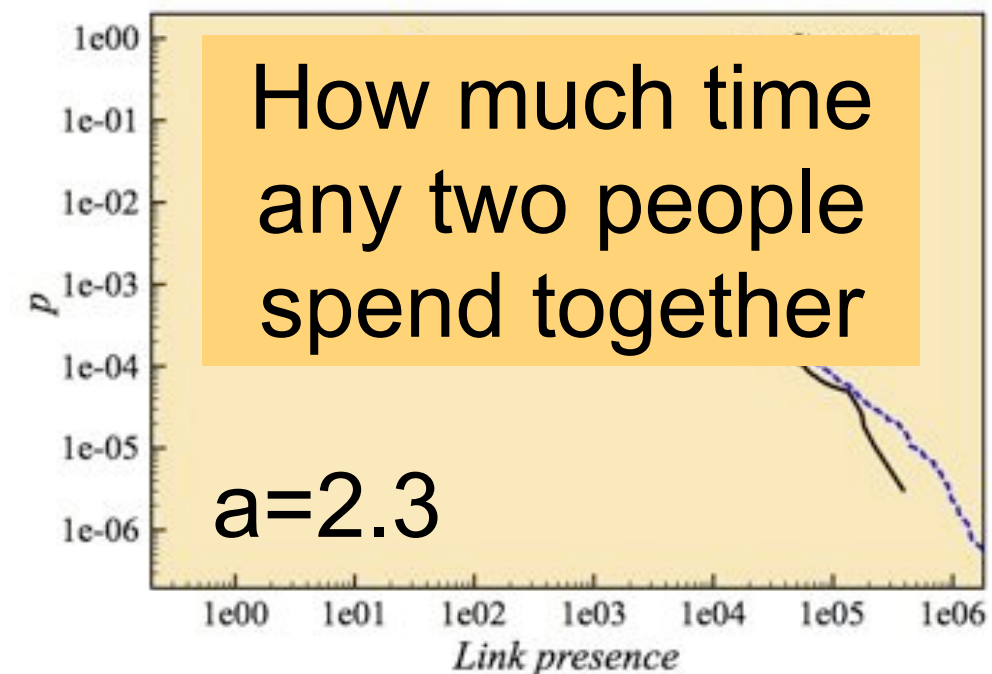
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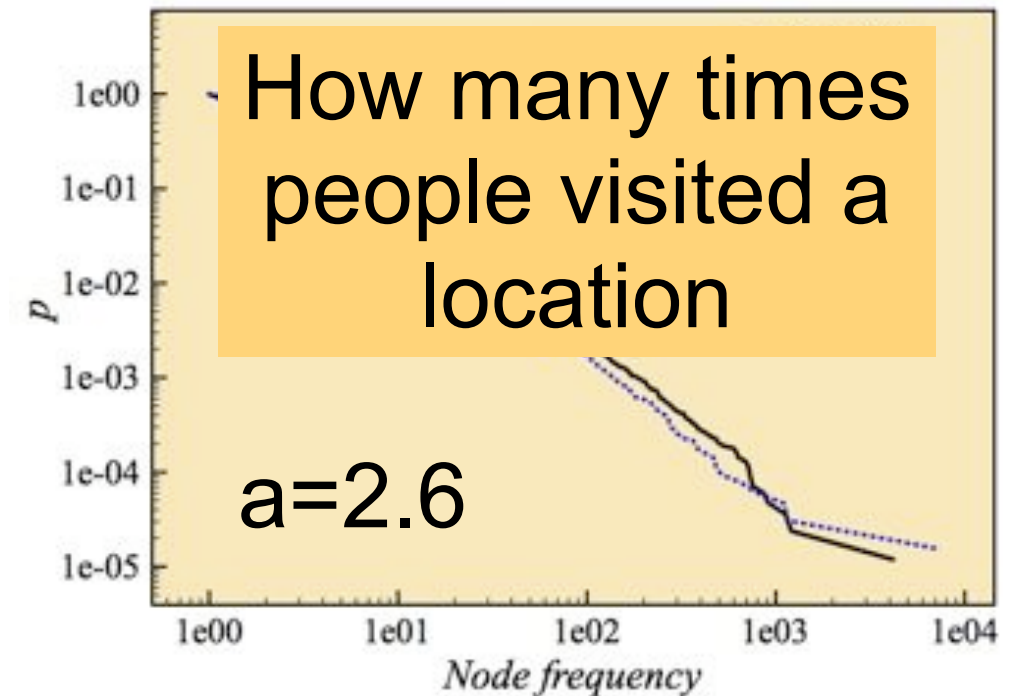
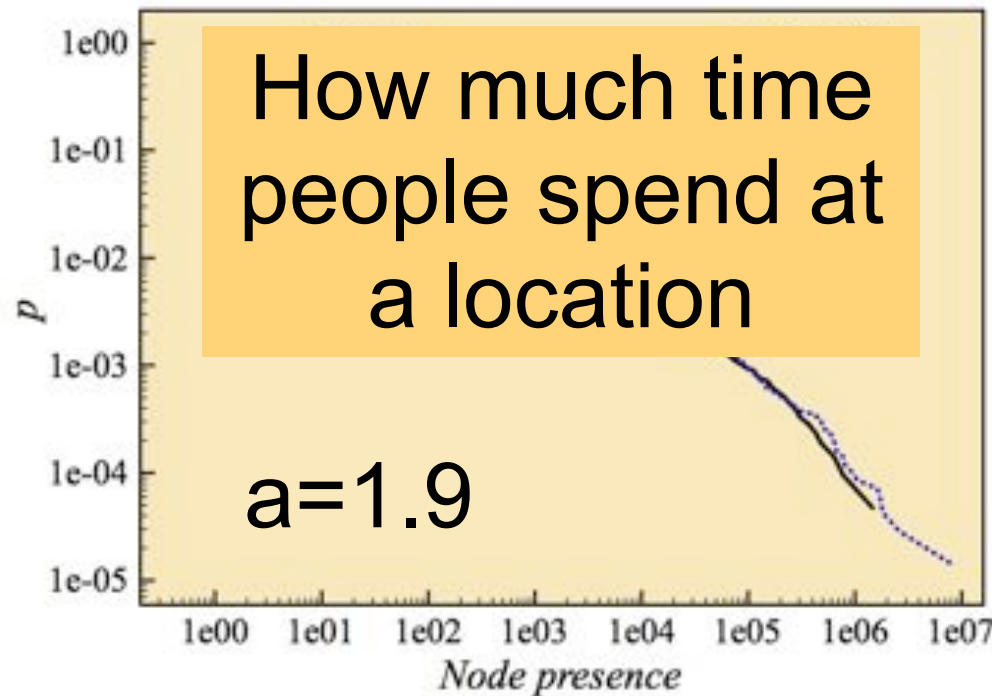
