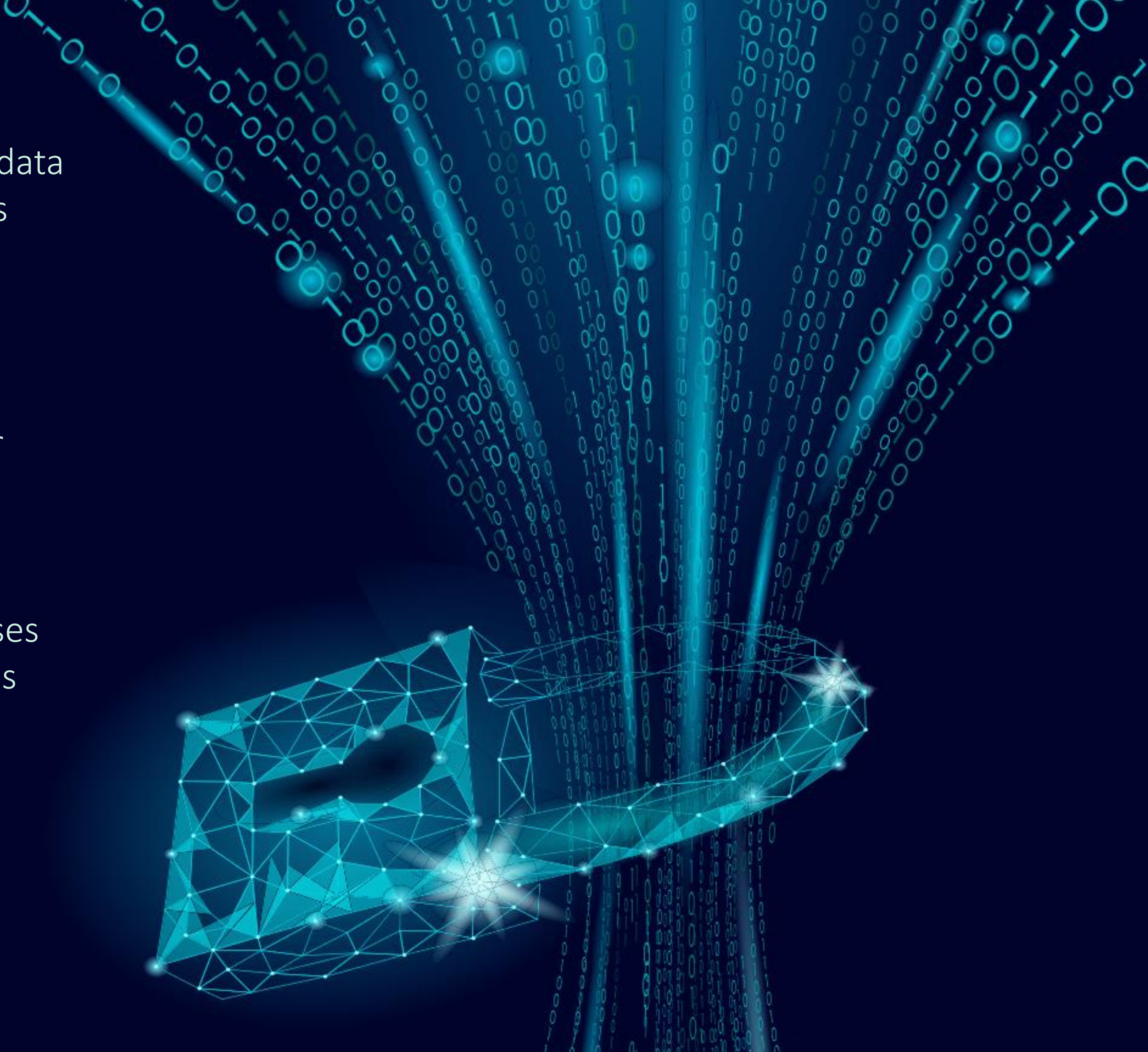
Amnesia

Status and next steps

- GGDPR limits the usage of personal data
  - according to law and contracts
  - Consent
  - Can be used for research

- No easy to use personal data
  - Consent might not be given or withdrawn
  - Difficult to manage
  - Usage for research purposes requires strict internal processes
  - Cannot share with third parties



Unlock the information

- Research and studies need statistical information and properties
- Personal identification is not necessary in most fields
- Low reduction in data quality is tolerable
    - Or can be mitigated by using larger amounts of data

- Anonymization unlocks the valuable information in data
  - The anonymized data are **different from the original data**
  - Anonymization is a one-way transformation of data
  - Original data cannot be retrieved

- Pseudo-Anonymization is not Anonymization
  - In Pseudo-Anonymized data there is a way to retrieve the original data
  - Pseudo – Anonymized data are still personal data

Why Anonymize?

