

MVŠO

MORAVSKÁ VYSOKÁ ŠKOLA OLMOUC 

Introduction & Information

Vít PÁSZTO

28.2.2023

Introduction

- Historical city (UNESCO)
- 100,000 inhabitants (+23,000 students)
- MVSO:
 - Regional college/university
 - One and only economic school in the region
 - Approx. 400 students
 - Closely connected with business enterprises/companies



Introduction

- New complex („smart building“)



My background

- PhD at Palacký University in Olomouc
- Member of MVSO since 2013
- Field of study – **geoinformatics**
- **Scientific interests**
 - **Geocomputation** (Fuzzy sets and logic in spatial analyses, Entropy measurement of geographical phenomena, Fractal geometry application in geoinformatics, Shape metrics in spatial analyses)
 - **Physical and human geography**
 - **Economic geography (Spationomy)**
 - **Gamification/serious learning**

Geoinformatics

- Science studying spatial information and geo-related issues
- „Geography in computer“
- GIS, Remote Sensing, GNSS, Cartography, Spatial statistics etc.
- Application in many fields, including economy (Insurance, Geomarketing, Location Based Services, BIS, Facility mgmt., Customer analyses...)

MVSO

- Informatics for Economists
- Computer Networks
- Advanced Visualisation of (economic) data
- Data transmission // HTML and web resources

YOU

A large, stylized grey arrow graphic pointing to the right, composed of several thick, overlapping geometric shapes. It is positioned on the right side of the slide, partially overlapping the word 'YOU'.

Course schedule & organization

1. Every week
 - Tuesday – 08:00-09:30

Course programme

(Computer Networks)

1. Introduction to computer networks
2. Network topology and classification, network architectures
3. ISO/OSI reference model
4. Physical layer
5. Data linking layer
6. Network layer
7. TCP/IP. IP protocol. IP addresses. Routing in the internet.
Protocols TCP and UDP. The DHCP service
8. Computer network nodes and communication media

Requirements/Exam

- Attendance
- Active approach
- Homeworks

- Theoretical test

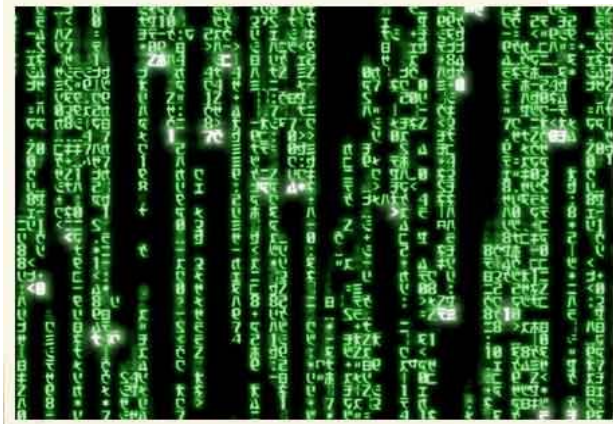
Literature

- TANENBAUM, A. S. - WETHERALL, D. J. *Computer Networks. 5.vyd.*. Prentice Hall, 2010. ISBN 978-0132126953.
- LOWE, D. *Networking All-in-One For Dummies, 5.vyd.* John Wiley & Sons, 2012. ISBN 1118380983.
- Miller J. B. *Internet Technologies and Information Services (Library and Information Science Text Series)*. Libraries Unlimited Inc., 2014.
- Jacobson D., Woods D., Brail G. *APIs: A Strategy Guide..* O'Reilly Media, 2011. ISBN 1449308929.
- Sosinski B. *Cloud Computing Bible*. John Wiley & Sons, 2011. ISBN 0470903562.
- Peterson M. P. *Mapping in the Cloud*. The Guilford Press, 2014. ISBN 1462510418.

- And lot more + internet

Computer configuration

What drives/controls the World?



What drives/control the World?



Information is not data

Information

- information is not data

2 694	399	25 255	15 216	241	1 749 865	34 290	229 235
737	571						
540	170	12 483	6 039	81	272 613	673	33 877
360	707						
314	31	1 457	987	21	223 152	4 806	24 968
688	368						
159	14	763	655	8	107 282	3 797	16 073
363	869						
141	14	705	442	6	93 677	2 520	13 814
202	707						
76 802	9 275	292	138	6	51 096	570	6 380
172	17	890	478	23	117 892	2 011	15 828
030	883						
114	10	487	395	12	82 647	1 357	9 363
472	856						
133	12	763	535	15	93 320	2 454	12 302
970	329						
115	10	617	423	5	78 892	1 888	11 585
116	430						
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14.448793

Information

- information is not data

2 694 737	399 571	25 255	15 216	241	1 749 865	34 290	229 235
540 360	170 707	12 483	6 039	81	272 613	673	33 877
314 688	31 368	1 457	987	21	223 152	4 806	24 968
159 363	14 869	763	655	8	107 282	3 797	16 073
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295 523	45 308	2 837	2 056	32	189 938	4 426	25 778
137 119	12 524	781	596	6	95 682	1 963	12 922
138 197	14 049	738	287	10	97 535	1 909	12 647
248 500	27 247	1 990	1 696	14	172 991	2 408	23 063