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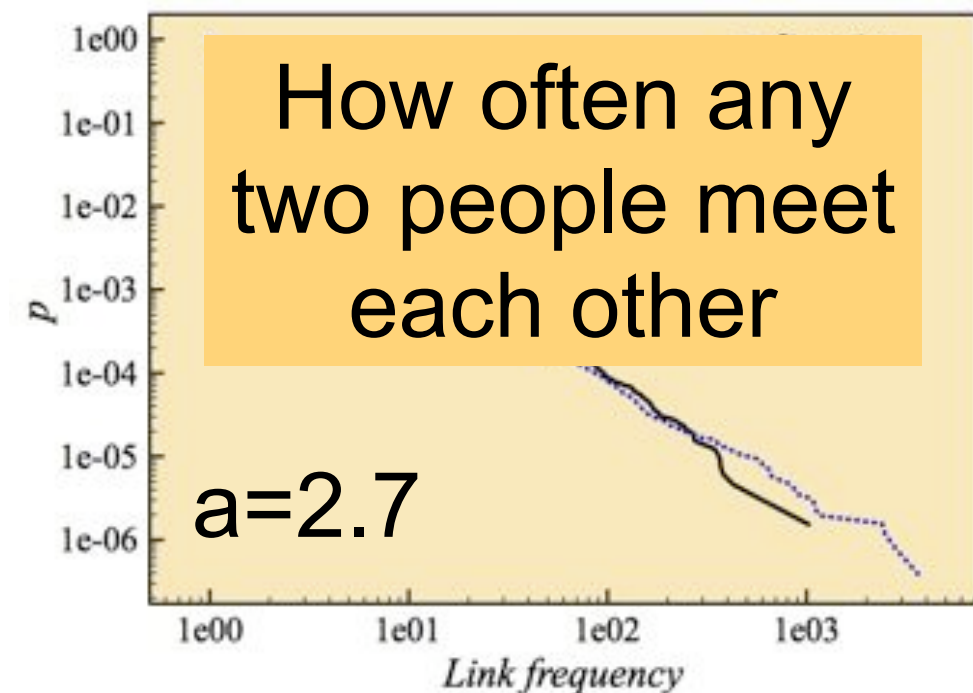
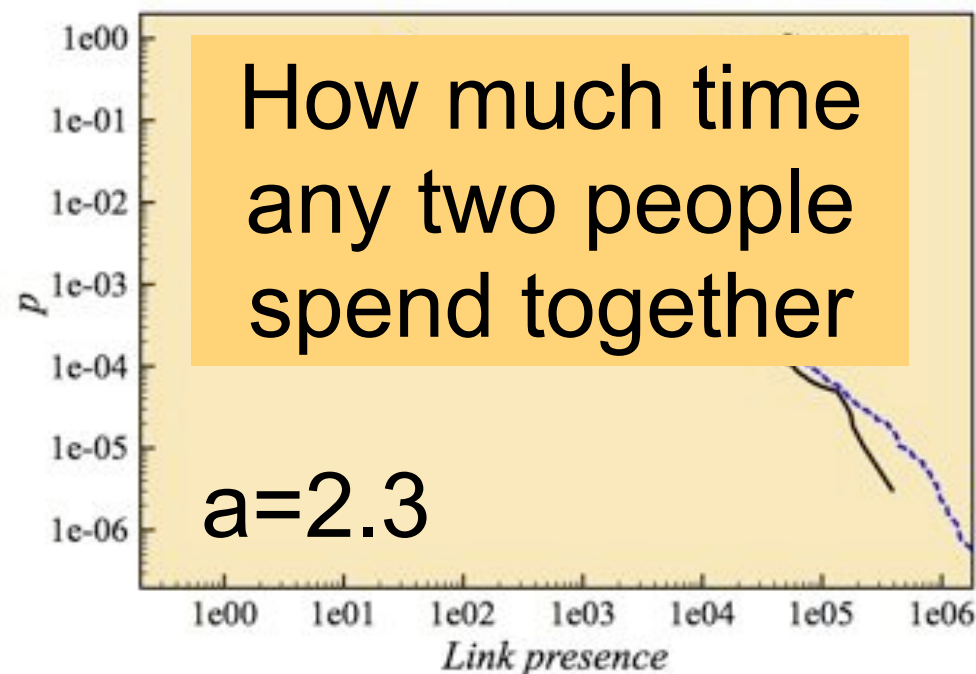
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