DataTags, Data-Handling Policy Spaces, and the Tags Language

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Ben-Gurion University of the Negev
NSF
DATA PRIVACY LAB
The Institute for Quantitative Social Science at Harvard University

We present a framework for formally describing, reasoning about, and arriving at data-handling policies

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formally describing,
reasoning about, and
arriving at
data-handling policies

Making it Easier to
store and share scientific datasets

Why Share Data?

- **Good Science**
  - Transparency
  - Collaboration
  - Research acceleration
  - Reproducibility
  - Data citation
- **Compliance** with requirements from sponsors and publishers

W ?

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  - Transparenc
  - Collaboratio
  - Research ac
  - Reproducibi
  - Data citation
- **Compliance** w s and publishers

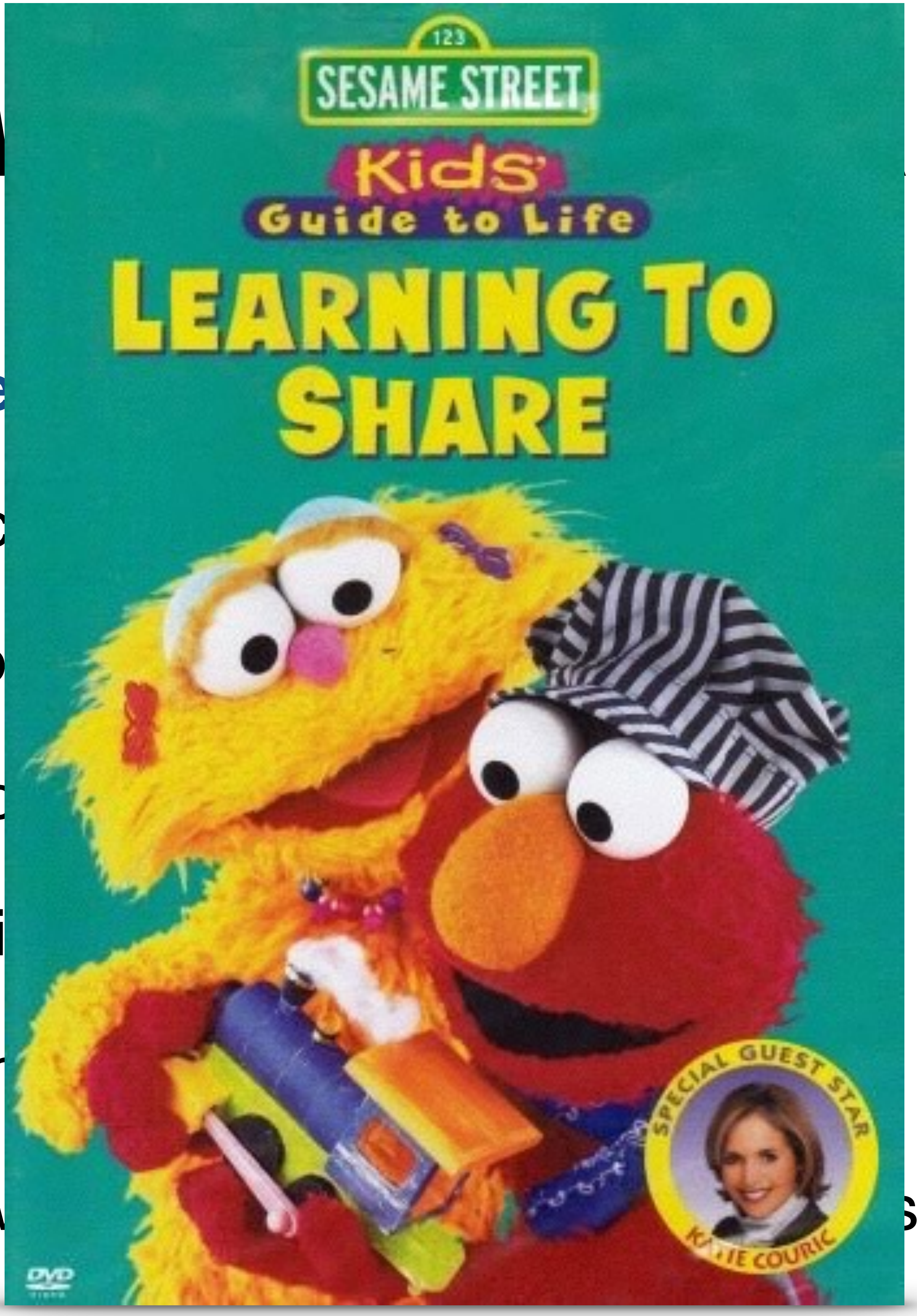


image: © Sesame Workshop

http://s4.evcdn.com/images/edpborder500/I0-001/003/710/831-6.jpeg_/avenue-q-31.jpeg

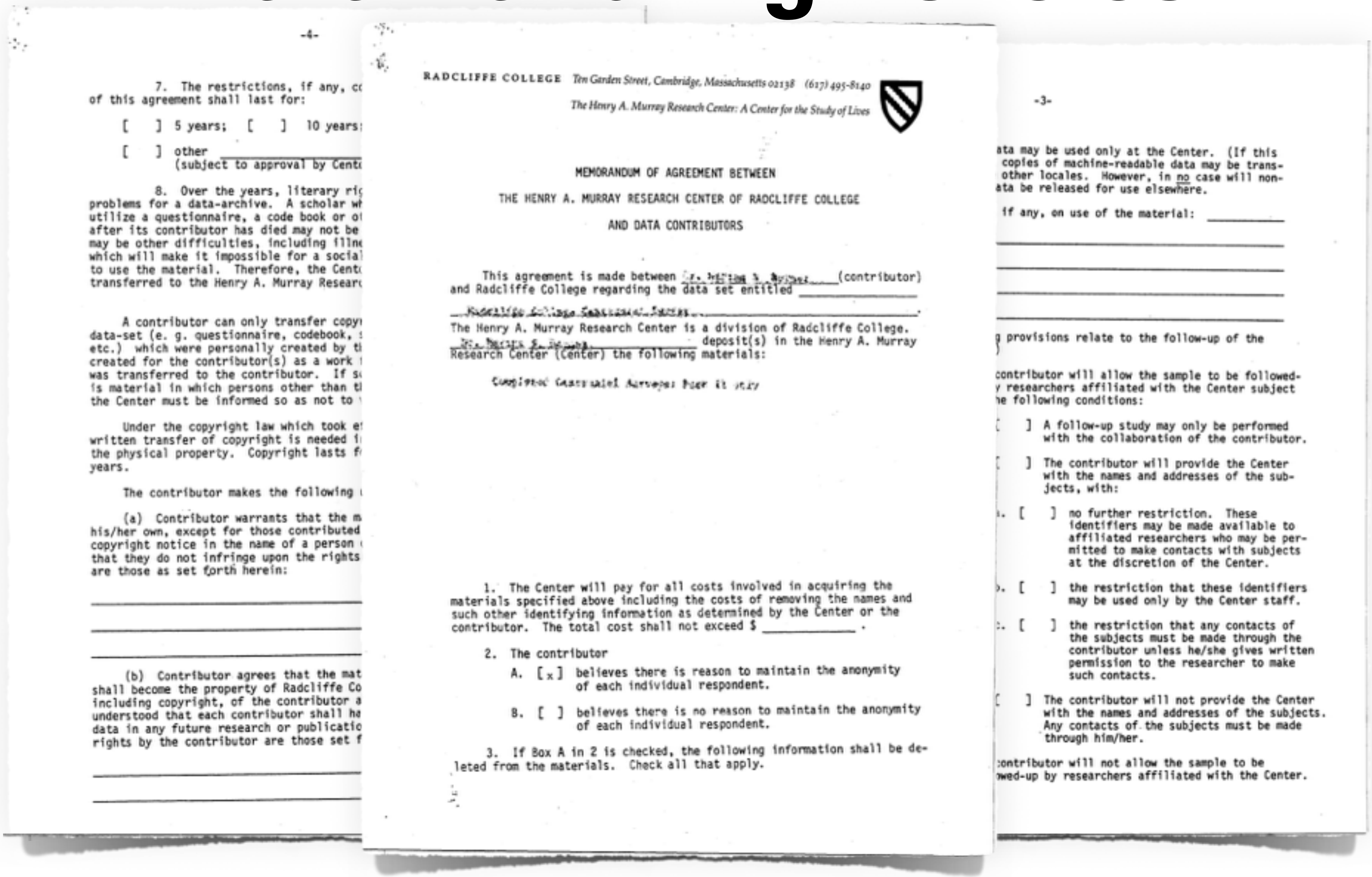
Sharing Data is Nontrivial

- *Sharing may harm the data subjects*
- **Law** is complex
  - 2187 privacy laws in the US alone, at federal, state and local level, usually context-specific [Sweeney, 2013]
- **Technology** is complex
  - E.g. encryption standards change constantly, as new vulnerabilities are found
- **Specific dataset provenance** (may be) complex

Dataset handling policies
play the critical role of balancing
privacy risks and scientific value
of sharing datasets.

Here are some

Data Handling Policies



-4-

7. The restrictions, if any, c
of this agreement shall last for:

[ ] 5 years; [ ] 10 years;

[ ] other
(subject to approval by Cent

8. Over the years, literary ri
problems for a data-archive. A scholar wh
utilize a questionnaire, a code book or o
after its contributor has died may not be
may be other difficulties, including illn
which will make it impossible for a socia
to use the material. Therefore, the Cent
transferred to the Henry A. Murray Resear

A contributor can only transfer copy
data-set (e. g. questionnaire, codebook,
etc.) which were personally created by t
created for the contributor(s) as a work
was transferred to the contributor. If s
is material in which persons other than t
the Center must be informed so as not to

Under the copyright law which took e
written transfer of copyright is needed i
the physical property. Copyright lasts f
years.

The contributor makes the following

(a) Contributor warrants that the m
his/her own, except for those contributed
copyright notice in the name of a person
that they do not infringe upon the rights
are those as set forth herein:

____

____

____

(b) Contributor agrees that the mat
shall become the property of Radcliffe Co
including copyright, of the contributor a
understood that each contributor shall ha
data in any future research or publicatio
rights by the contributor are those set f

____

____

RADCLIFFE COLLEGE *Ten Garden Street, Cambridge, Massachusetts 02138 (617) 495-8140*
The Henry A. Murray Research Center: A Center for the Study of Lives

MEMORANDUM OF AGREEMENT BETWEEN

THE HENRY A. MURRAY RESEARCH CENTER OF RADCLIFFE COLLEGE

AND DATA CONTRIBUTORS

This agreement is made between [illegible] (contributor) and Radcliffe College regarding the data set entitled ________ [illegible].

The Henry A. Murray Research Center is a division of Radcliffe College. [illegible] deposit(s) in the Henry A. Murray Research Center (Center) the following materials:

[illegible]

1. The Center will pay for all costs involved in acquiring the materials specified above including the costs of removing the names and such other identifying information as determined by the Center or the contributor. The total cost shall not exceed $ ________ .

2. The contributor

A. [x] believes there is reason to maintain the anonymity of each individual respondent.

B. [ ] believes there is no reason to maintain the anonymity of each individual respondent.

3. If Box A in 2 is checked, the following information shall be deleted from the materials. Check all that apply.

-3-

ata may be used only at the Center. (If this
copies of machine-readable data may be trans-
other locales. However, in no case will non-
ata be released for use elsewhere.

if any, on use of the material: ________

____

____

____

____

g provisions relate to the follow-up of the

contributor will allow the sample to be followed-
y researchers affiliated with the Center subject
he following conditions:

[ ] A follow-up study may only be performed with the collaboration of the contributor.

[ ] The contributor will provide the Center with the names and addresses of the subjects, with:

a. [ ] no further restriction. These identifiers may be made available to affiliated researchers who may be permitted to make contacts with subjects at the discretion of the Center.

b. [ ] the restriction that these identifiers may be used only by the Center staff.