Information

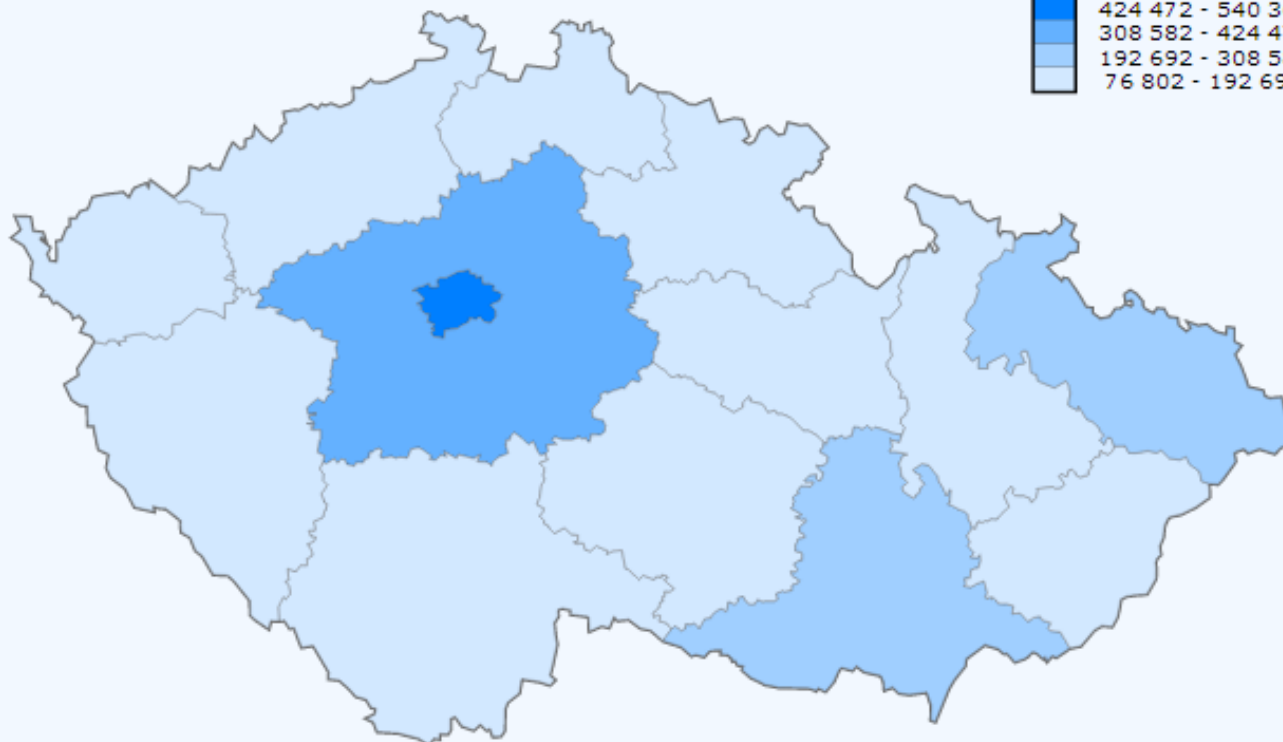
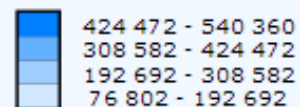
Registrované ekonomické subjekty							Období 31.12.2013	
	Počet subjektů celkem	Obchodní společnosti		Družstva	Státní podniky	Fyzické osoby		
		celkem	z toho akciové společnosti			soukromí podnikatelé podnikající dle živnostenského zákona	zemědělští podnikatelé	soukromí podnikatelé podnikající dle jiných zákonů než živnostenského
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Information

Ekonomicke subjekty podle vybraných právních forem a krajů
Registrované ekonomické subjekty

Kód: ORG0010PU_KR
Období: 31.12.2013

Počet subjektů celkem



Information

- information is not data

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00000000 0000 0001 0001 1010 0010 0001 0004 0128
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00000020 0000 0001 0004 0000 0000 0000 0000 0000
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Information is not data

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Information is not data

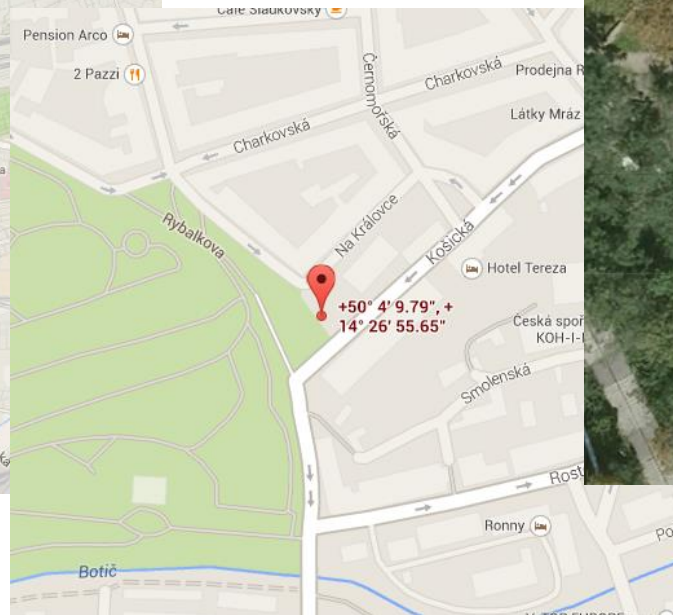
50.069387 & 14.448793

- Before party...part II. #getting #ready #sekt #strawberries #bubbles #food #mask #up #NYE #2013...
- Tue Dec 31 20:18:28 +0000 2013
- I'm Maria. I live in Prague. I like playing guitar, singing, reading, traveling, writing stories, going to concerts, music♥ ATL, P!ATD, SP, MT, YMA6...!
- 302/119 (Následuje/Následována)
- **50.069387x14.448793**



Information is not data

50.069387 & 14.448793



Data, Information, Knowledge, Wisdom

Data, Information, Knowledge, Wisdom

Data // Information // Knowledge // Wisdom

- **Data**

- Objective datum/figure about existing phenomenon – numbers, text, symbols...
- Acquired by measurement, experiment, observation, survey
- Is a representative tool of facts with one-way and unique importance/meaning
- We try to interpret data

Data // Information // Knowledge // Wisdom

- Information

- Informatio/informare – to put ideas into a form
- Materialisation of ideas to:
 - Inform, communicate and transfer „message“
- Data with meaning based on user's:
 - Knowledge, experiences, cognisance, and skills
- We try to synthesise information

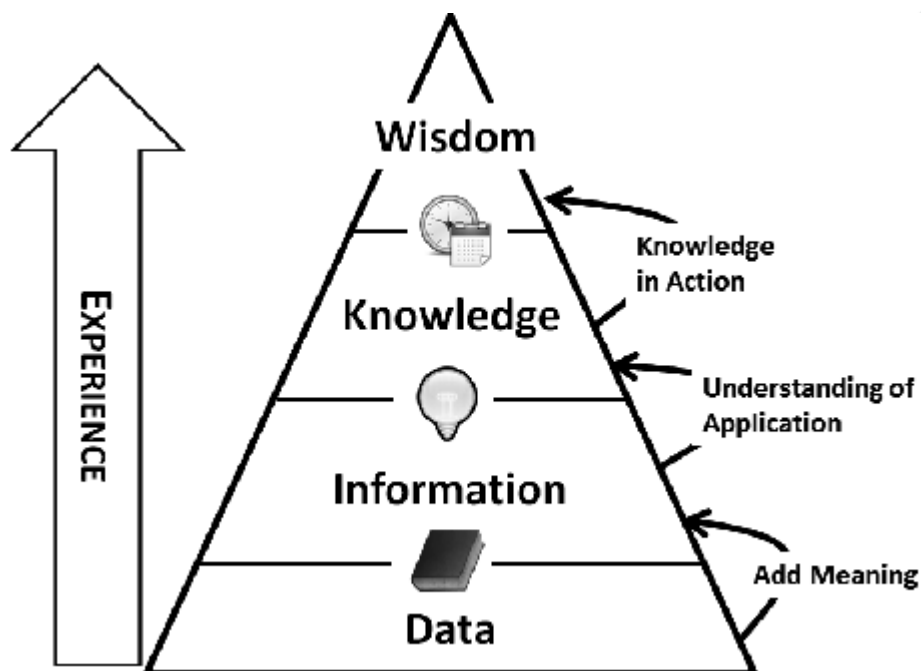
Data // Information // **Knowledge** // Wisdom