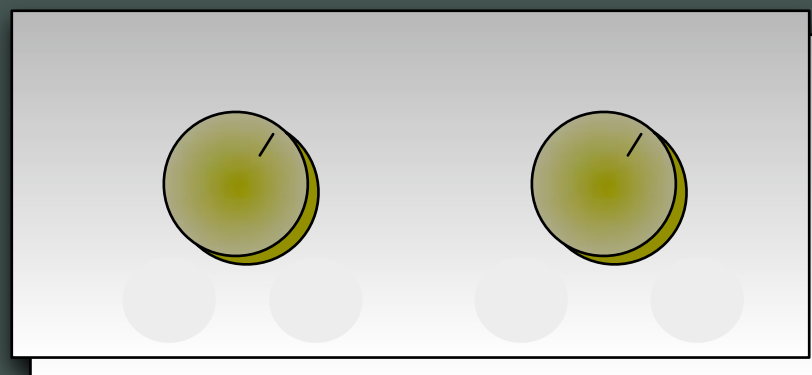
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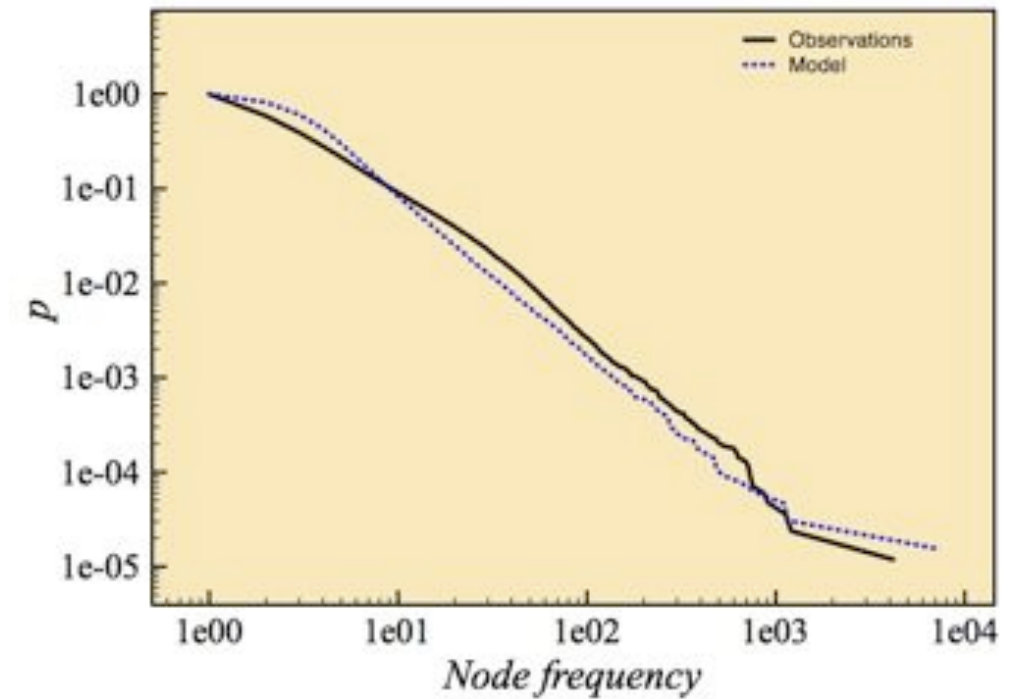
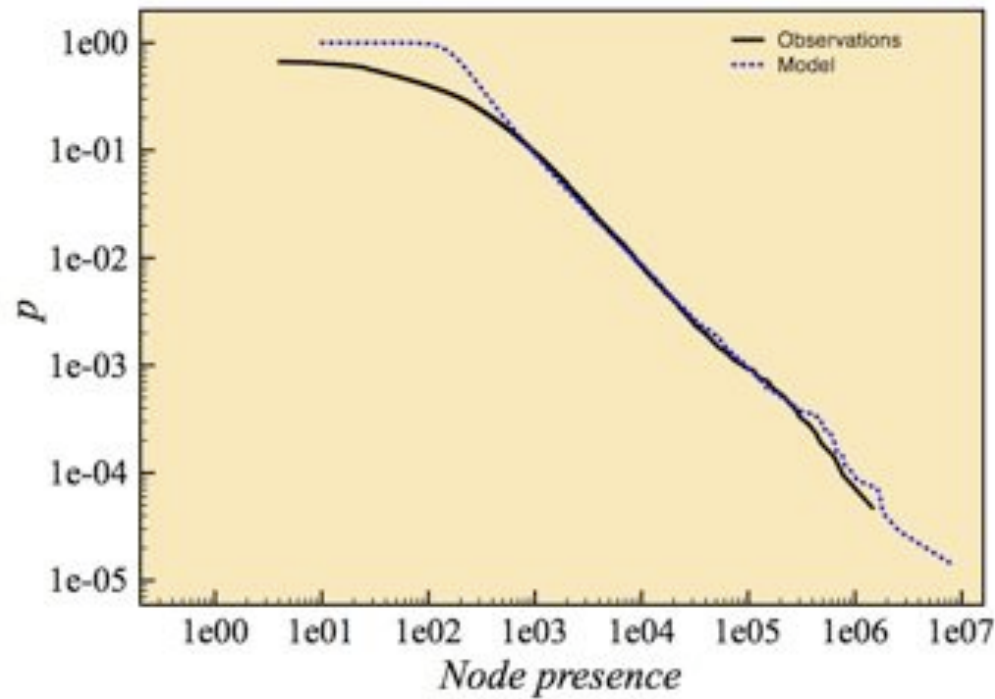