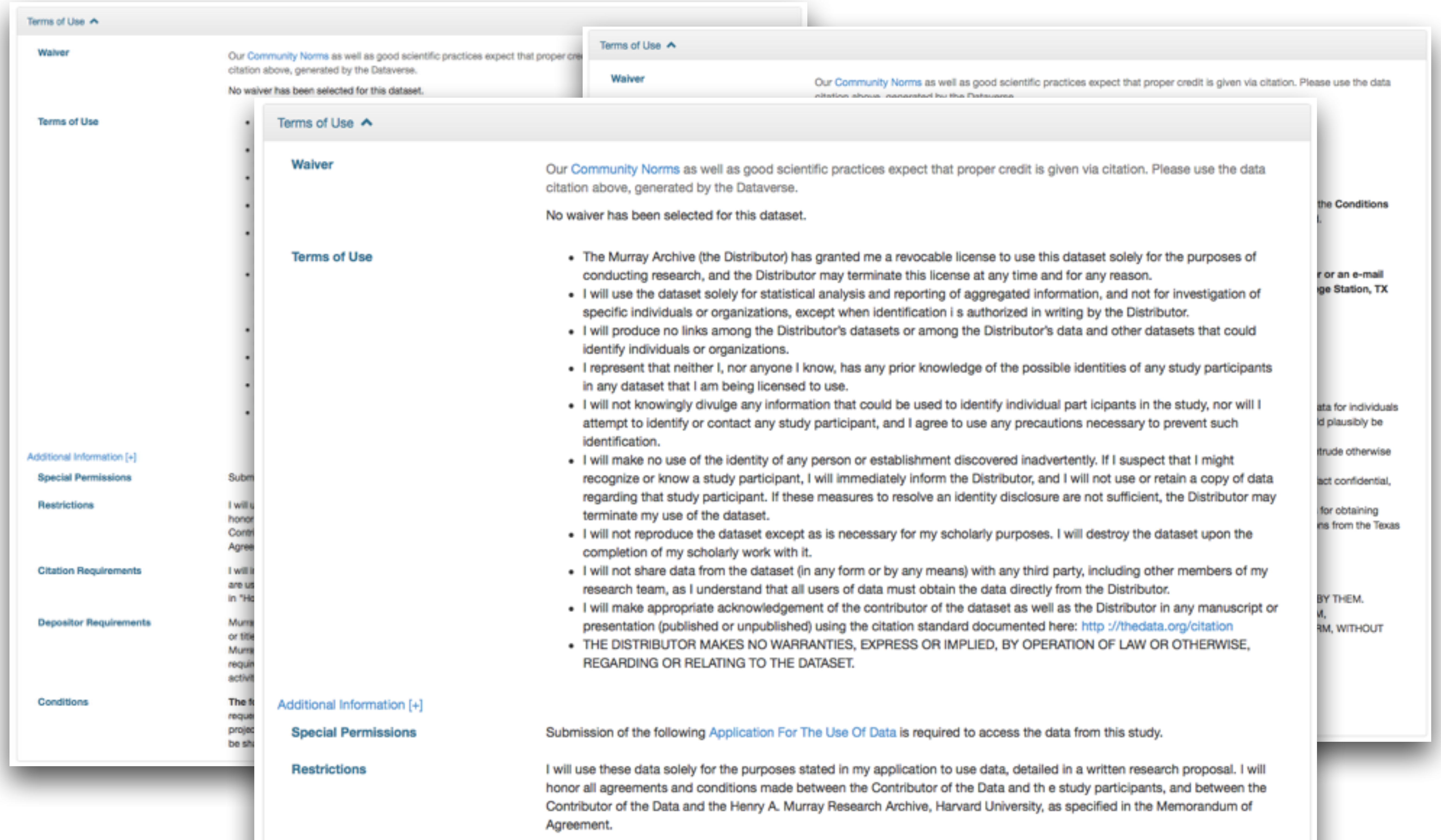
c. [ ] the restriction that any contacts of the subjects must be made through the contributor unless he/she gives written permission to the researcher to make such contacts.

[ ] The contributor will not provide the Center with the names and addresses of the subjects. Any contacts of the subjects must be made through him/her.

contributor will not allow the sample to be
owed-up by researchers affiliated with the Center.

Here are some new

Data Handling Policies



Terms of Use

Waiver

Our Community Norms as well as good scientific practices expect that proper credit is given via citation. Please use the data citation above, generated by the Dataverse.

No waiver has been selected for this dataset.

Terms of Use

- The Murray Archive (the Distributor) has granted me a revocable license to use this dataset solely for the purposes of conducting research, and the Distributor may terminate this license at any time and for any reason.
- I will use the dataset solely for statistical analysis and reporting of aggregated information, and not for investigation of specific individuals or organizations, except when identification i s authorized in writing by the Distributor.
- I will produce no links among the Distributor's datasets or among the Distributor's data and other datasets that could identify individuals or organizations.
- I represent that neither I, nor anyone I know, has any prior knowledge of the possible identities of any study participants in any dataset that I am being licensed to use.
- I will not knowingly divulge any information that could be used to identify individual part icipants in the study, nor will I attempt to identify or contact any study participant, and I agree to use any precautions necessary to prevent such identification.
- I will make no use of the identity of any person or establishment discovered inadvertently. If I suspect that I might recognize or know a study participant, I will immediately inform the Distributor, and I will not use or retain a copy of data regarding that study participant. If these measures to resolve an identity disclosure are not sufficient, the Distributor may terminate my use of the dataset.
- I will not reproduce the dataset except as is necessary for my scholarly purposes. I will destroy the dataset upon the completion of my scholarly work with it.
- I will not share data from the dataset (in any form or by any means) with any third party, including other members of my research team, as I understand that all users of data must obtain the data directly from the Distributor.
- I will make appropriate acknowledgement of the contributor of the dataset as well as the Distributor in any manuscript or presentation (published or unpublished) using the citation standard documented here: http ://thedata.org/citation
- THE DISTRIBUTOR MAKES NO WARRANTIES, EXPRESS OR IMPLIED, BY OPERATION OF LAW OR OTHERWISE, REGARDING OR RELATING TO THE DATASET.

Additional Information [+]

Special Permissions

Submission of the following Application For The Use Of Data is required to access the data from this study.

Restrictions

I will use these data solely for the purposes stated in my application to use data, detailed in a written research proposal. I will honor all agreements and conditions made between the Contributor of the Data and th e study participants, and between the Contributor of the Data and the Henry A. Murray Research Archive, Harvard University, as specified in the Memorandum of Agreement.

Formal$_{\text{cs}}$ DHPs

W3C’s Privacy Preference Project (P3P)

Focuses on web data collection

Open Digital Rights Language (ODRL)

Models DRM, supports privacy and rule-based assertions

PrimeLife Policy Language (PPL)

Focuses on downstream usage, using rules

Data-Purpose Algebra [Hanson, Berners-Lee, Kagal, Sussman, Weitzner]

Models restriction transformation along data processing path

DataTags

Tag Type	*Description*	*Security Features*	*Access Credentials*
Blue	Public	Clear storage, Clear transmit	Open
Green	Controlled public	Clear storage, Clear transmit	Email- or OAuth Verified Registration
Yellow	Accountable	Clear storage, Encrypted transmit	Password, Registered, Approval, Click-through DUA
Orange	More accountable	Encrypted storage, Encrypted transmit	Password, Registered, Approval, Signed DUA
Red	Fully accountable	Encrypted storage, Encrypted transmit	Two-factor authentication, Approval, Signed DUA
Crimson	Maximally restricted	Multi-encrypted storage, Encrypted transmit	Two-factor authentication, Approval, Signed DUA

DataTags and their respective policies

Sweeney L, Crosas M, Bar-Sinai M. Sharing Sensitive Data with Confidence: The Datatags System. Technology Science [Internet]. 2015.

Data-handling policies consist of independent *aspects*.

Encryption at rest, transfer type, access credentials, etc.

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Encryption at rest, transfer type, access credentials, etc.

Each aspect has multiple *possible requirements*, and can be defined such that these requirements are ordered.

DHPs: From Text to Space

Data-handling policies consist of independent *aspects*.

Encryption at rest, transfer type, access credentials, etc.

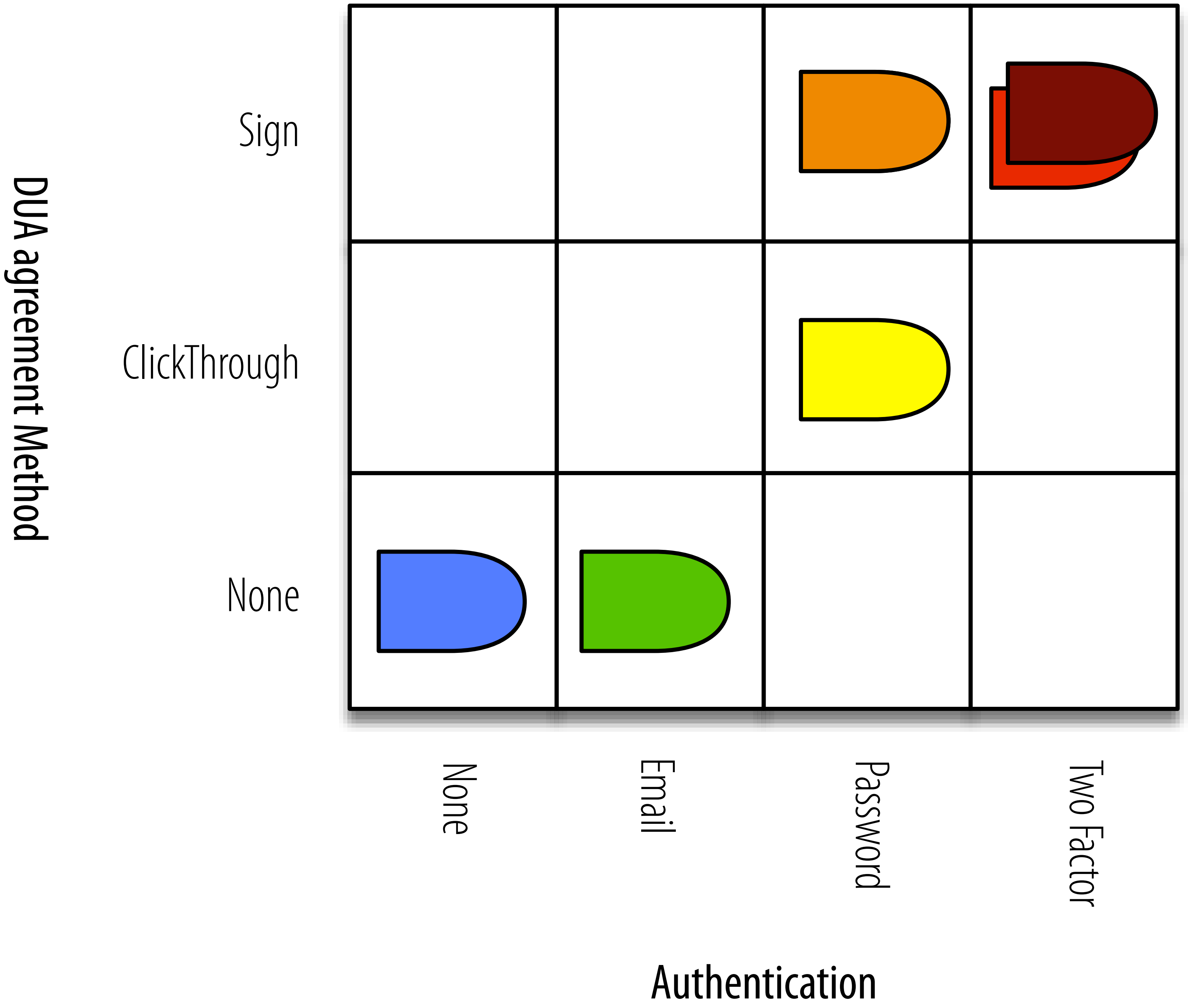
Each aspect has multiple *possible requirements*, and can be defined such that these requirements are ordered.

We can construct a data-handling policy space by viewing aspects as axes, where each aspect's possible requirements serves as its coordinates.