Anonymized data are outside the scope of GDPR

Anonymization provides a statistical guaranty about the risk of information leakage

It is the most suitable way to give information to third parties, without revealing personal data

Limitations of Anonymization

- Anonymized data have lost some information
  - The key idea of a good anonymization algorithm is to minimize this loss and limit it in the least important information
- There are gray boundaries between anonymized and pseudo-anonymized data
- Formal privacy guaranties provide a statistical guaranty for the anonymized data
  - This is only an interpretation of the notion of "privacy"
- It cannot easily be fully automated
  - User input is needed

When to anonymize

- When you are a practitioner, and you want to share data with researchers and third parties without compromising the privacy of the user
  - After the data is anonymized, you do not need consent
- When you want to give data to recipients you do not fully trust
  - Encryption will reduce the risks of data leaks to unauthorized third parties, it will do nothing for untrusted recipients
- When you want to openly publish data and you are not fully aware of the audience
- When reduction in information quality is acceptable

Why Amnesia

- User friendly
- Works locally, no data transfer risk
- Allows users to customize the solution
- The only tool to offer anonymization for set-valued data
- The only tool to support k^m-anonymity
- Easy to incorporate to third party information systems

Statistics

- 32k visitors
- 105k page views
- 2k unique downloads

Status

K-anonymity

Km-anonymity

Object relational datasets

Disk based algorithm

API

ReST and command line API exist to help programmers

Bugs have diminished

Queries in helpdesk are less about bugs these days

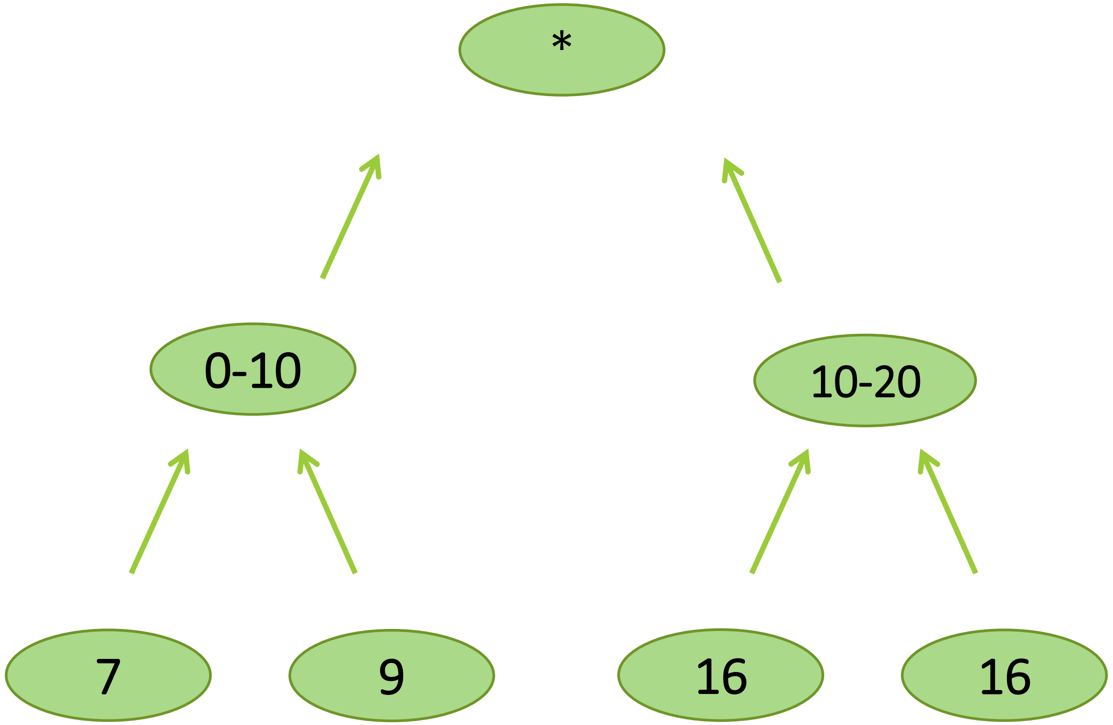
k-anonymity

- Each entry becomes indistinguishable from other *k*-1 entries

id	Zipcode	Age	National.	Disease
1	13053	28	Russian	Heart Disease
2	13068	29	American	Heart Disease
3	13068	21	Japanese	Viral Infection
4	13053	23	American	Viral Infection
5	14853	50	Indian	Cancer
6	14853	55	Russian	Heart Disease
7	14850	47	American	Viral Infection
8	14850	49	American	Viral Infection
9	13053	31	American	Cancer
10	13053	37	Indian	Cancer
11	13068	36	Japanese	Cancer
12	13068	35	American	Cancer

~~id~~	Zipcode	Age	National.	Disease
~~1~~	130**	<30	∗	Heart Disease
~~2~~	130**	<30	∗	Heart Disease
~~3~~	130**	<30	∗	Viral Infection
~~4~~	130**	<30	∗	Viral Infection
~~5~~	1485*	≥40	∗	Cancer
~~6~~	1485*	≥40	∗	Heart Disease
~~7~~	1485*	≥40	∗	Viral Infection
~~8~~	1485*	≥40	∗	Viral Infection
~~9~~	130**	3∗	∗	Cancer
~~10~~	130**	3∗	∗	Cancer
~~11~~	130**	3∗	∗	Cancer
~~12~~	130**	3∗	∗	Cancer

Generalization Hierarchy



k^m-anonymity

	Fruits	Meat	Vegetables	Fish
Vassilis	X	X		
Manolis	X	X	X	
Eleni			X	
Maria		X	X	
Kostas	X			X

	Fruits	Meat	Other food
Vassilis	X	X	
Manolis	X	X	X
Eleni			X
Maria		X	X
Kostas	X		X

- 2^2-anonymous
- Any combination of *m* items will not appear less than *k* times

Amnesia Limitations

- Users are not familiar with anonymization techniques
- The process is novel and requires effort from the user’s part
- Amnesia cannot decide on privacy parameters
- K-anonymity does not protect from every type of attack

Thank You

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https://amnesia.openaire.eu