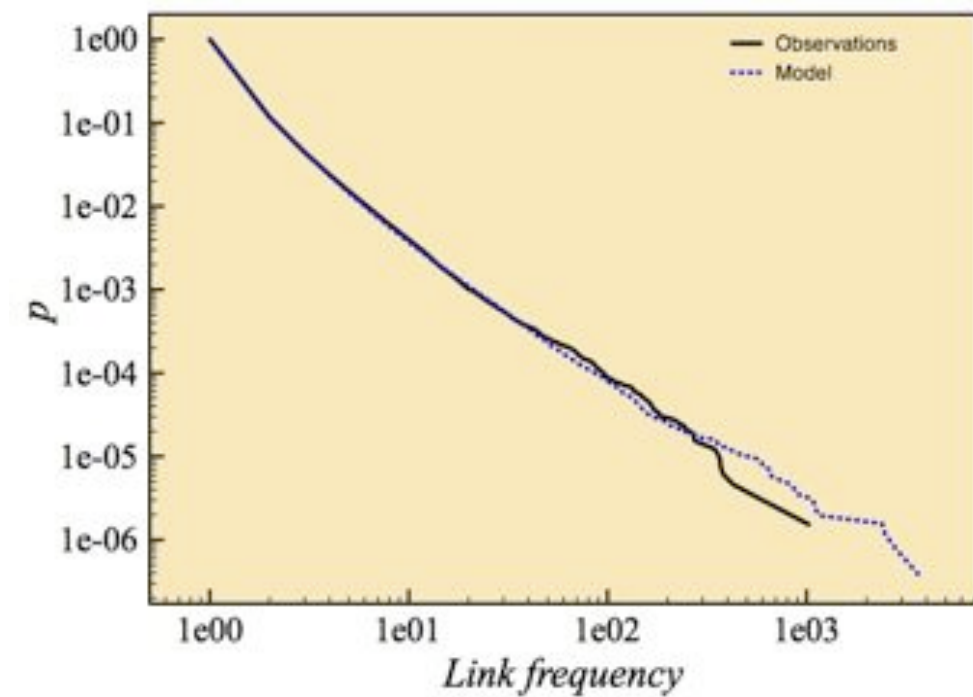
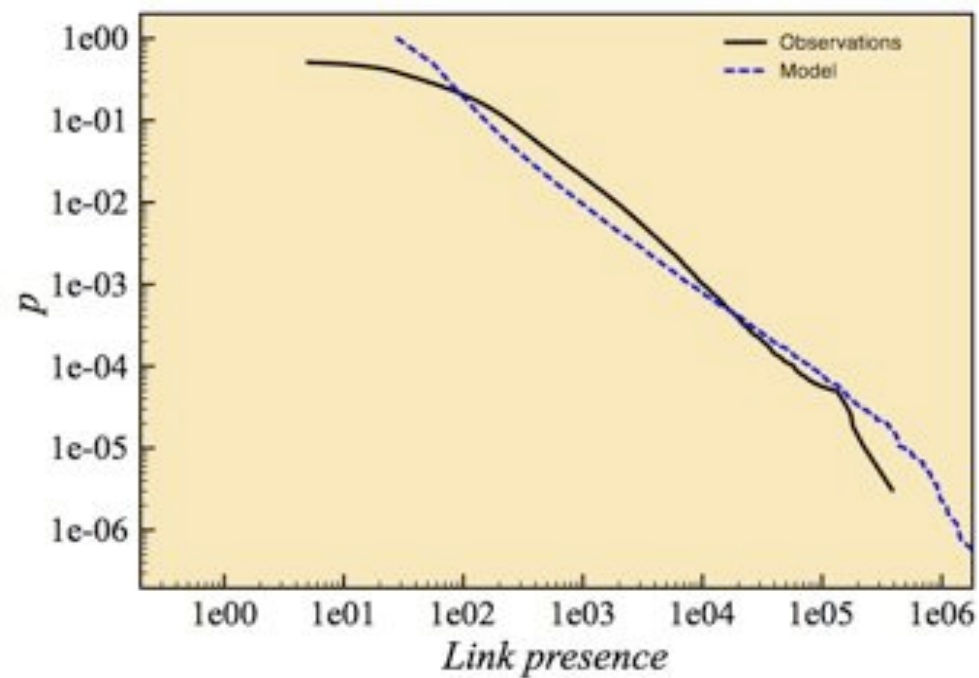
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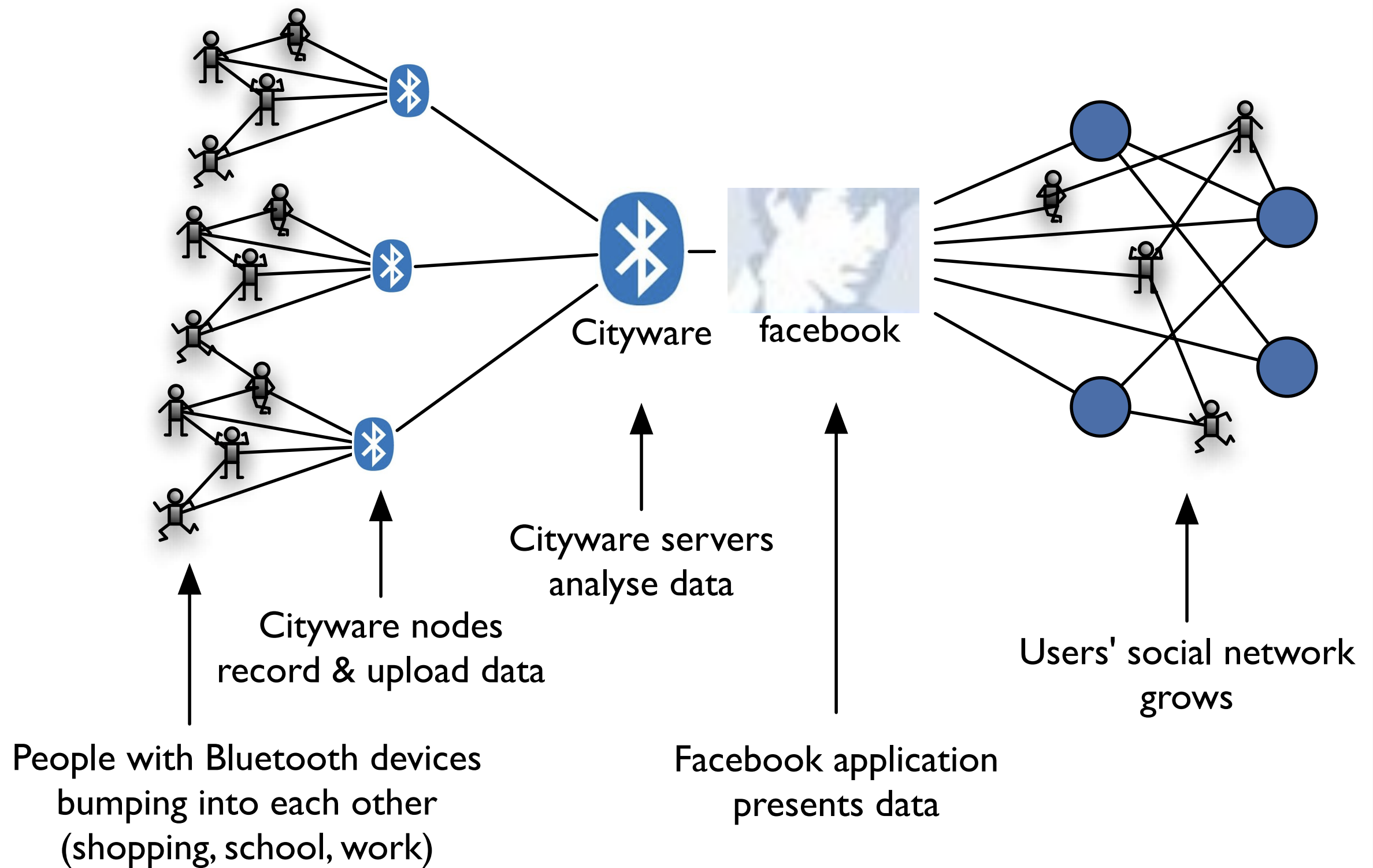