Going from this…

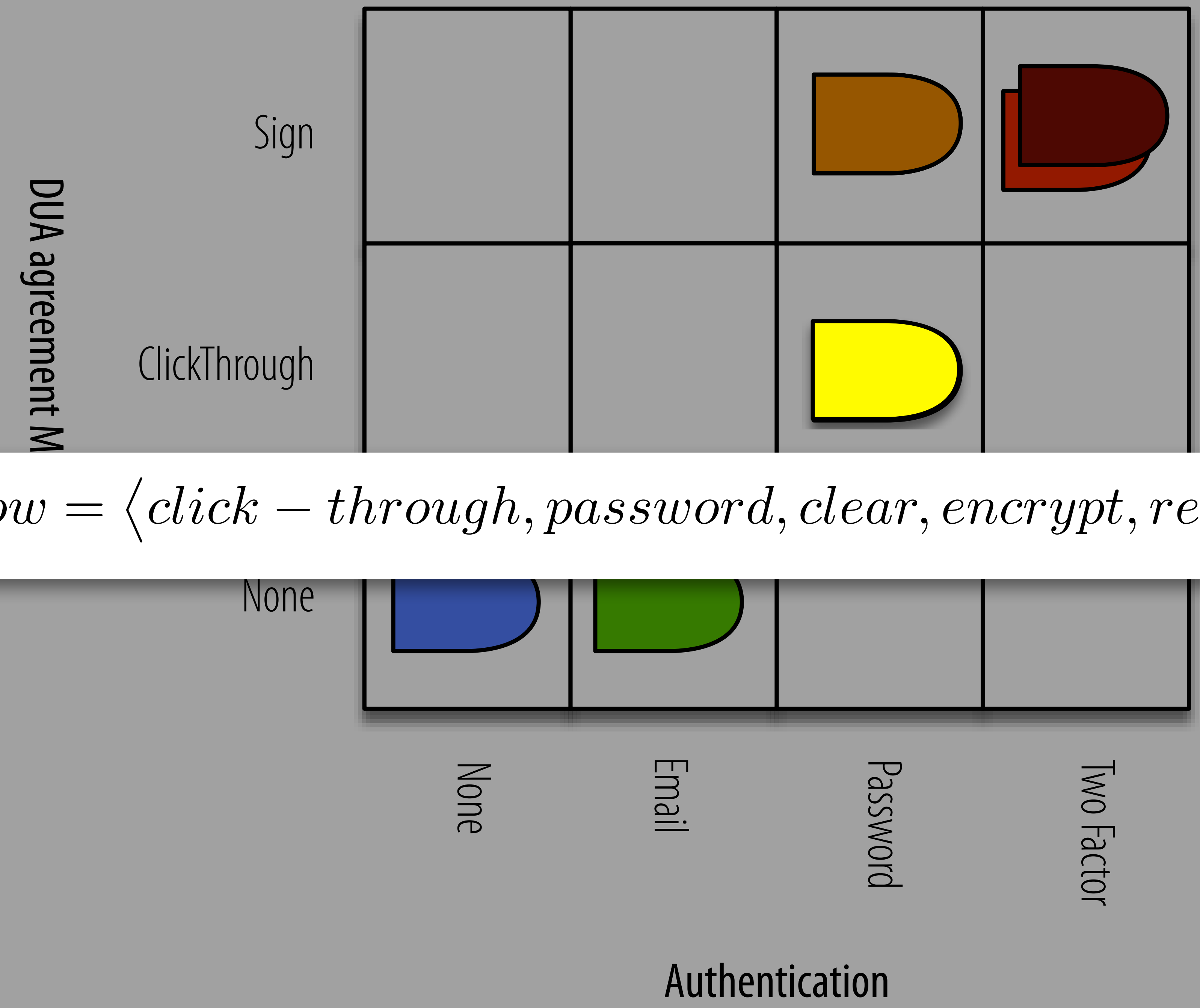
Tag Type	*Description*	*Security Features*	*Access Credentials*
Blue	Public	Clear storage, Clear transmit	Open
Green	Controlled public	Clear storage, Clear transmit	Email- or OAuth Verified Registration
Yellow	Accountable	Clear storage, Encrypted transmit	Password, Registered, Approval, Click-through DUA
Orange	More accountable	Encrypted storage, Encrypted transmit	Password, Registered, Approval, Signed DUA
Red	Fully accountable	Encrypted storage, Encrypted transmit	Two-factor authentication, Approval, Signed DUA
Crimson	Maximally restricted	Multi-encrypted storage, Encrypted transmit	Two-factor authentication, Approval, Signed DUA

...to This*



* *Shown here is a 2-D projection over the DUA Agreement Method and Authentication axes.*

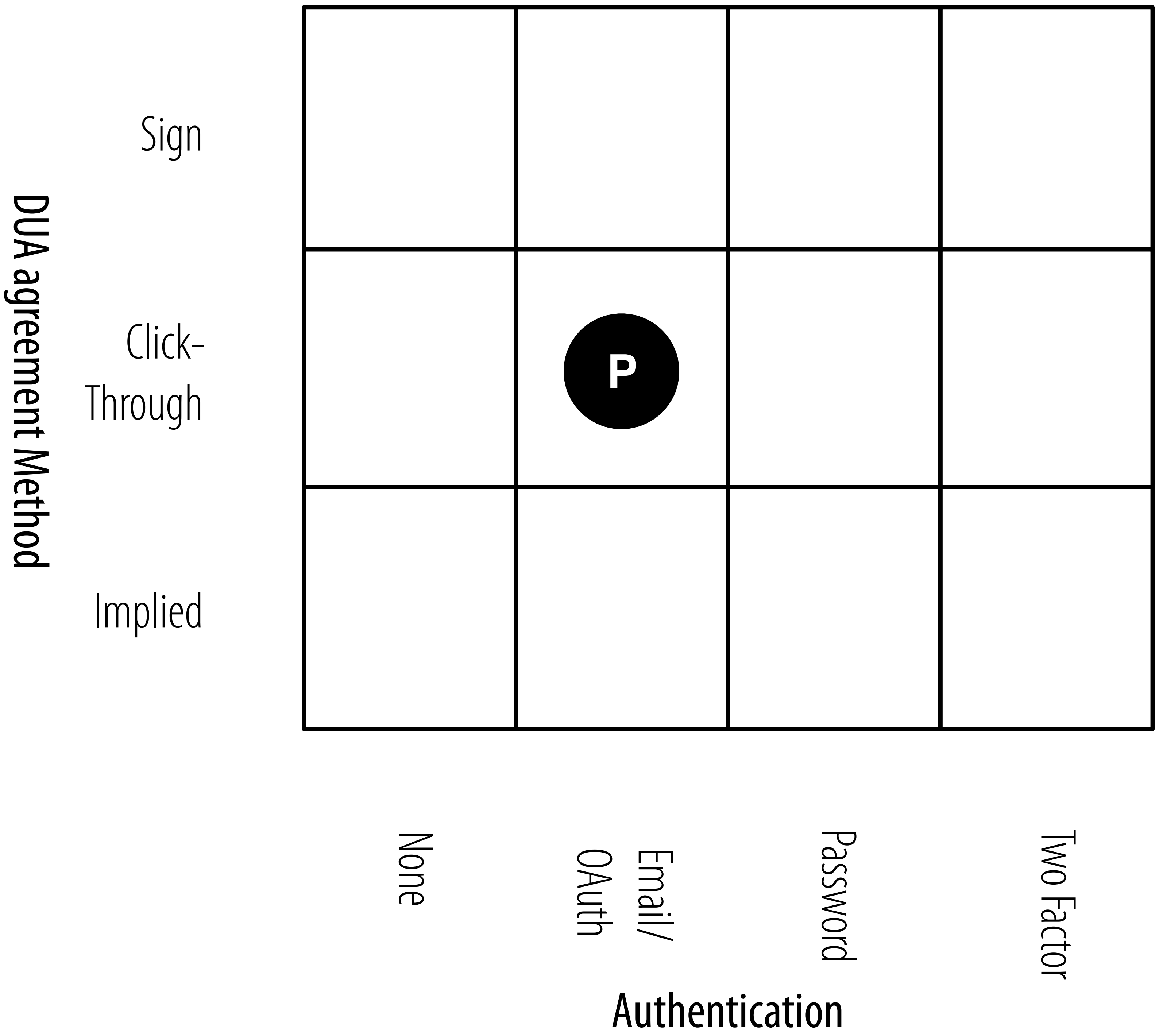
...to This*



$$Yellow = \langle click-through, password, clear, encrypt, registered, approval\rangle$$

* *Shown here is a 2-D projection over the DUA Agreement Method and Authentication axes.*

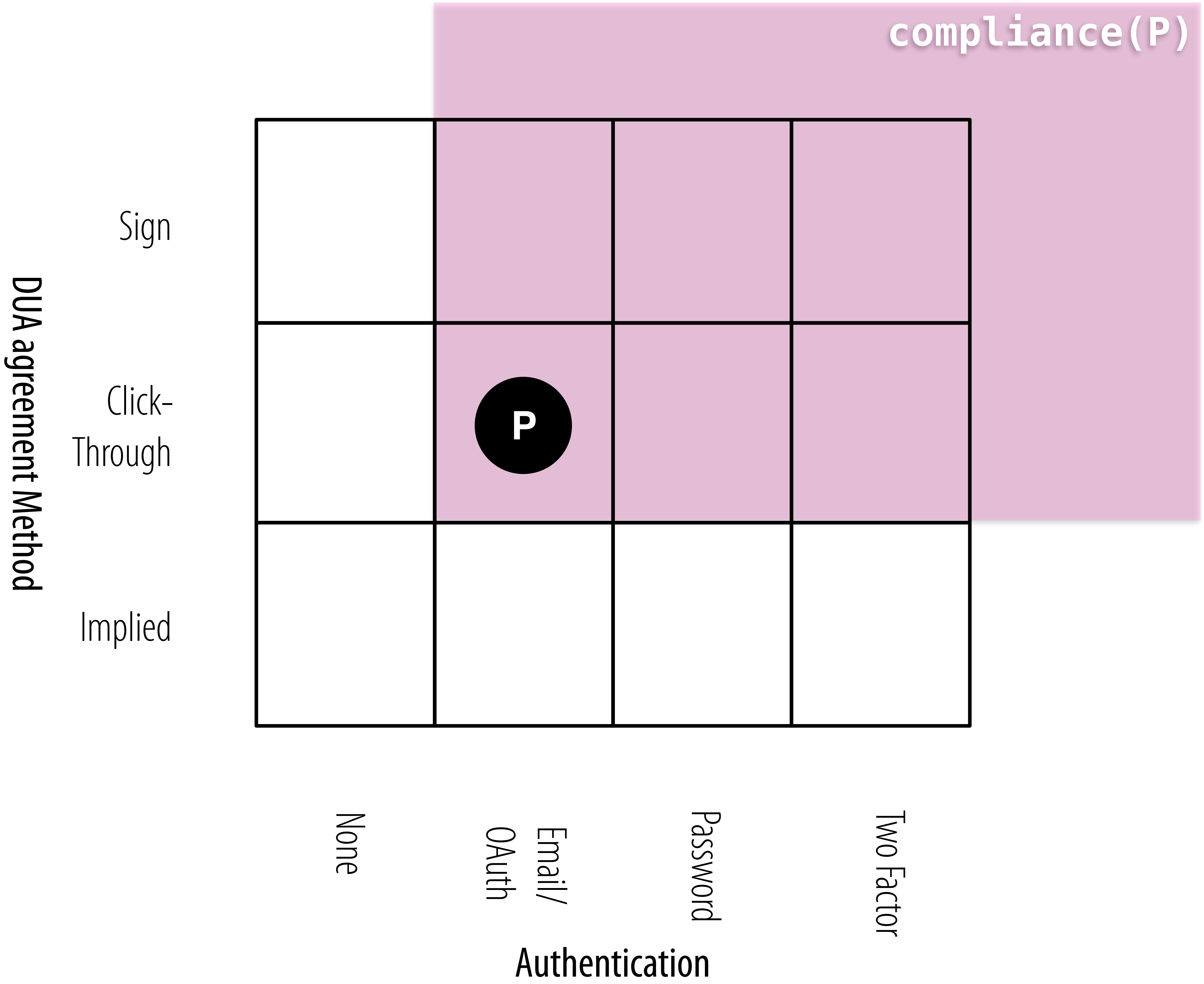
Strictness



DUA agreement Method	None	Email/ OAuth	Password	Two Factor
Sign				
Click-Through		P		
Implied				

Authentication

Strictness



compliance(P)