- Knowledge
 - When we understand relations/laws/rules
 - Information with added value
 - Allows decision-making based on:
 - Interpretation, experiences, exploring, understanding, intelligence and ability to put things into a context
 - Is broader and deeper than data or information

Data // Information // Knowledge // **Wisdom**

- Wisdom
 - Connected with individual learning with personal context
 - Information with added value
 - Set of knowledge coming from understanding of the problems essence in given context
 - Is based on:
 - Knowledge competences (intellectual and emotional), high level of human cognition, its evaluation criteria and dual relationship with the environment

Data // Information // Knowledge // Wisdom



D-I-K-W summary

- Data management (creation, organisation, manipulation, translation, exchange) is a key issue for subsequent interpretation of phenomena that data represents
- Data mgmt is the most demanding part in data analyses
 - It might take even 80 % (or more) of the time
- Example – presentation of the analysis to your boss
 - You might show „just“ few charts, maps, visualisation of data but:
 - First you have to acquire data, then
 - You choose format to work with, and also software
 - You check, adjust, filter, select data etc.; i.e. data editing
 - You perform analysis (calculations)
 - You prepare final outputs (visualisation in general), output format/form (e.g. in PDF)
 - Lastly, you do interpretation, outline relevant information, summary etc.

Origin of data and its metadata

- To acquire a comprehensive dataset, you have to think about the data first. You must distinguish between:
 - Primary data vs. secondary data
- Primary data
 - Simply, data that does not exist and you create it, i.e. completely new data
 - Reasons of primary data creation:
 - Data you need does not exist in terms of quantity (underrepresentative sample) or quality (too much bias/uncertainty, data are not reliable or trusty)
 - Lack of detail (some of the parameters are missing)
 - Data is not actual
 - Data is not geographically coherent (e.g. some regions are missing)
 - You can collect/create data yourself, or ask another subject (e.g. data provider)

Origin of data and its metadata

- Primary data
 - Ordinarily, we collect data by
 - Measurement
 - Survey (e.g. questionnaire)
 - Mass survey (e.g. census)
 - Testing
 - Interview
 - Observation
 - It is always important to choose a method that suits the analysis goal
 - Usually, you can encounter mistakes when dealing with primary data. Most common are:
 - Systematic (easily to debug) – e.g. measurement errors (non-calibrated measurement with known deviance)
 - Random – you have to perform basic statistical check (e.g. outlier analysis) to reveal and eliminate/correct them

Origin of data and its metadata

- Secondary data
 - Represents data taken over from other parties (e.g. statistical offices)
 - Already existing data sets (free of charge, or purchased)
 - First, you should explore secondary data sources before you decide to create primary data
 - Examples of secondary data sources:
 - Statistical databases
 - Scientific databases and documents
 - Official documents (e.g. legislative docs, norms, laws, yearbooks etc.)
 - Specialised surveys (e.g. labour market performance, household expenditures, etc.)
 - Annual reports
 - Mass and social media
 - In all cases, the data validity and reliability should be checked (even in case of data sources from public institutions/local authorities etc.)

Metadata

- In order to check secondary data, use common sense
- All good-quality data sets are complemented with „metadata“:
 - Simply said – data about data
 - Usually, it is a plain document describing all relevant aspects about the secondary data sets, e.g.:
 - Provider/author/owner
 - Date of acquisition/creation (data validity in terms of time)
 - Data updates
 - Attribute and geographical scale/coverage
 - Description of indicators
 - Data resolution
 - Method of acquisition
 - Licenses and restrictions for further use
 - Data format, coding etc.
 - Commonly, metadata is in XML file, or in txt, or directly e.g. in Excel sheet

Q&A

- What is the difference between information and data?
- What is the difference between primary and secondary data?
- What you can/should find in metadata?

Open Data Concept

&

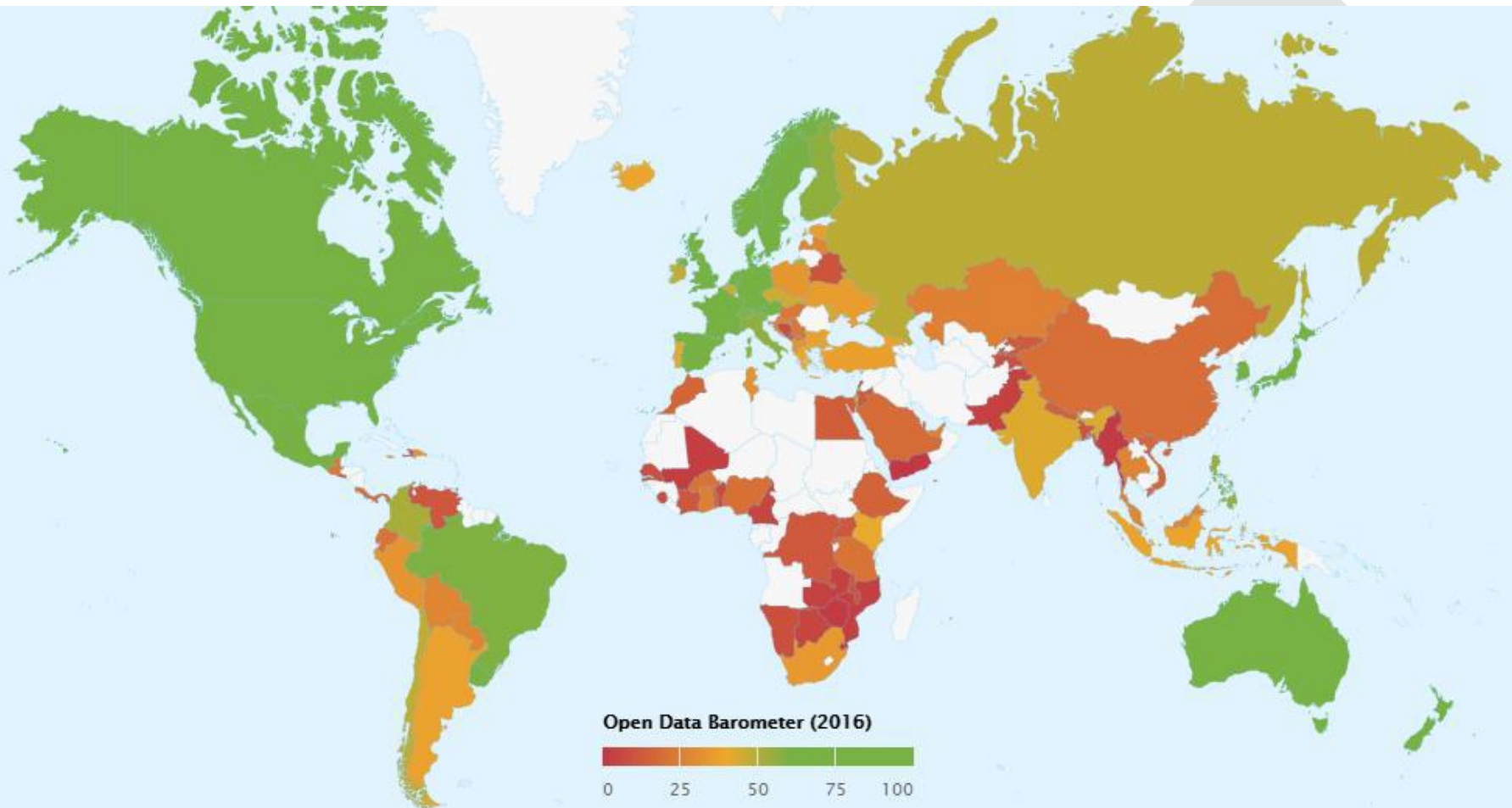
Data Formats

Open data principles

- A lot of data produced by national agencies or science
- Data we are „paying for“ and are about „us“
- Availability for everybody without any restrictions
- Great potential for building an applications upon it
- Data requirements:
 - Openness (technical & legal)
 - Accessibility and originality (native data)
 - Clarity (catalogue/metadata)