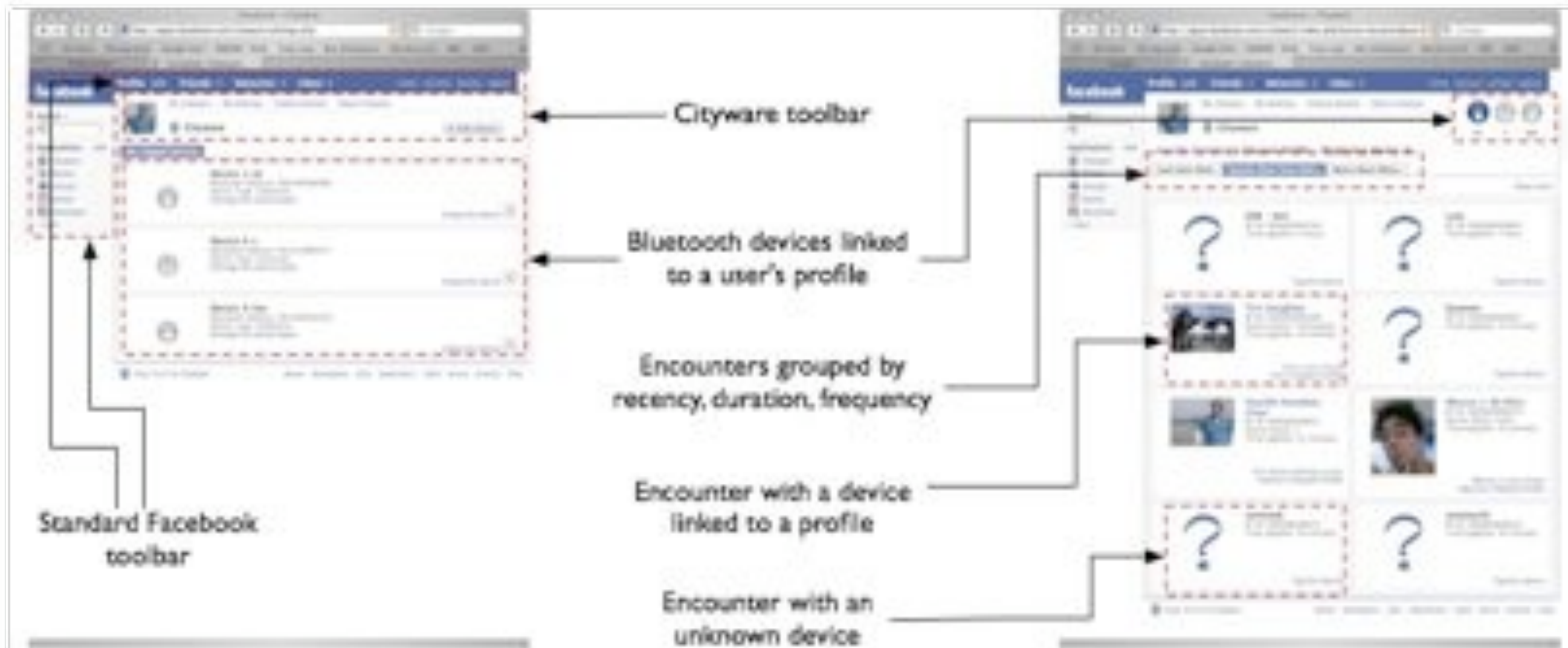
Encounters

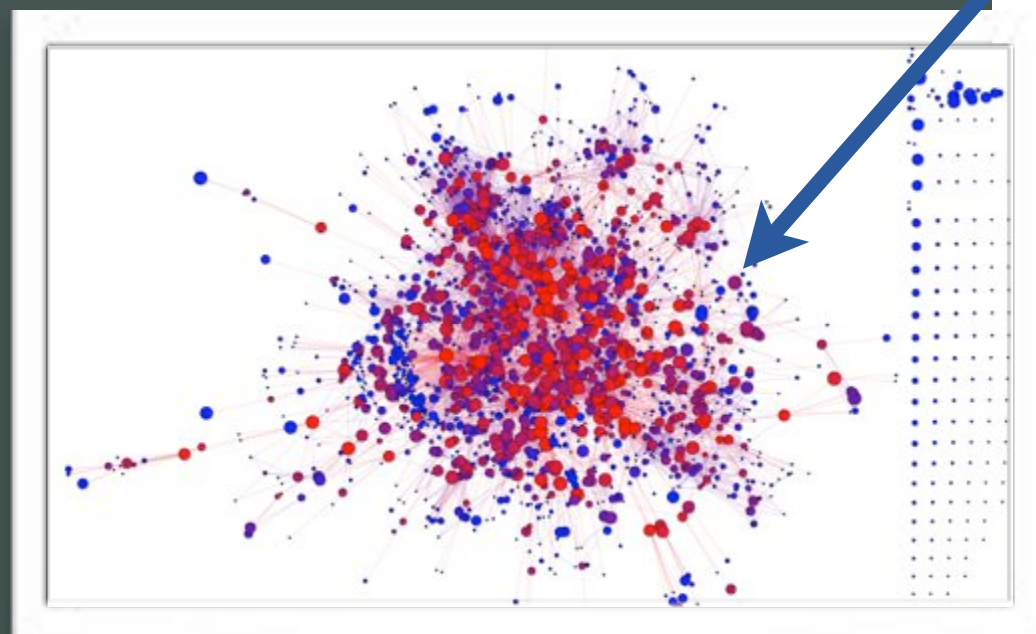












Facebook | Cityware

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

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Google Facebook | Cityware

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Cityware My Settings Getting Started About Cityware