DUA agreement Method

Sign

Click-Through

Implied

P

None

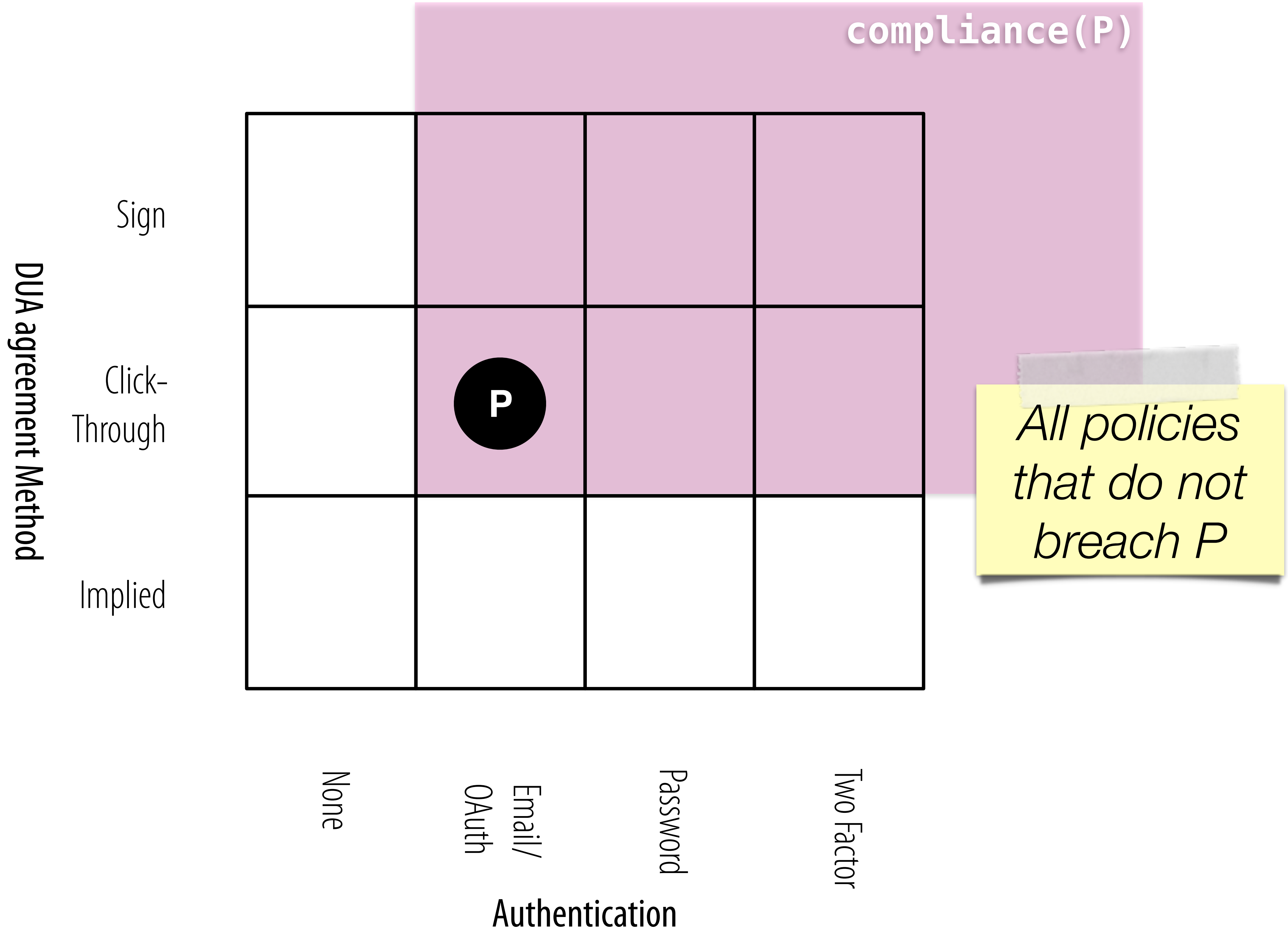
Email/ OAuth

Password

Two Factor

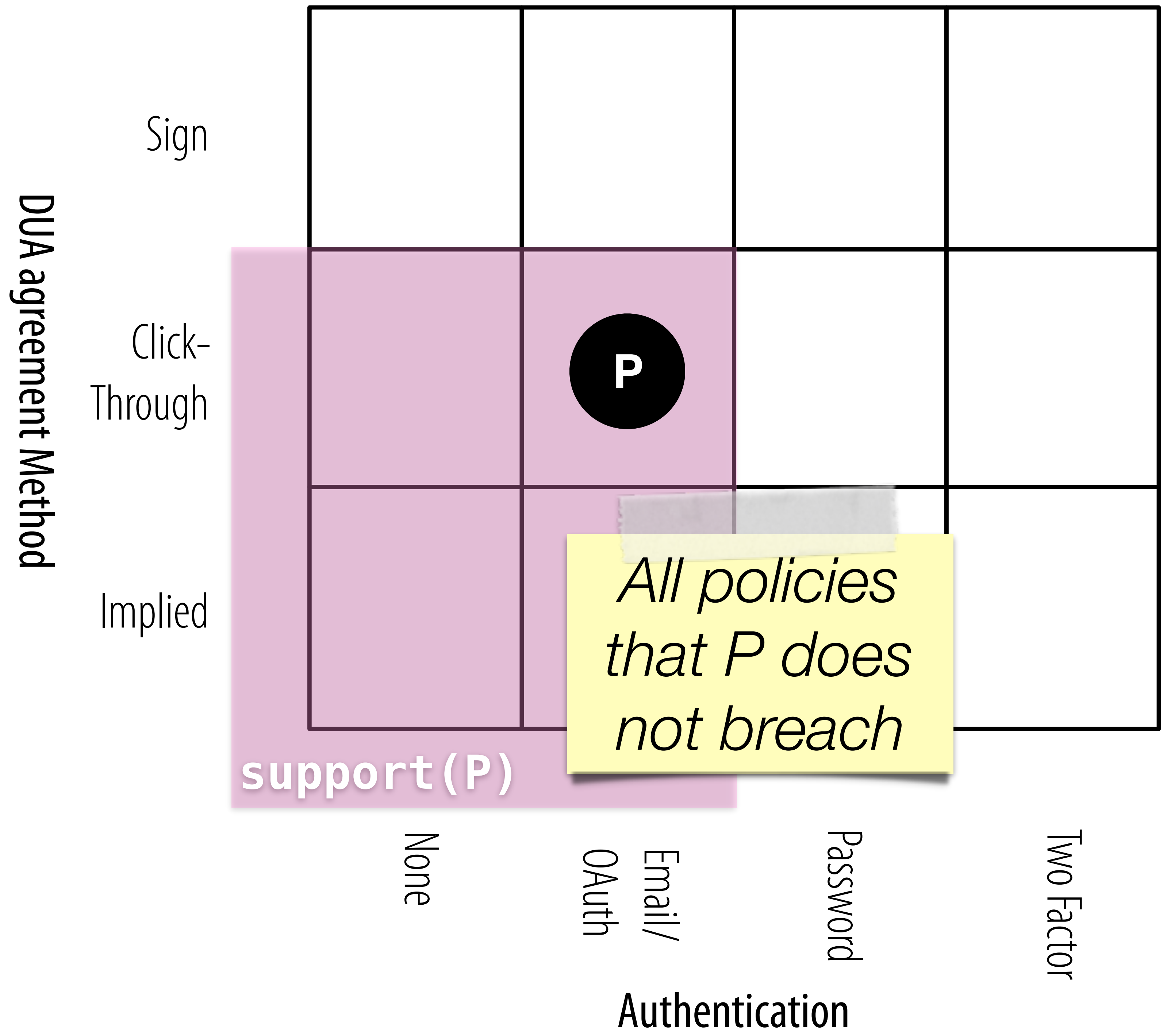
Authentication

Strictness



All policies that do not breach P

Lenience



DUA agreement Method

Sign

Click-Through

Implied

P

support(P)