Open data principles

- Open Data Barometer

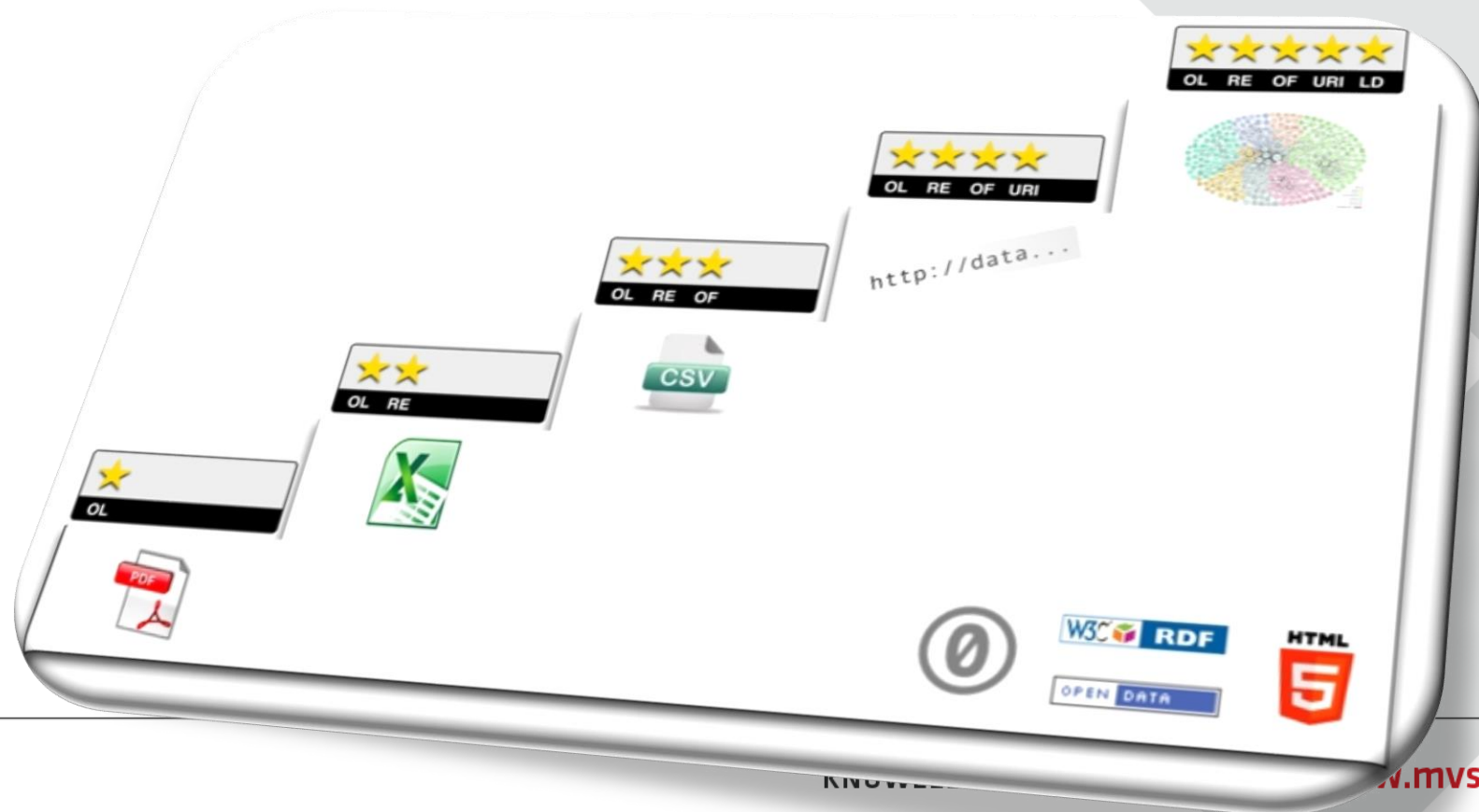


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Open data principles

- Availability vs. „availability“



Open data principles

- Some of the fundamental requirements (Kitchin, Open Definition):
 - Access
 - Redistribution
 - Reuse
 - Absence of technological restriction
 - attribution
 - Integrity
 - No discrimination against persons or groups
 - No discrimination against fields or endeavour
 - Distribution

Open data principles

- Some of the fundamental requirements (Open Government Data):
 - Complete
 - Primary
 - Actual
 - Accessible
 - Readable by computer
 - With no restriction of use
 - Not proprietary
 - No copyrights
 - Open (in terms of contact to the author)

Data Formats

- Here is the list of most common data formats used:
 - .txt
 - .csv
 - .xls/xlsx
 - .ods/.odt
 - .xml/ for geographical data - .gml/.kml/.gpx
 - .pdf
- Statistical sw formats
 - IBM SPSS - .sav
 - Statistica - .sta
 - Stata - .dta
 - R Project - .R/.Rdata
 - MATLAB - .M/.MAT
 - Mathematica - .NB

„Open data“ Phenomenon

- <http://data.gov.uk>
- <https://www.data.gov/>
- Austria?
- Task no. 1 – look up for your countries' open data

Why it is useful to visualize?

As of 31 December 2013, there were a total of two million six hundred and ninety-four thousand seven hundred and thirty-seven registered economic entities in the Czech Republic, of which 399,571 were commercial companies, of which a total of 25,255 entities had the status of a joint-stock company. In total, there were also 15,216 cooperatives and 241 state-owned enterprises. Most of the total number of registered economic entities existed by private entrepreneurs doing business according to the Trade Licensing Act (1,749,865). Natural persons and agricultural entrepreneurs were represented in the number of 34,290 entities. Finally, there were 229,235 private entrepreneurs doing business under laws other than the Trade Licensing Act.