Cityware

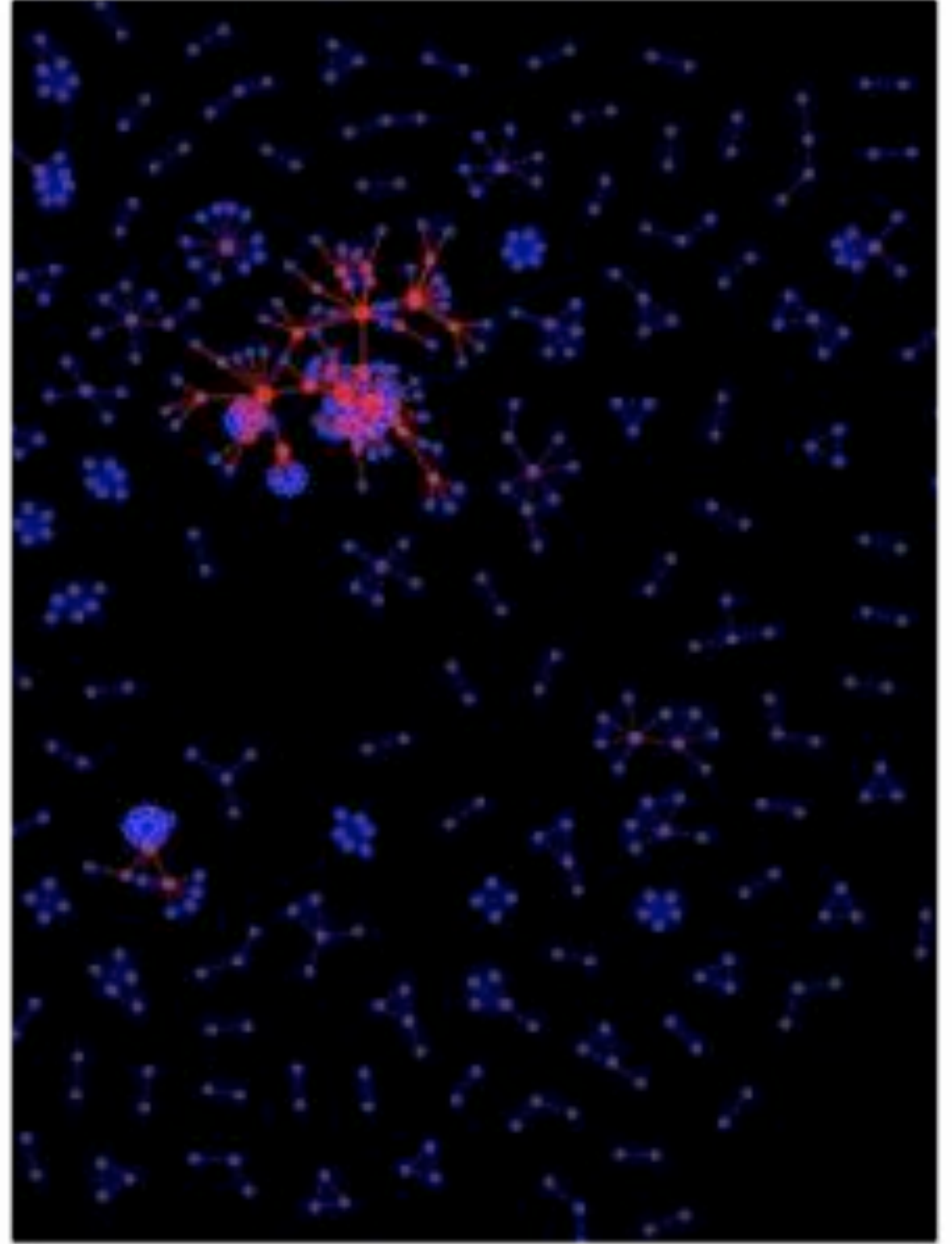
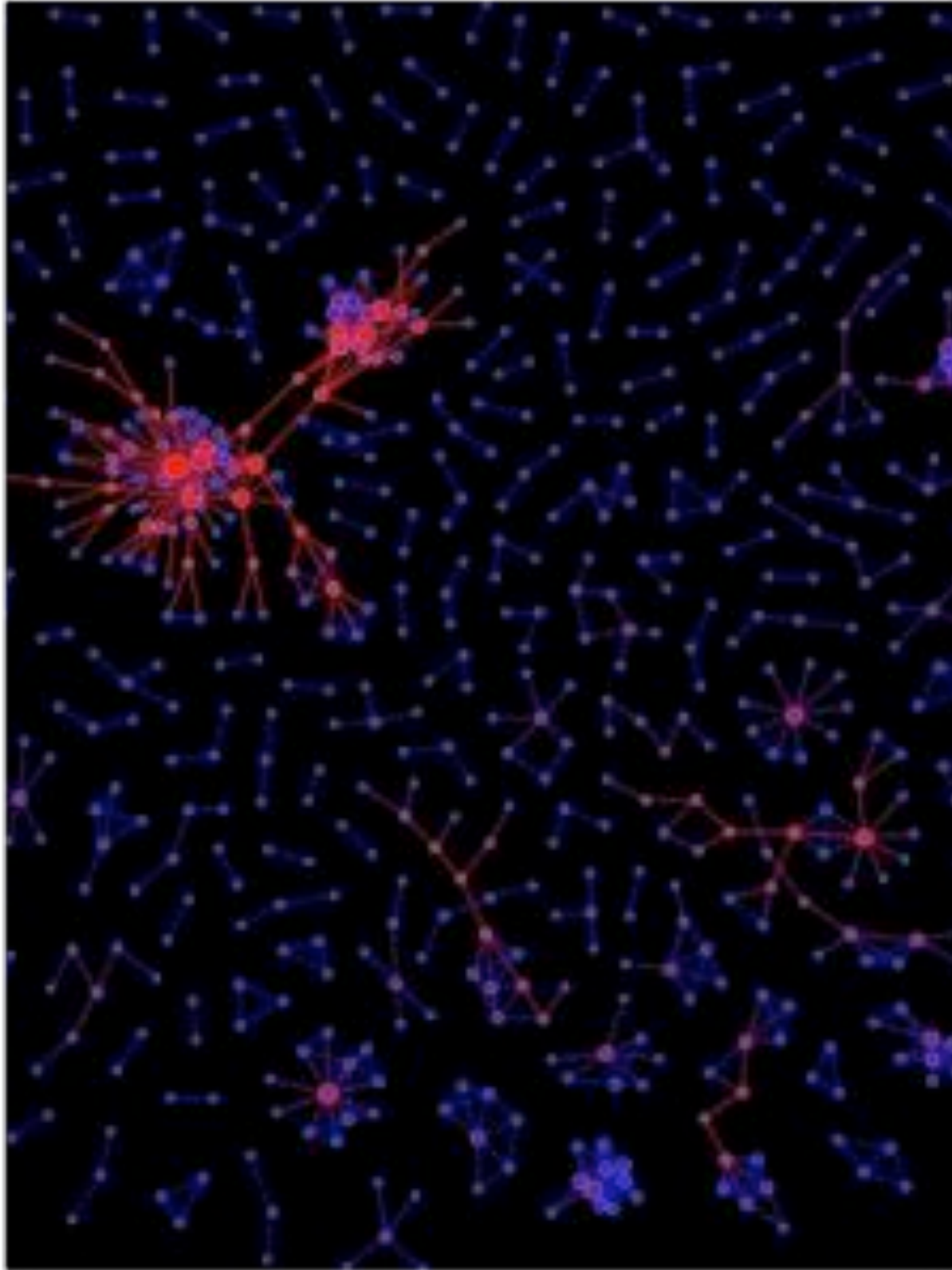
Kostakos's Cityware Profile - Displaying device: vk

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

Show more

<p>CSR - bc4 BT ID: 3000000007A4 Time together: 2 hours</p> <p>Tag this device</p>	<p>Lulu BT ID: 30000000082A Time together: 1 hour</p> <p>Tag this device</p>
<p>Tim Coughlan BT ID: 300000000288 Device Name: TimsLaptop Time together: 34 minutes</p> <p>Tim is your friend Tim's Cityware Profile</p>	<p>Eamonn BT ID: 300000000837 Time together: 53 minutes</p> <p>Tag this device</p>
<p>Vassilis Kostakos (You) BT ID: 300000000FC1 Device Name: v Time together: 51 minutes</p> <p>This device belongs to you Vassili's Cityware Profile</p>	<p>Marcus L. Da Silva BT ID: 3000000002C9 Device Name: Vicky Time together: 45 minutes</p> <p>Marcus is your friend Marcus's Cityware Profile</p>
<p>minime9 BT ID: 300000000E73 Time together: 44 minutes</p> <p>Tag this device</p>	<p>minime10 BT ID: 300000000D1E Time together: 44 minutes</p> <p>Tag this device</p>

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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.