All policies that P does not breach

None

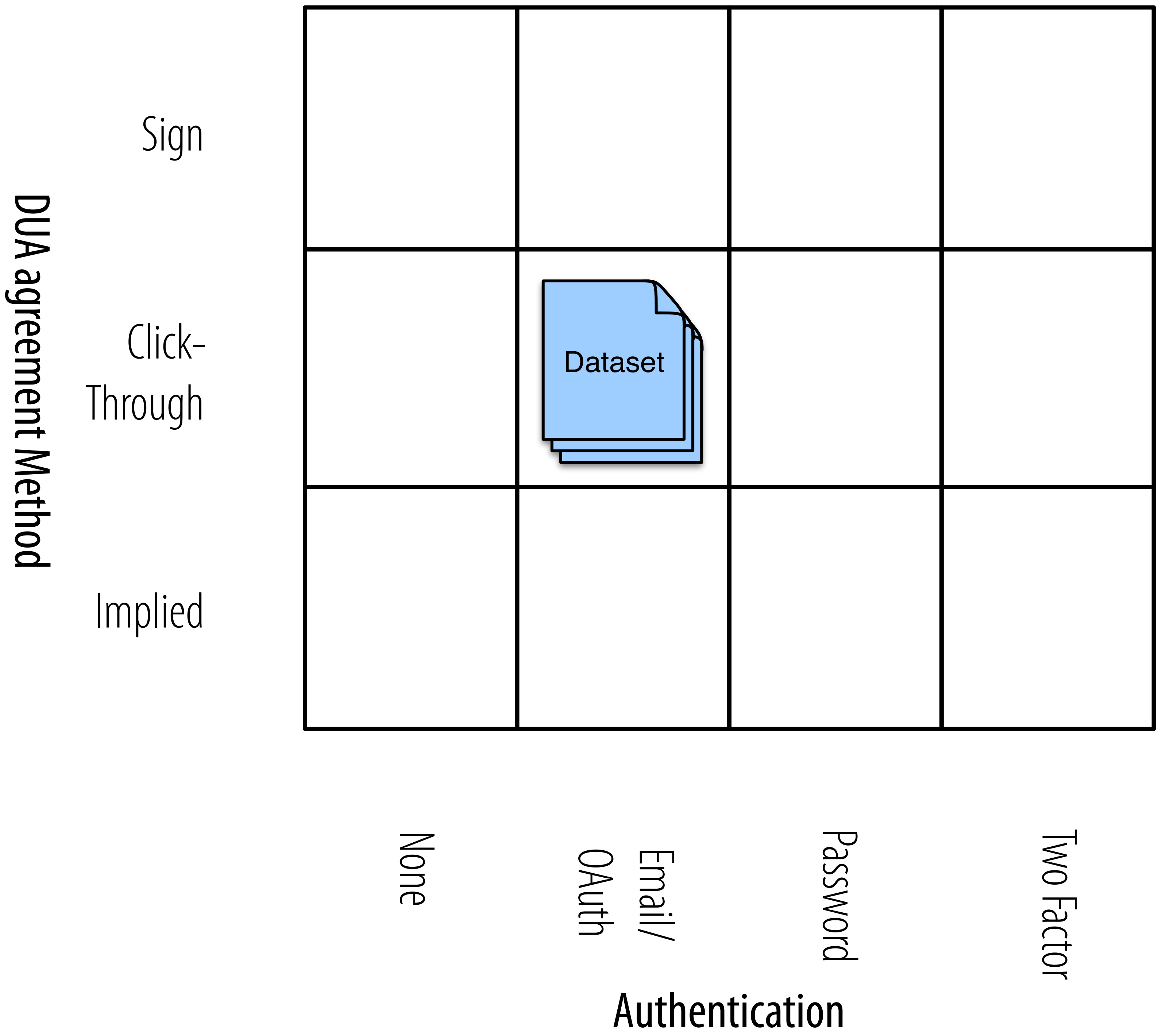
Email/ OAuth

Password

Two Factor

Authentication

A Dataset and a Repository walk into a DHP space…

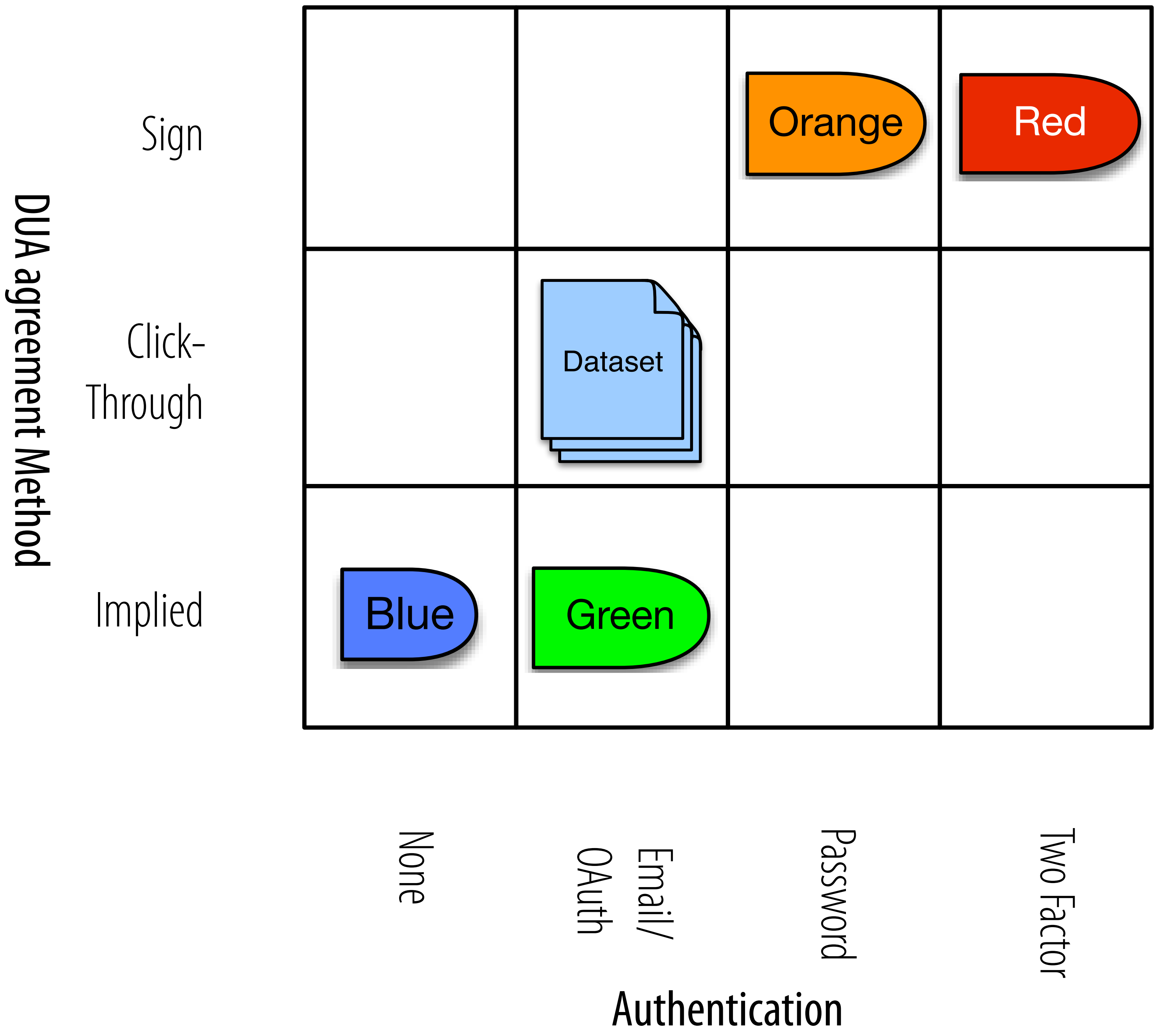


DUA agreement Method

	None	Email/ OAuth	Password	Two Factor
Sign				
Click-Through		Dataset		
Implied				

Authentication

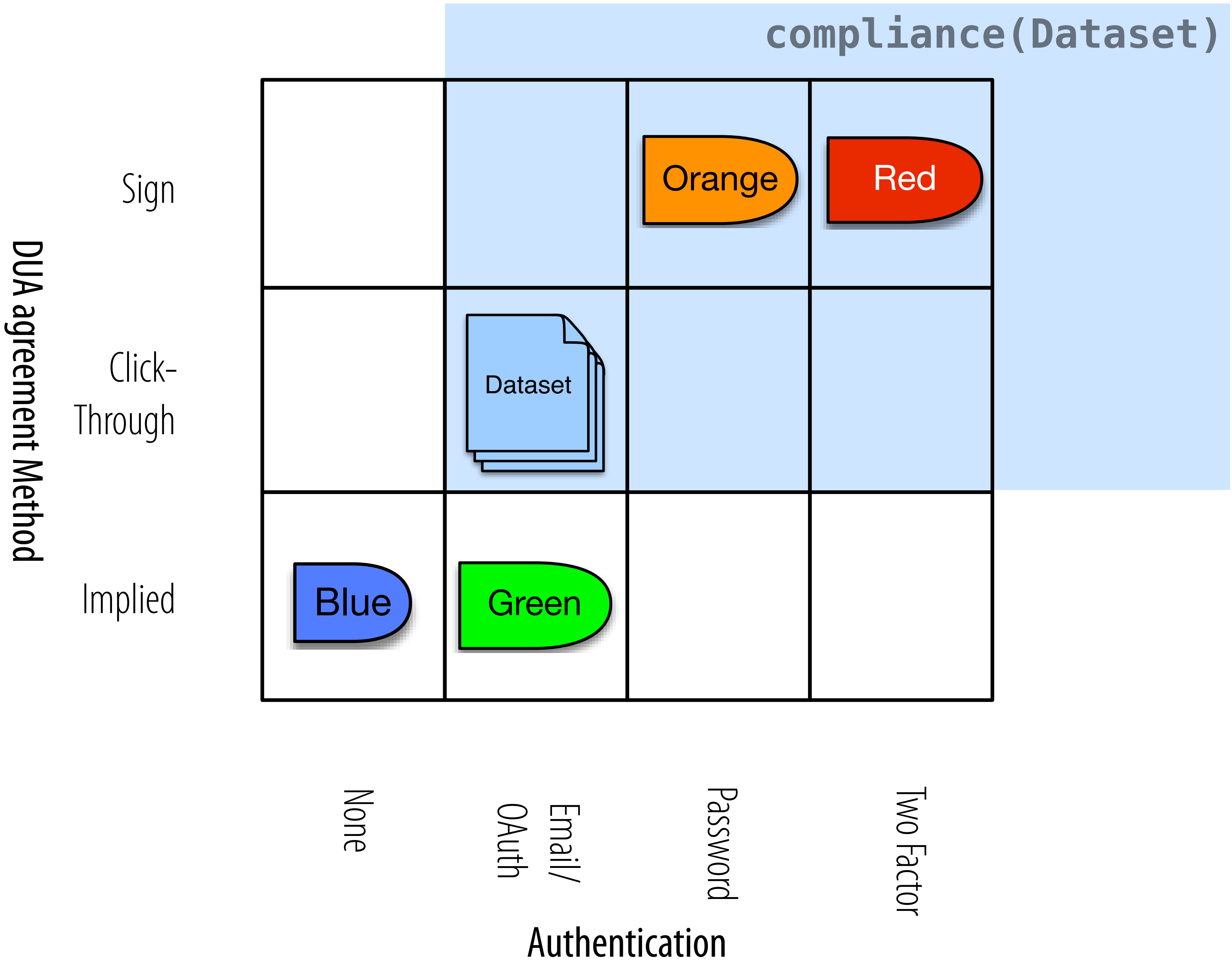
A Dataset and a Repository walk into a DHP space…



Authentication

DUA agreement Method	None	Email/ OAuth	Password	Two Factor
Sign			Orange	Red
Click-Through		Dataset		
Implied	Blue	Green		

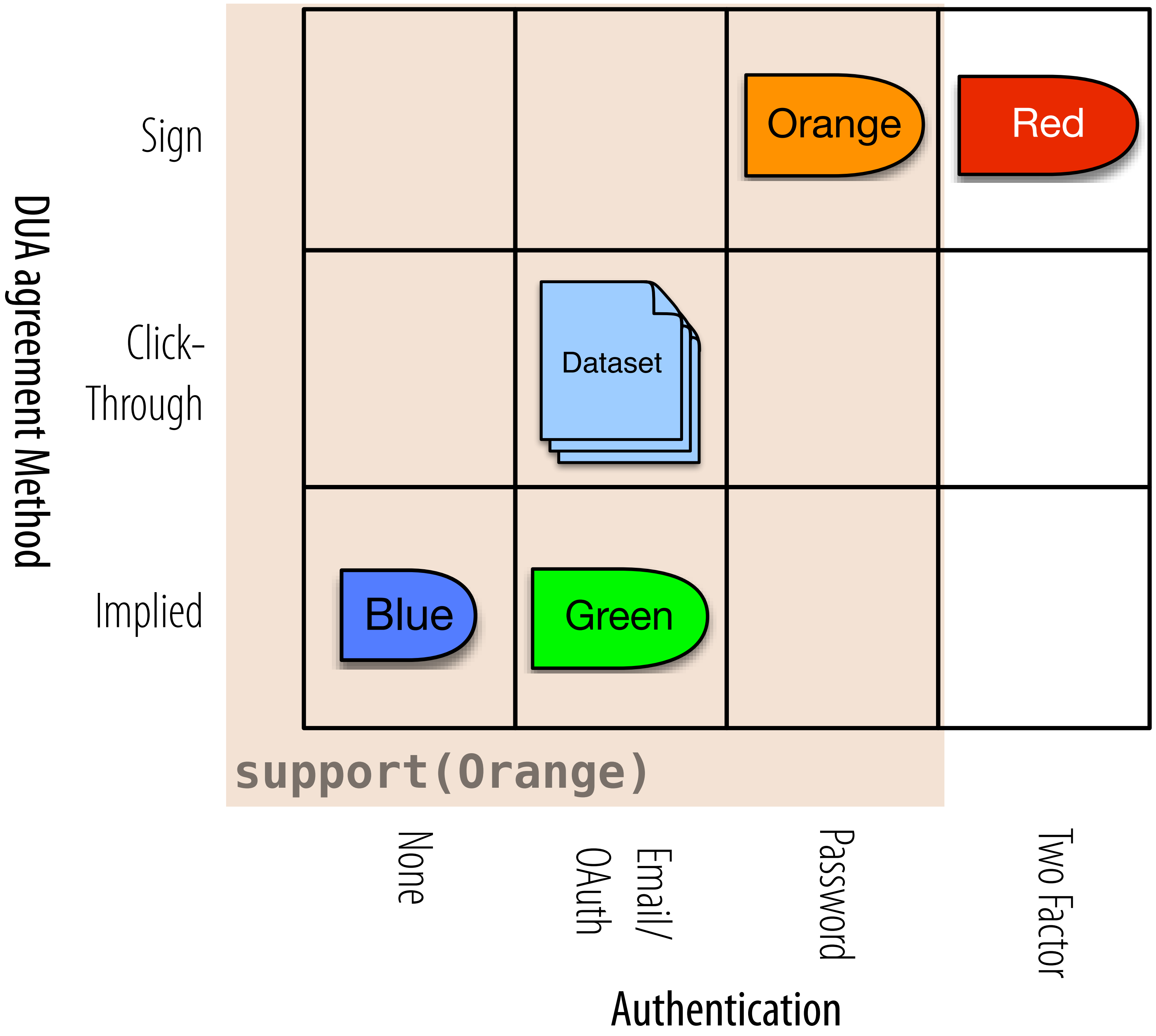
A Dataset and a Repository walk into a DHP space…



`compliance(Dataset)`

DUA agreement Method \ Authentication	None	Email/ OAuth	Password	Two Factor
Sign			Orange	Red
Click-Through		Dataset		
Implied	Blue	Green		