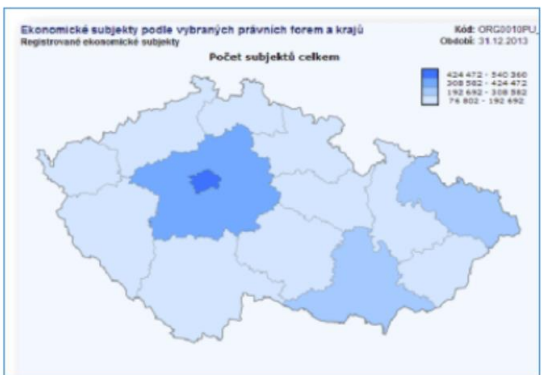
Registrované ekonomické subjekty

Státní podniky



- Hlavní město Praha ● Středočeský kraj ● Jihočeský kraj ● Plzeňský kraj ● Karlovarský kraj
- Ústecký kraj ● Liberecký kraj ● Královéhradecký kraj ● Pardubický kraj ● Kraj Vysočina
- Jihomoravský kraj ● Olomoucký kraj ● Zlínský kraj ● Moravskoslezský kraj

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Visualization matters

showcase 1 (anscombe)

Visualization online tools

Visualization online tools

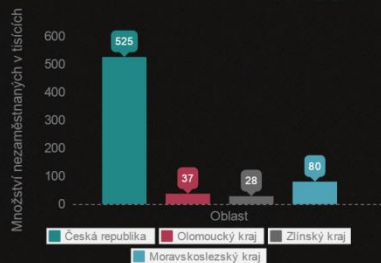
- selection

- . Infogr.am
- . Create.ly
- . Datawrapper.de
- . Easel.ly
- . Plotly

Nezaměstnanost 2014

Nezaměstnanost v krajích

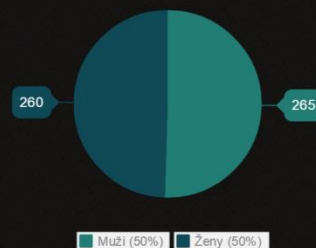
k 31. 12. 2014



Ke konci roku 2014 tvořil celkový počet nezaměstnaných ve pouze ve třech vybraných regionech asi 28% celkové nezaměstnanosti v ČR. Počet nezaměstnaných v Moravskoslezském kraji byl největší v celé České republice.

Nezaměstnanost mužů a žen

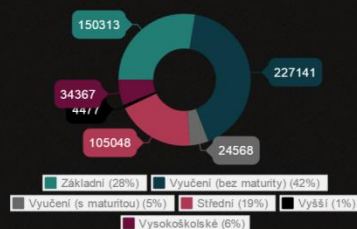
k 31. 12. 2014



Poměr mezi nezaměstnanými muži a ženami se pohybuje kolem 1:1. V celé České republice je pouze o 5 tisíc víc nezaměstnaných mužů. V uvažovaných krajích bylo možné pozorovat stejné tendence a největší rozdíl (téměř o 4 tisíce méně žen) byl v Moravskoslezském kraji.

Nezaměstnanost a vzdělání

k 31. 12. 2014



Největší procento nezaměstnaných je pouze vyučeno a nemá maturitu (42%). Nejmenší procento zastávají absolventi vyšších odborných škol (1%). U středního a vyššího odborného vzdělání převyšuje počet nezaměstnaných žen nezaměstnané muže.