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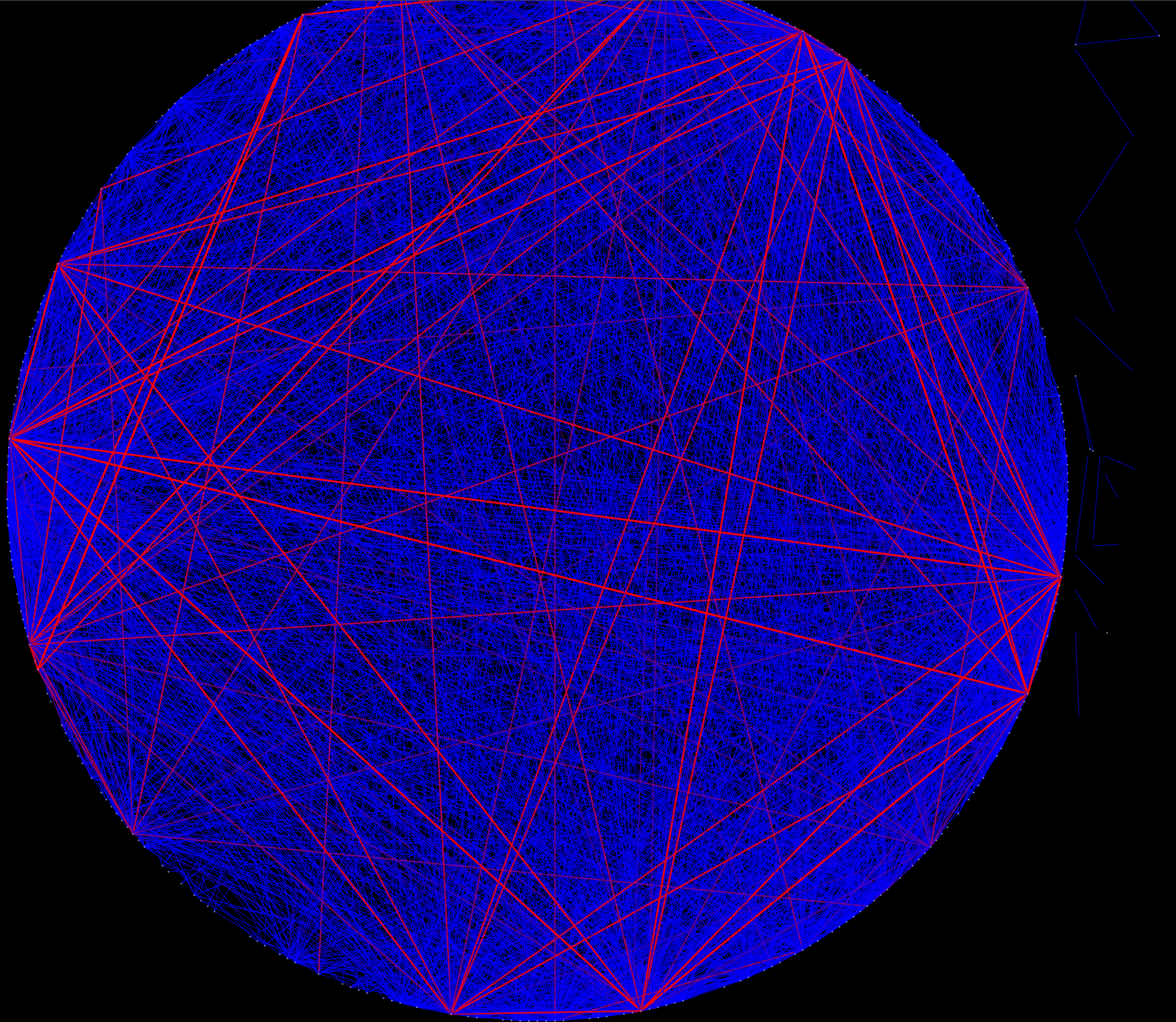
- [Cityware](#)
- [About Cityware on Facebook](#)
(requires registration)