A Dataset and a Repository walk into a DHP space…

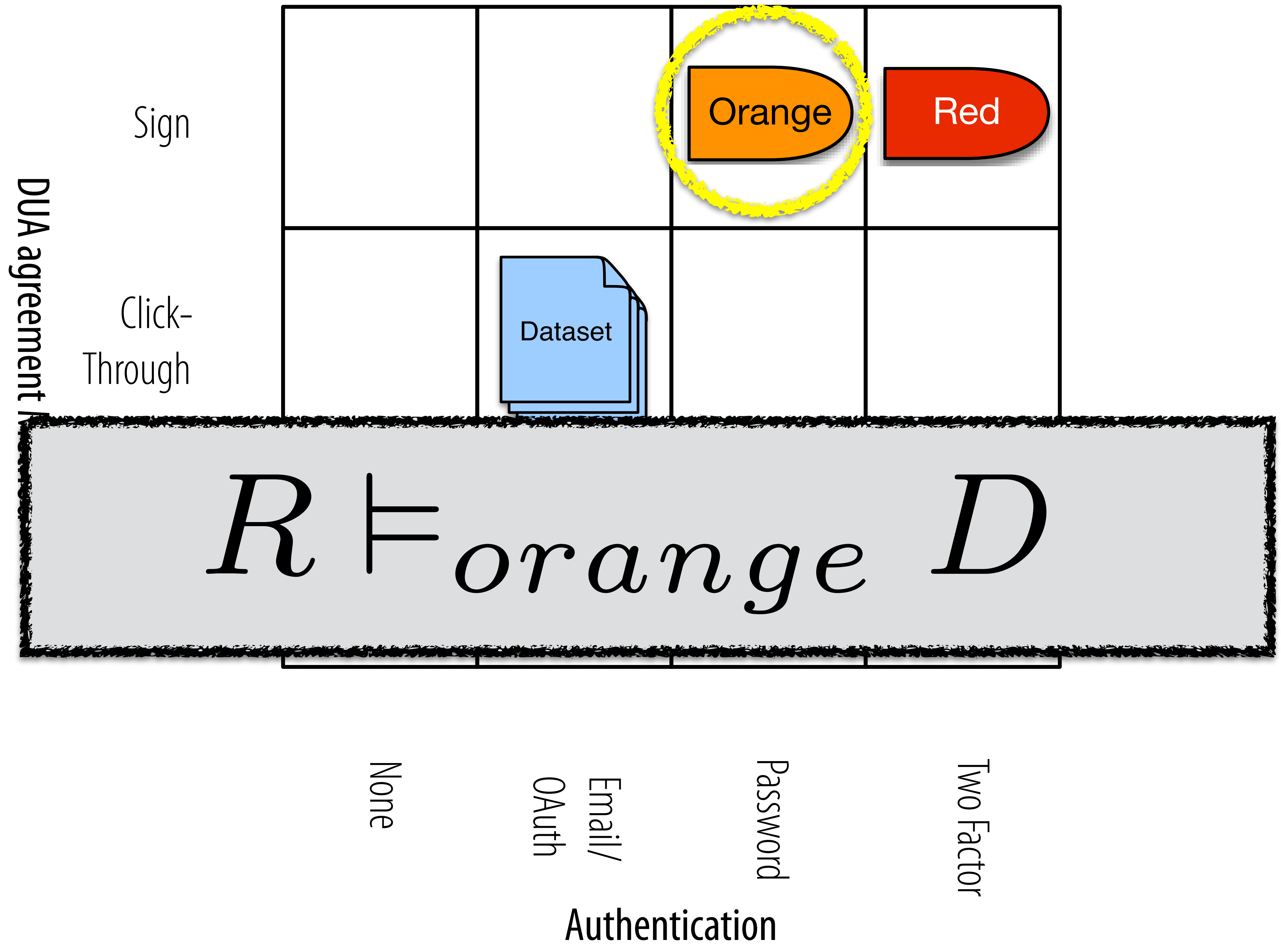


DUA agreement Method	None	Email/ OAuth	Password	Two Factor
Sign			Orange	Red
Click-Through		Dataset		
Implied	Blue	Green		

support(Orange)

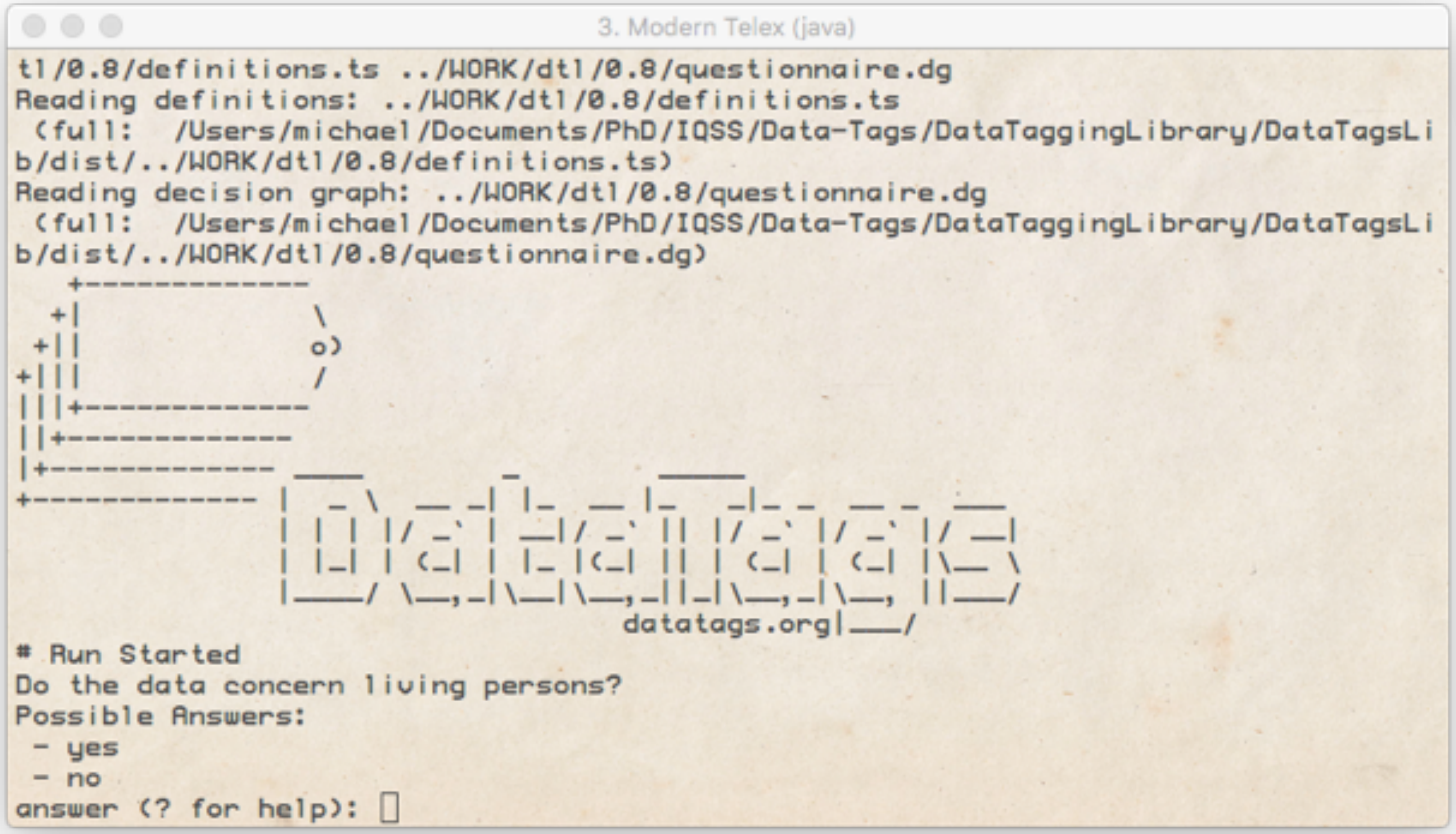
Authentication

A Dataset and a Repository walk into a DHP space…



$$R \vDash_{orange} D$$

DataTagsTools



```
tl/0.8/definitions.ts ../WORK/dtl/0.8/questionnaire.dg
Reading definitions: ../WORK/dtl/0.8/definitions.ts
 (full:  /Users/michael/Documents/PhD/IQSS/Data-Tags/DataTaggingLibrary/DataTagsLi
b/dist/../WORK/dtl/0.8/definitions.ts)
Reading decision graph: ../WORK/dtl/0.8/questionnaire.dg
 (full:  /Users/michael/Documents/PhD/IQSS/Data-Tags/DataTaggingLibrary/DataTagsLi
b/dist/../WORK/dtl/0.8/questionnaire.dg)
   +-------------
  +|             \
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+|||             /
|||+-------------
||+-------------
|+------------- ____        _        _____
+------------- |  _ \  __ _| |_ __ _|_   _|_ _  __ _ ___
               | | | |/ _` | __/ _` | | |/ _` |/ _` / __|
               | |_| | (_| | || (_| | | | (_| | (_| \__ \
               |____/ \__,_|\__\__,_| |_|\__,_|\__, |___/
                                   datatags.org|___/
# Run Started
Do the data concern living persons?
Possible Answers:
 - yes
 - no
answer (? for help): ▯
```
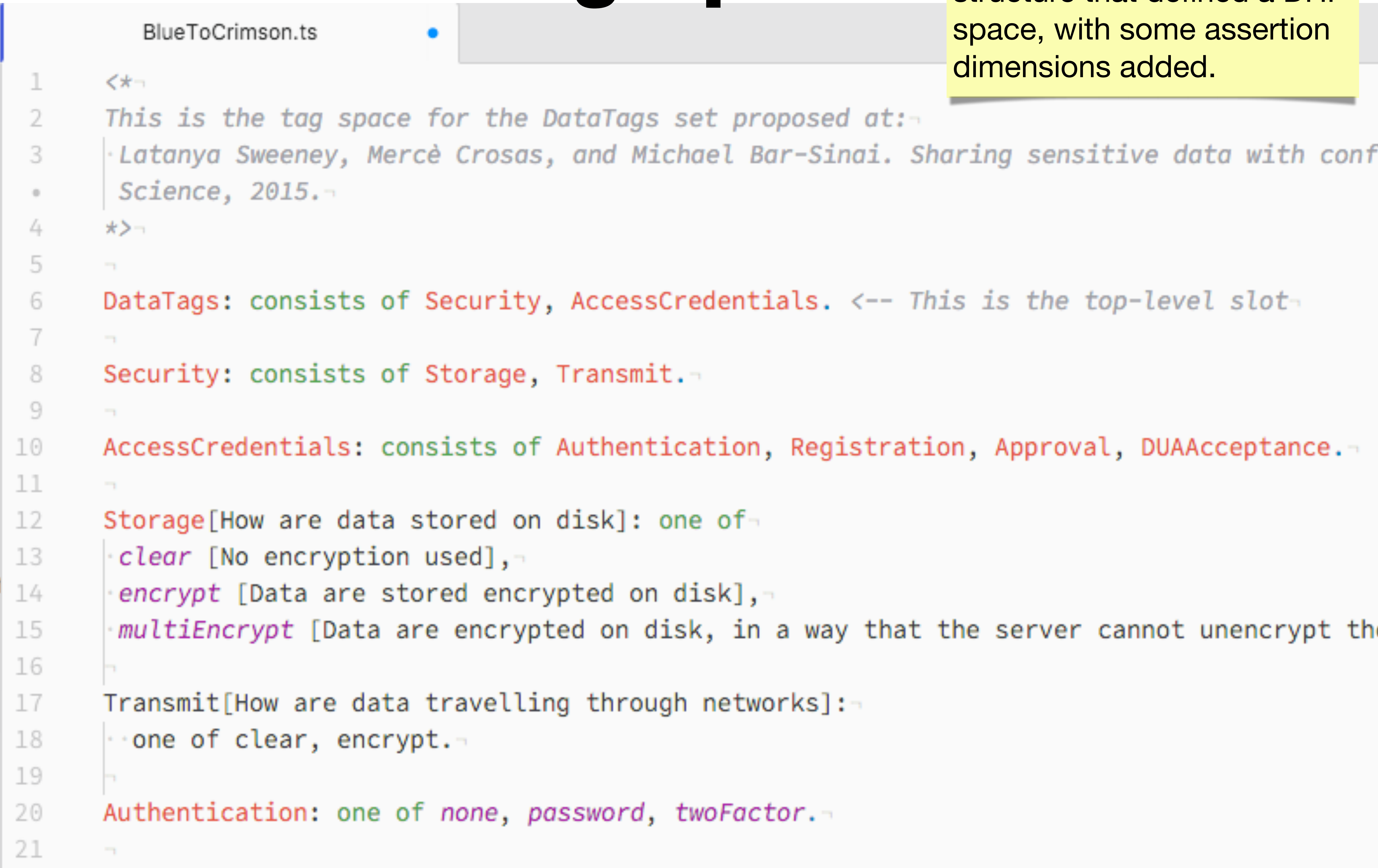