Information&visualization tool

Wolfram alpha

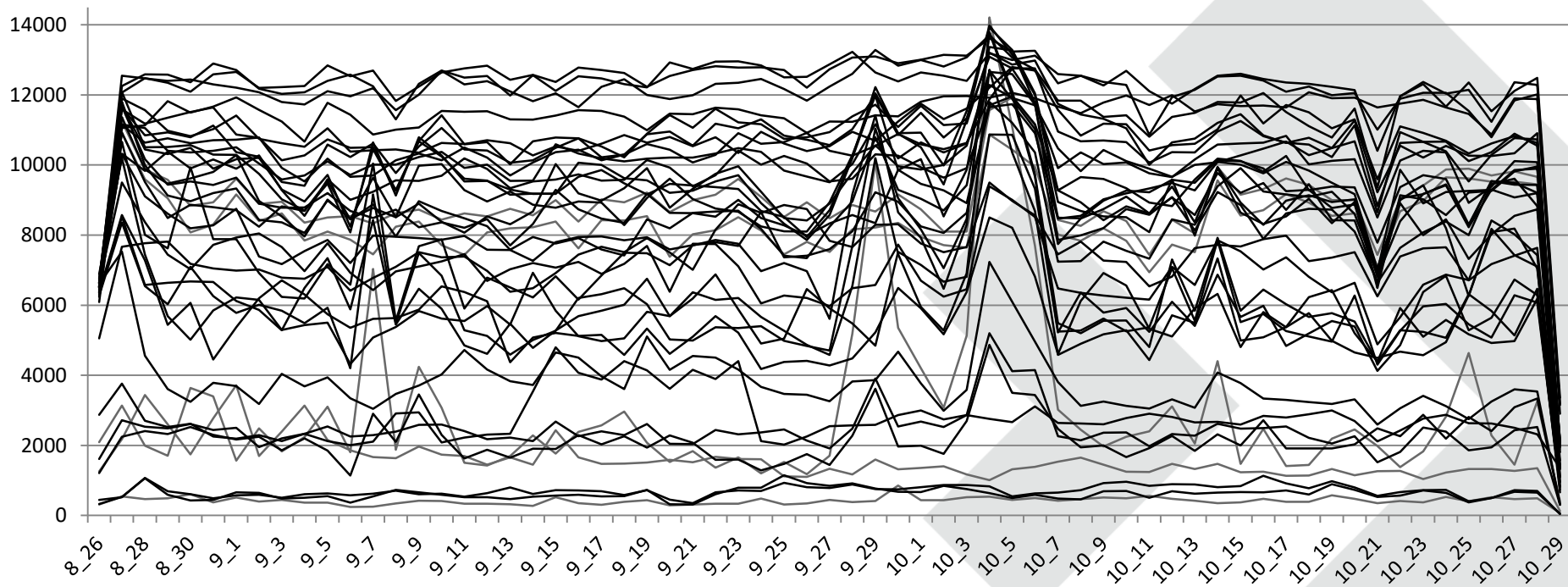
Map Storytelling

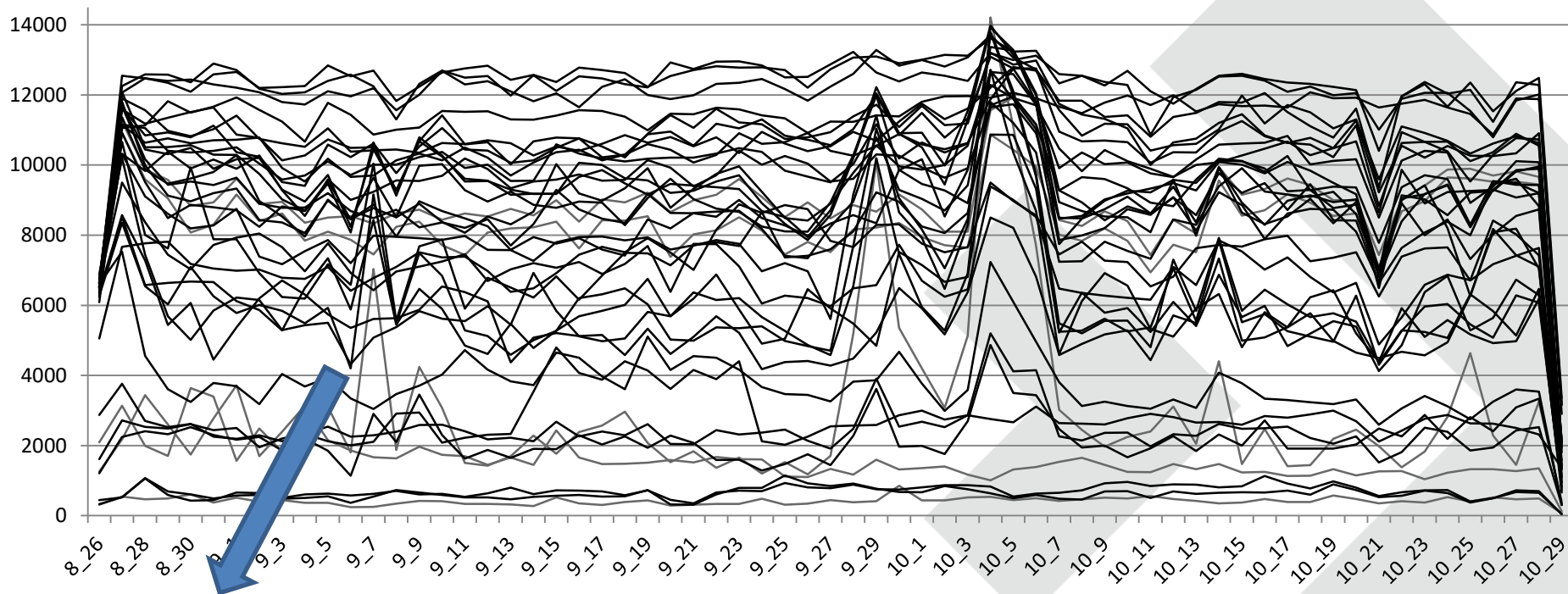
- . Story Maps ArcGIS
 - . Odyssey.js
 - . StoryMap.js
- . Google Tour Builder
- . Google My Maps

Data journalism

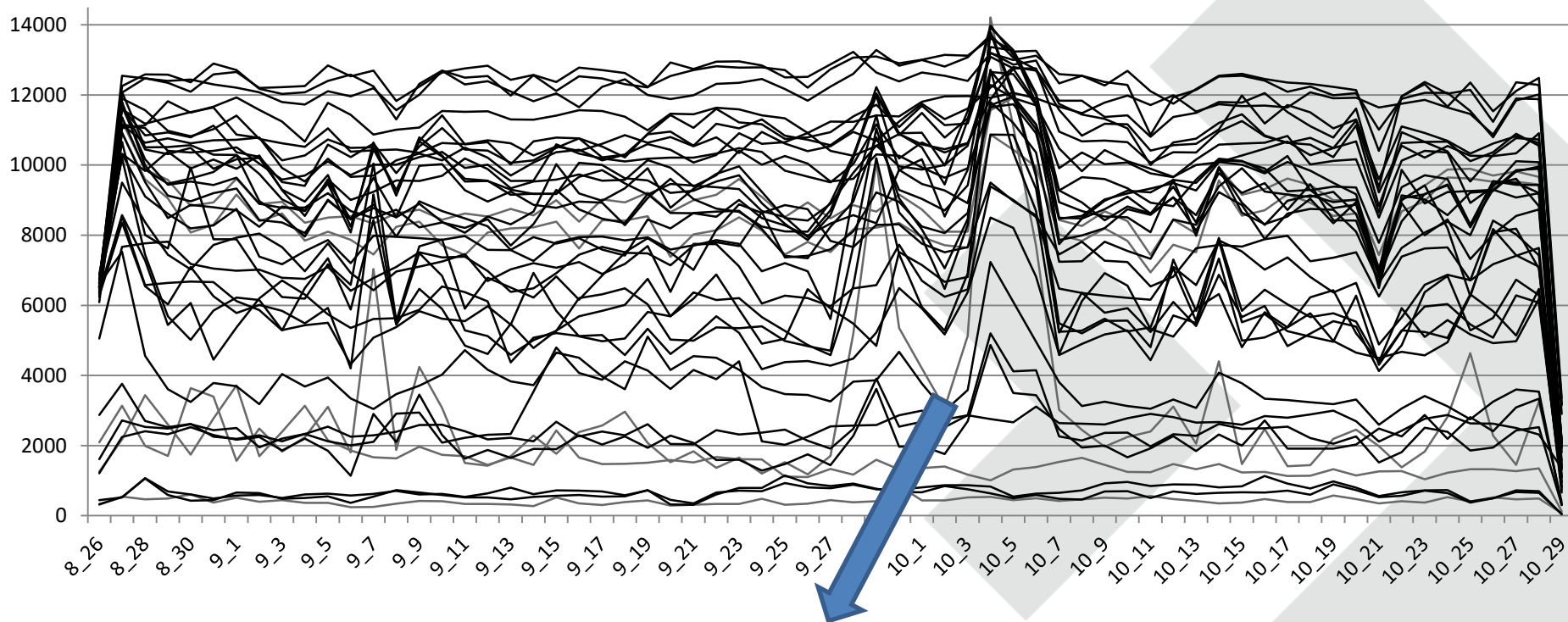
- . Český rozhlas / data
- . NY Times / Upshot
- . BBC / handbook
- . Guardian / data