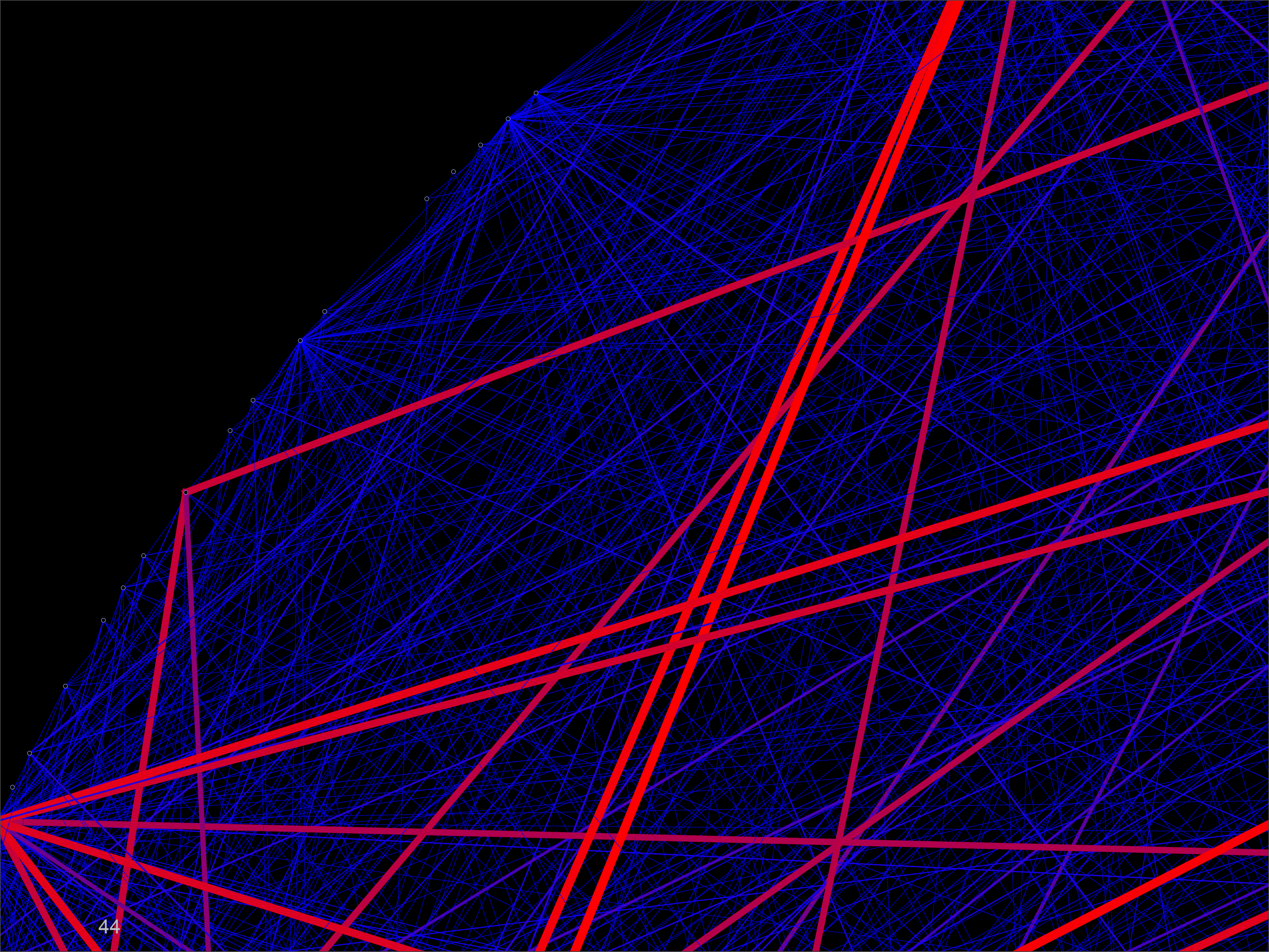
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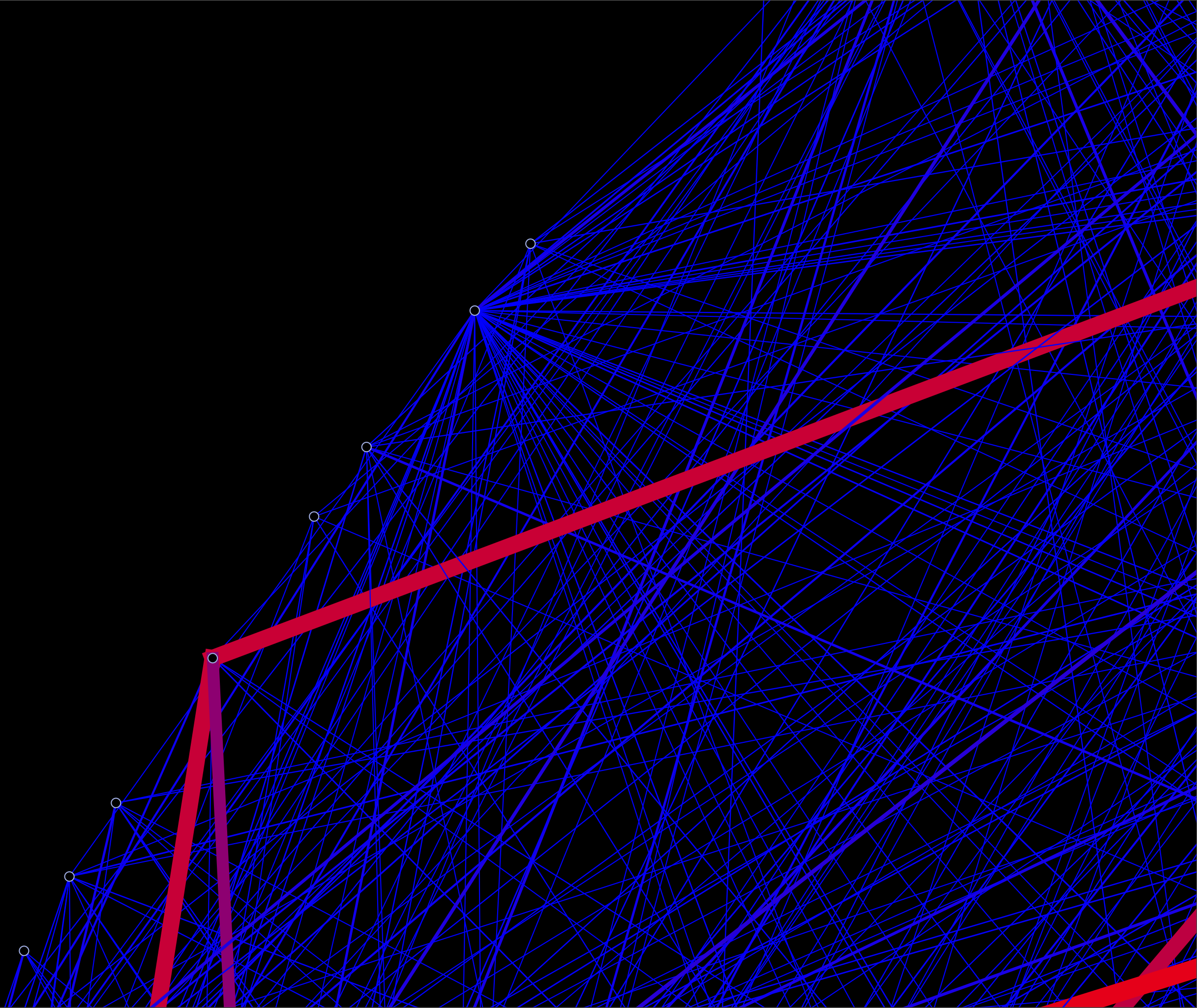
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45

Monday, 31 May 2010



It's a small world!



Develop theory to...

Develop theory to...

- Model the “system”

Develop theory to...

- Model the “system”
 - frequency of people’s visits

Develop theory to...

- Model the “system”
 - frequency of people’s visits
 - duration of their visits

Develop theory to...

- Model the “system”
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- Quantify the differences between two locations

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 - Metrics

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 - or groups of friends?
- Develop “attention span interfaces”
 - posters, displays, speakers, and mobile devices
 - adapt presentation based on visitors' patterns

The end

- Vassilis Kostakos
vk@m-iti.org



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 - VISA, RFID ticket, IMEI : stored in a database
 - Bluetooth: not stored centrally