***Open source** on* GitHub

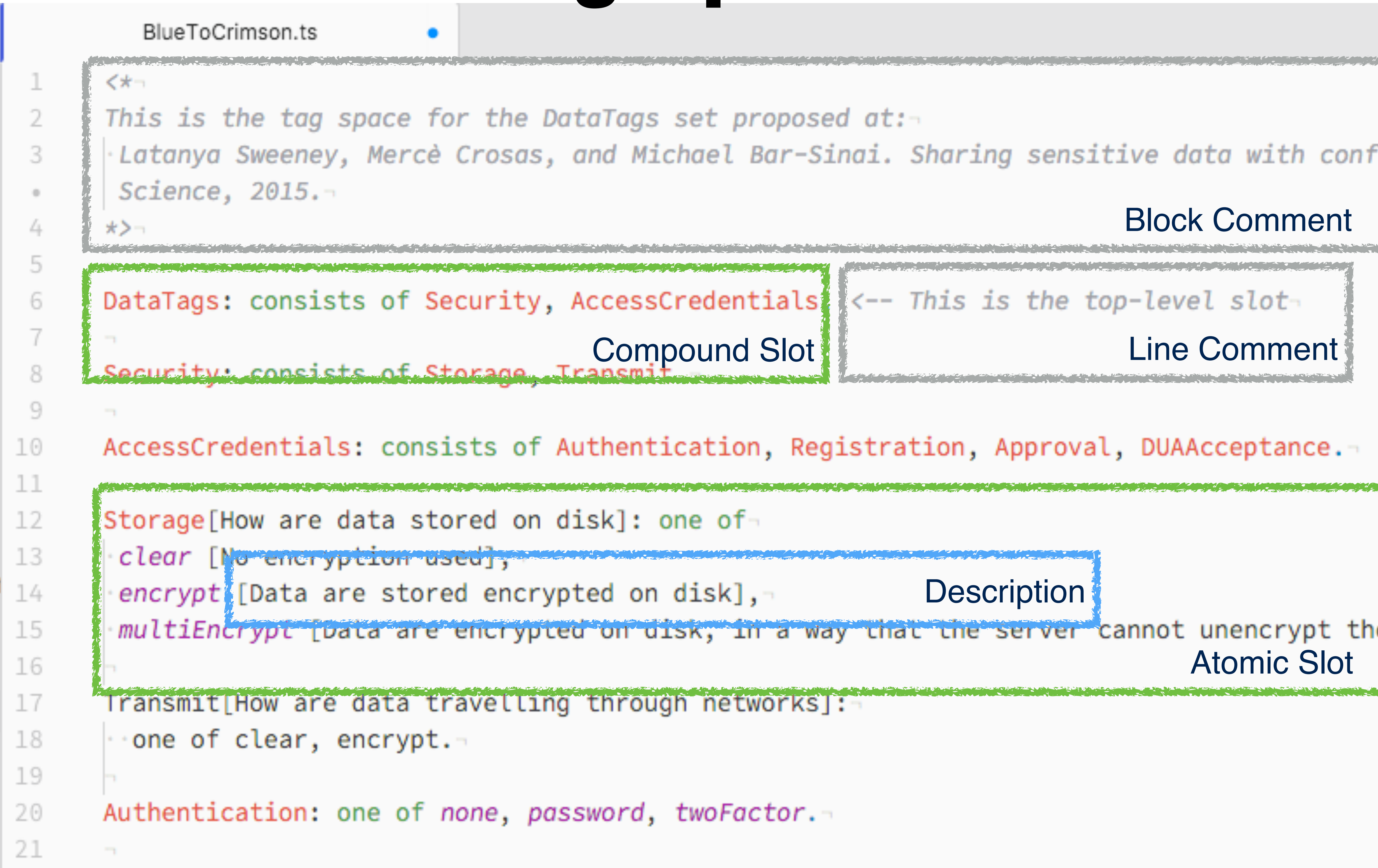
Tag Space

A tag space is a hierarchical structure that defined a DHP space, with some assertion dimensions added.



```
<*
This is the tag space for the DataTags set proposed at:
 Latanya Sweeney, Mercè Crosas, and Michael Bar-Sinai. Sharing sensitive data with conf
 Science, 2015.
*>

DataTags: consists of Security, AccessCredentials. <-- This is the top-level slot

Security: consists of Storage, Transmit.

AccessCredentials: consists of Authentication, Registration, Approval, DUAAcceptance.

Storage[How are data stored on disk]: one of
 clear [No encryption used],
 encrypt [Data are stored encrypted on disk],
 multiEncrypt [Data are encrypted on disk, in a way that the server cannot unencrypt th

Transmit[How are data travelling through networks]:
  one of clear, encrypt.

Authentication: one of none, password, twoFactor.

```

Tag Space



BlueToCrimson.ts

```
<*
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 Latanya Sweeney, Mercè Crosas, and Michael Bar-Sinai. Sharing sensitive data with conf
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Transmit[How are data travelling through networks]:
  one of clear, encrypt.

Authentication: one of none, password, twoFactor.

```

Block Comment

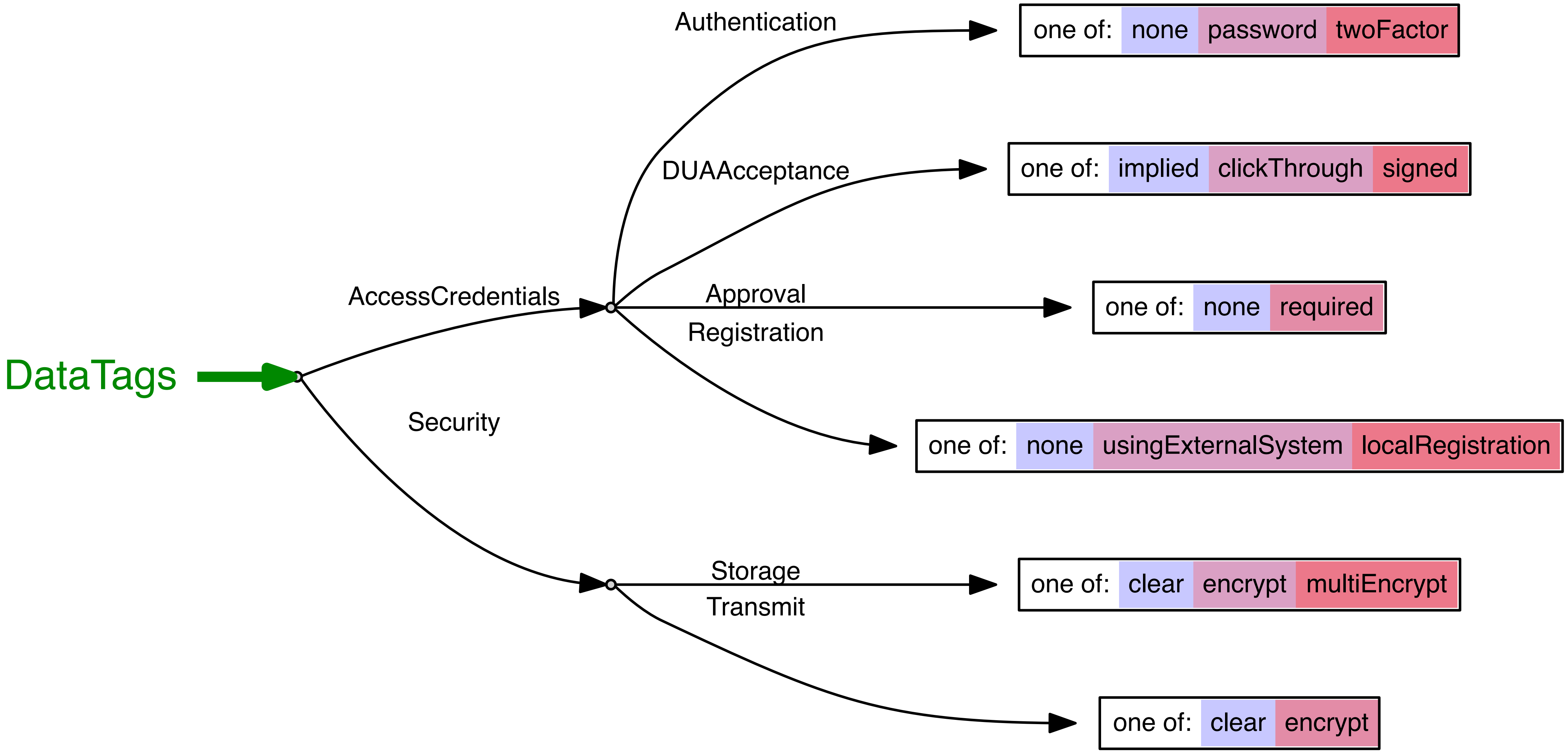
Compound Slot

Line Comment

Description

Atomic Slot

Tag-Space Visualized



DataTags

AccessCredentials

Authentication

one of: none password twoFactor

DUAAcceptance

one of: implied clickThrough signed

Approval

one of: none required

Registration

one of: none usingExternalSystem localRegistration

Security

Storage

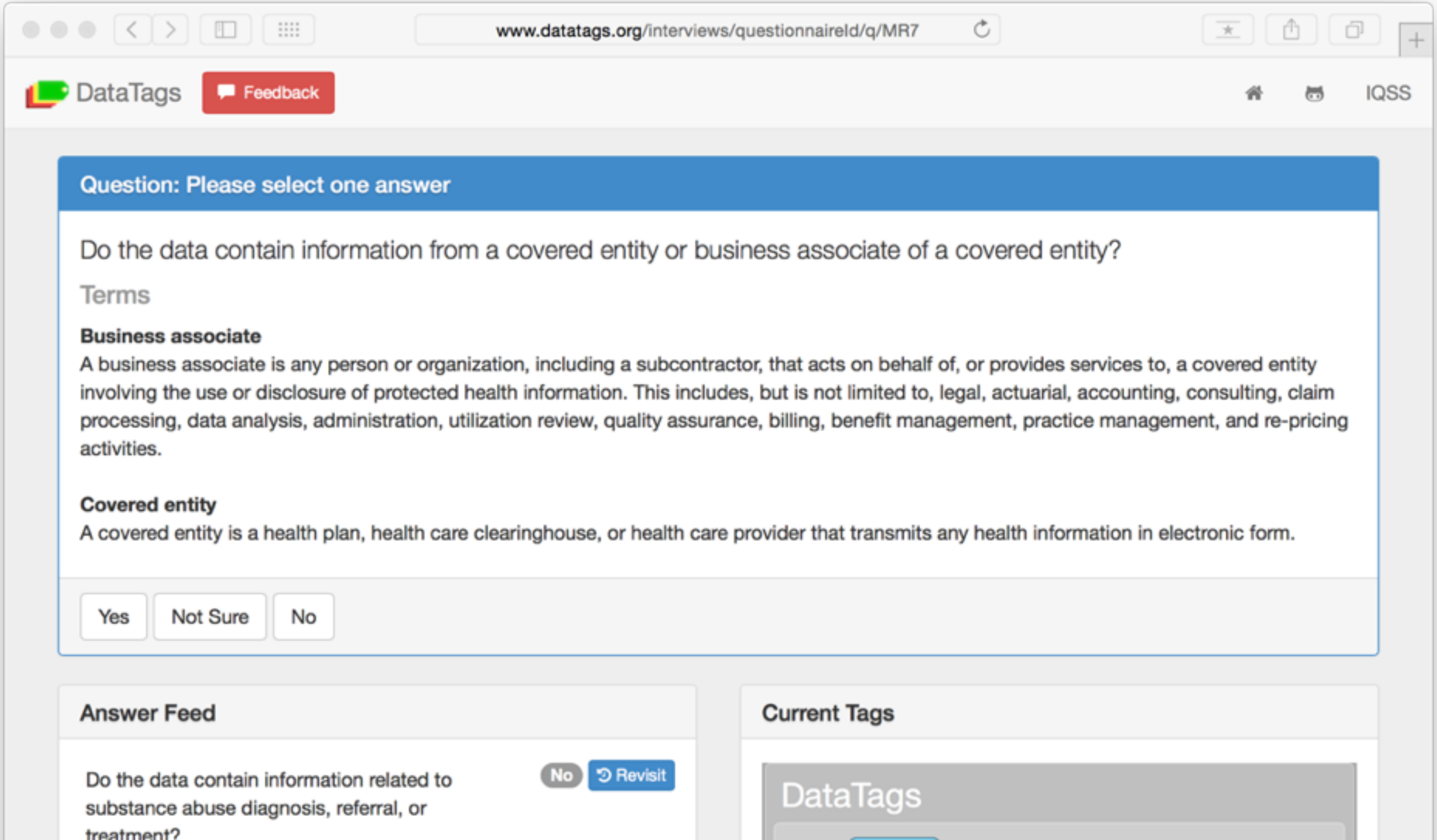
one of: clear encrypt multiEncrypt

Transmit

one of: clear encrypt

Visualization using CliRunner (on a later slide)
and Graphviz (www.graphviz.org).

Arriving at a DHP



Question: Please select one answer

Do the data contain information from a covered entity or business associate of a covered entity?