Big data a visualization

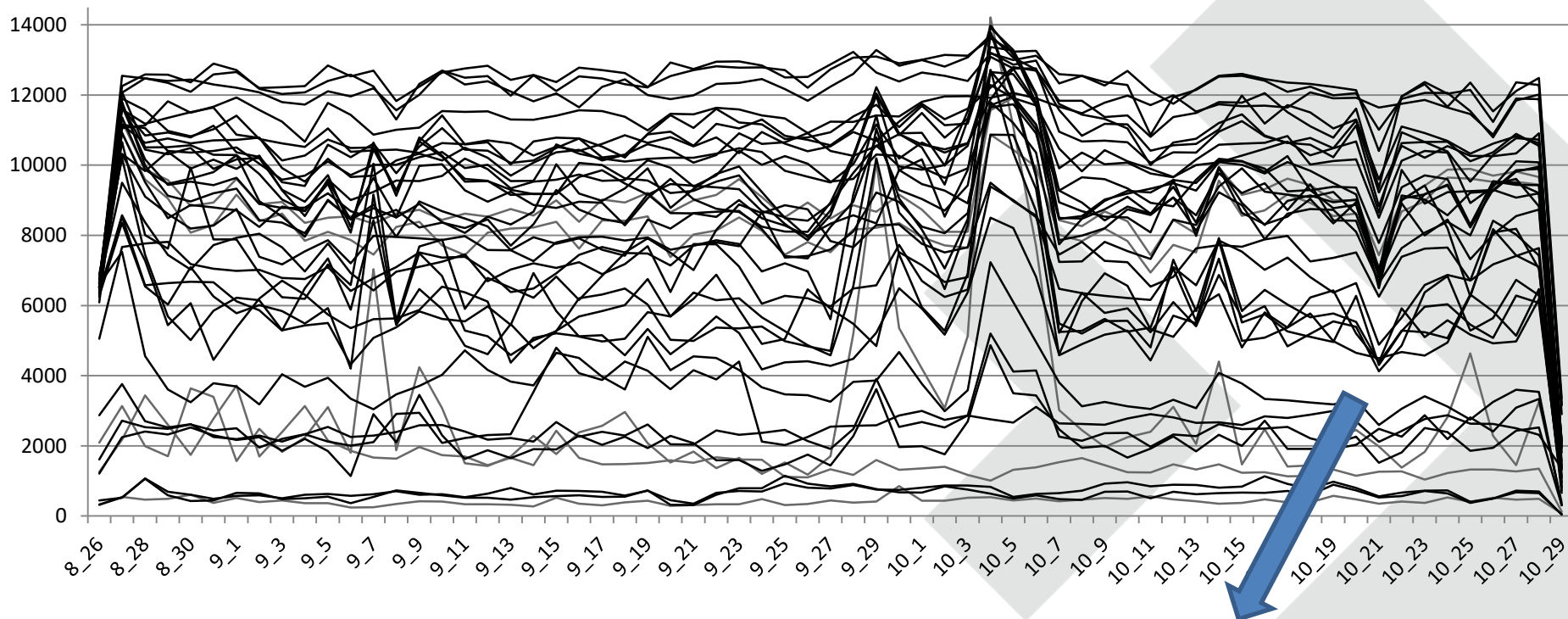




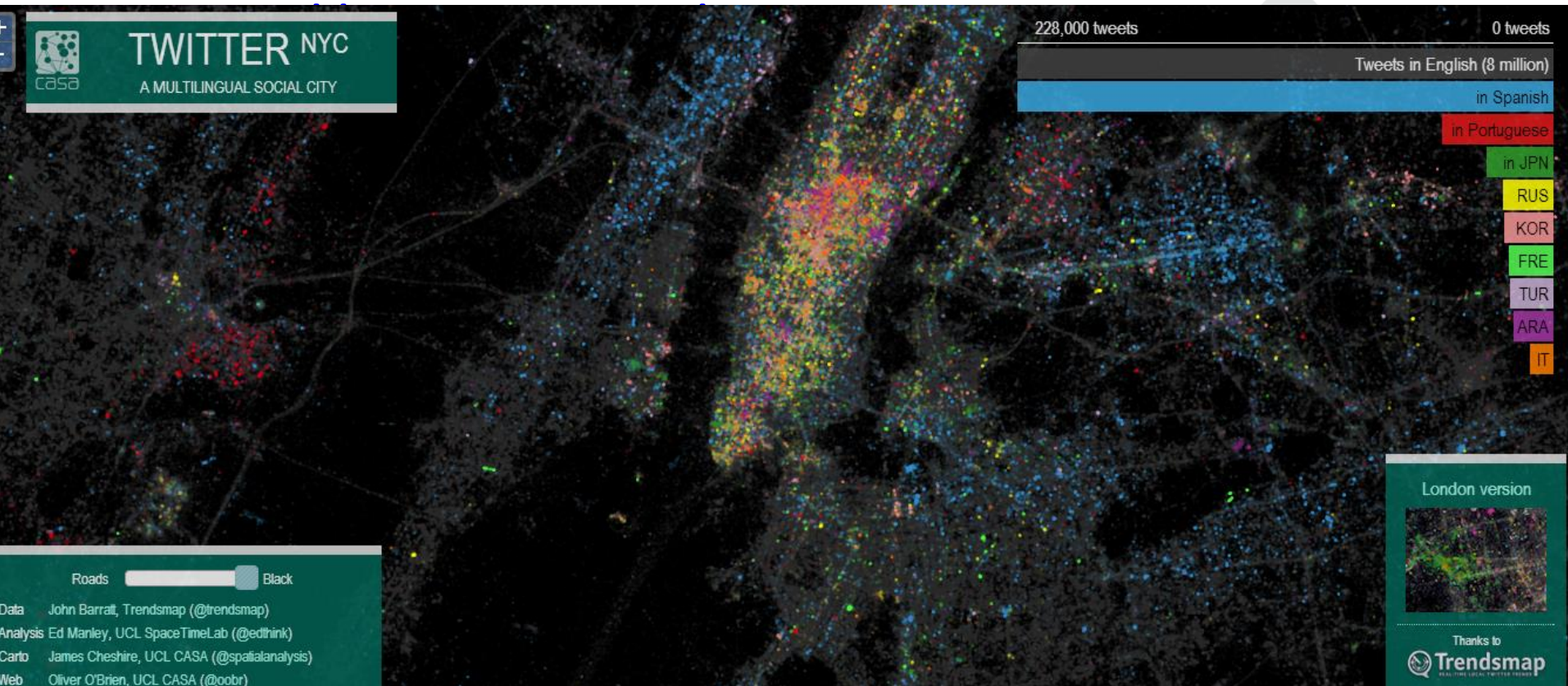
5th Sept.: Cease-fire Announcement; **7th Sept.:** shelling near the Donetsk airport

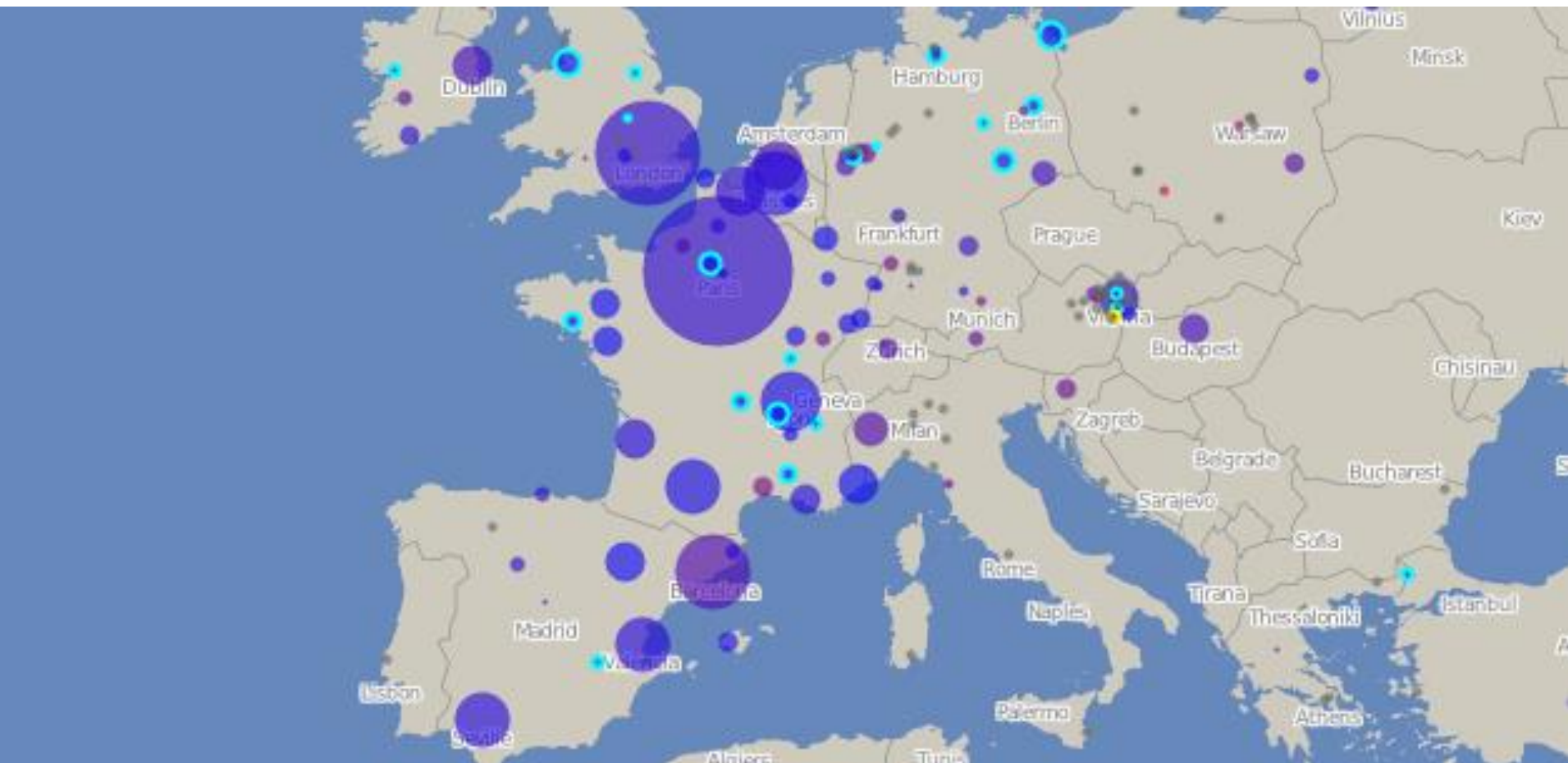


Since 3rd Oct.: Fighting for control of Donetsk airport intensifies – 12 separatists killed

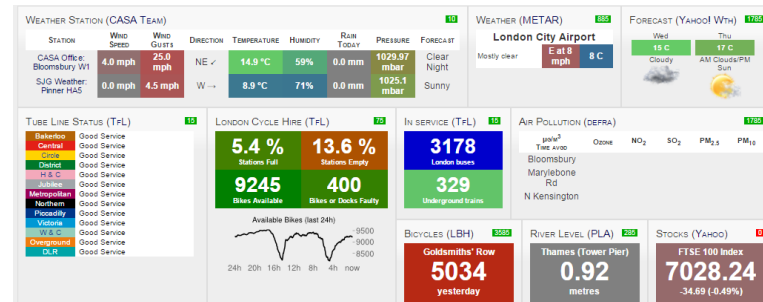


21st Oct.: UEFA Champions League – Bate Borisov vs. Shakhtar Donetsk... 0:7 😊









TRAFFIC

Uzavírka
Dec 19, 2020 - Mar 15, 2021

silnice III/4466 (ulice Hlavní), Skrbeň, okr. Olomouc, uzavřeno, oprava povrchu vozovky, Od 19.12.2020 00:00 Do 15.03.2021 23:59, úplná uzavírka silnice III/4466 ul. Hlavní, v...

TRAFFIC LEVEL

1

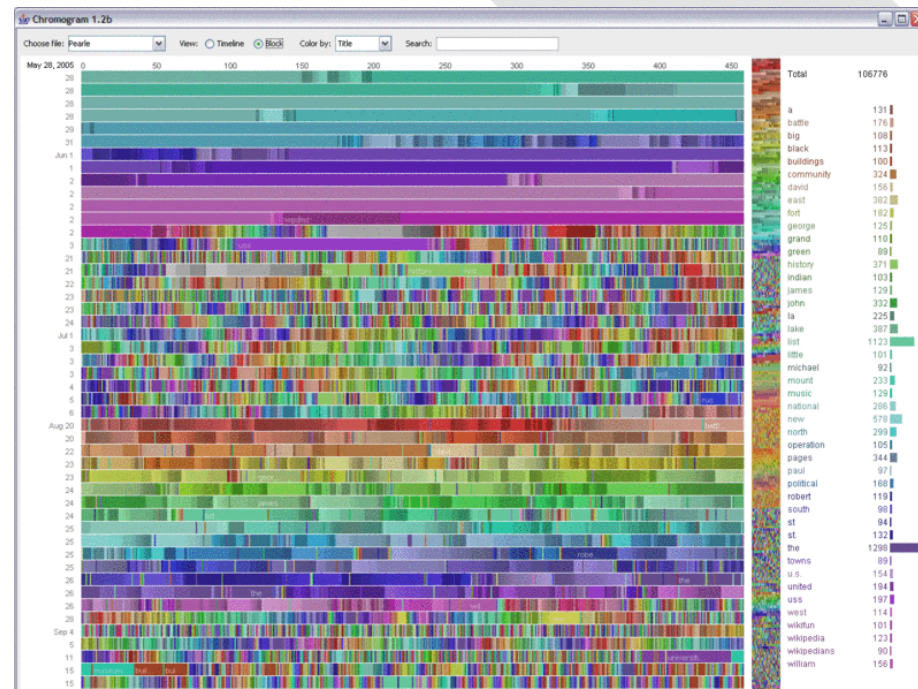
ENVIRONMENT

- Air temperature 2.72 °C
- Air pressure 1,018.63 hPa
- Air humidity 94.5 %
- Dew point 2.23 °C
- Wind speed 0.08 m/s

„Big data“ Phenomenon

- Volume up to 1000 TB (10^{15} bytes)
- Every day $2,5 \times 10^{18}$ of data
- Becoming a problem for relation DB
- př. Hadoop, HP Vertica

- sources:
 - sensor networks
 - social media
 - web-logs
 - indexes
 - call-data
 - transport data





facebook

„Big data“ Phenomenon



Introduction & Information

Vít PÁSZTO

14.3.2023