Terms

Business associate
A business associate is any person or organization, including a subcontractor, that acts on behalf of, or provides services to, a covered entity involving the use or disclosure of protected health information. This includes, but is not limited to, legal, actuarial, accounting, consulting, claim processing, data analysis, administration, utilization review, quality assurance, billing, benefit management, practice management, and re-pricing activities.

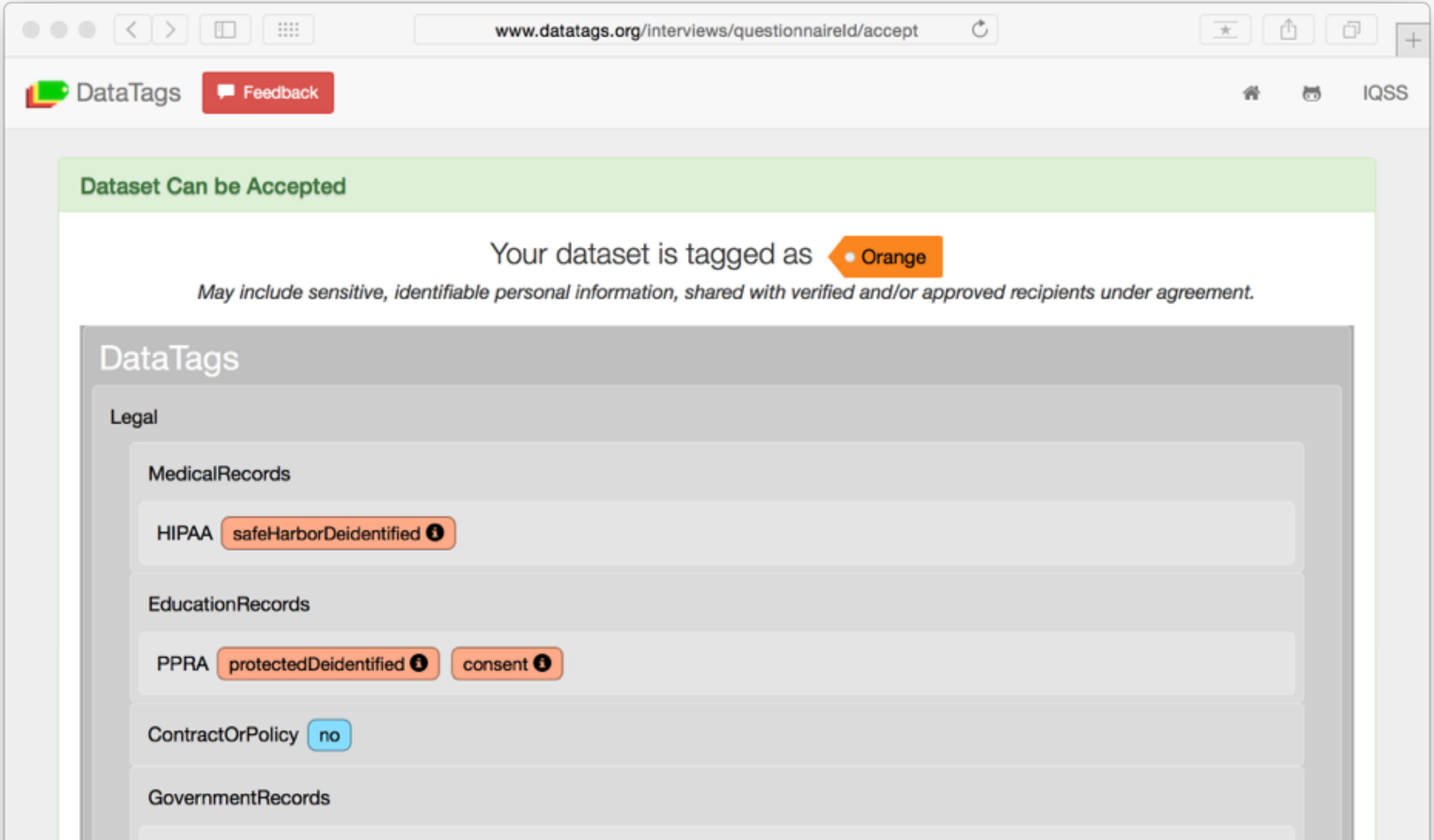
Covered entity
A covered entity is a health plan, health care clearinghouse, or health care provider that transmits any health information in electronic form.

Answer Feed

Do the data contain information related to substance abuse diagnosis, referral, or treatment? No

Current Tags

Arriving at a DHP



Dataset Can be Accepted

Your dataset is tagged as Orange

May include sensitive, identifiable personal information, shared with verified and/or approved recipients under agreement.

DataTags

Legal

MedicalRecords

HIPAA safeHarborDeidentified

EducationRecords

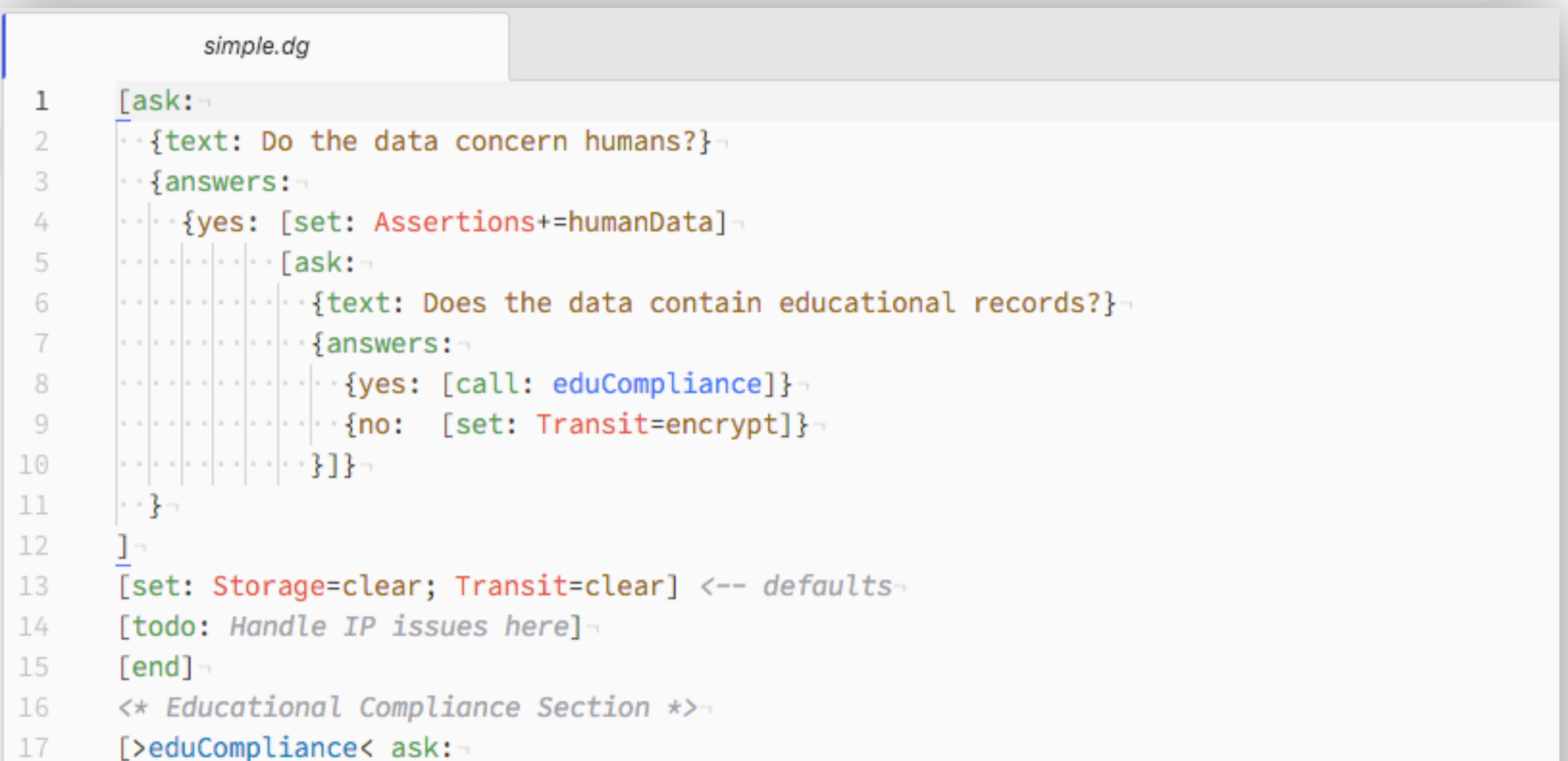
PPRA protectedDeidentified consent

ContractOrPolicy no

GovernmentRecords

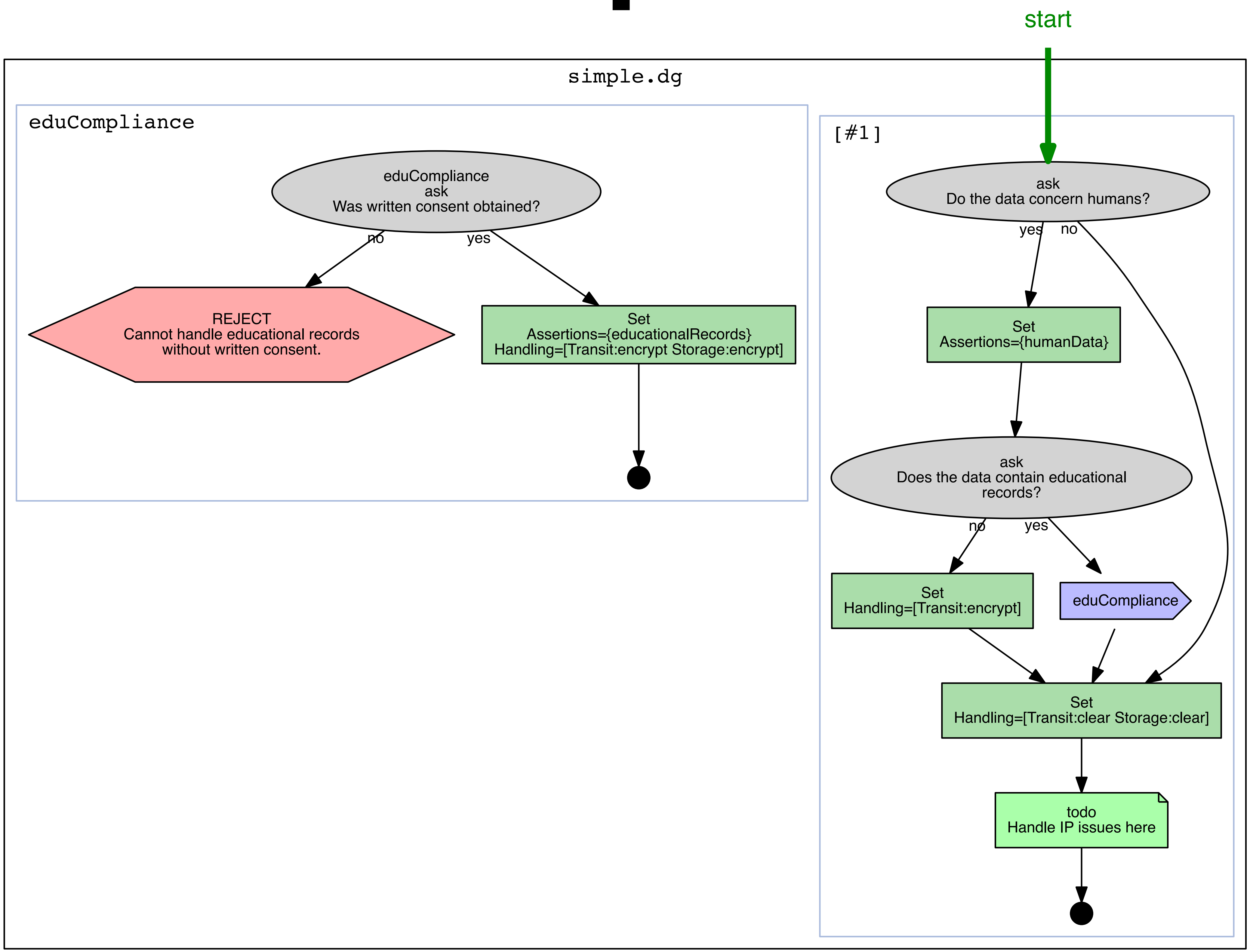
Tags Questionnaire

- “Interview with an expert” metaphor
- Consists of a tag space and a *decision graph*



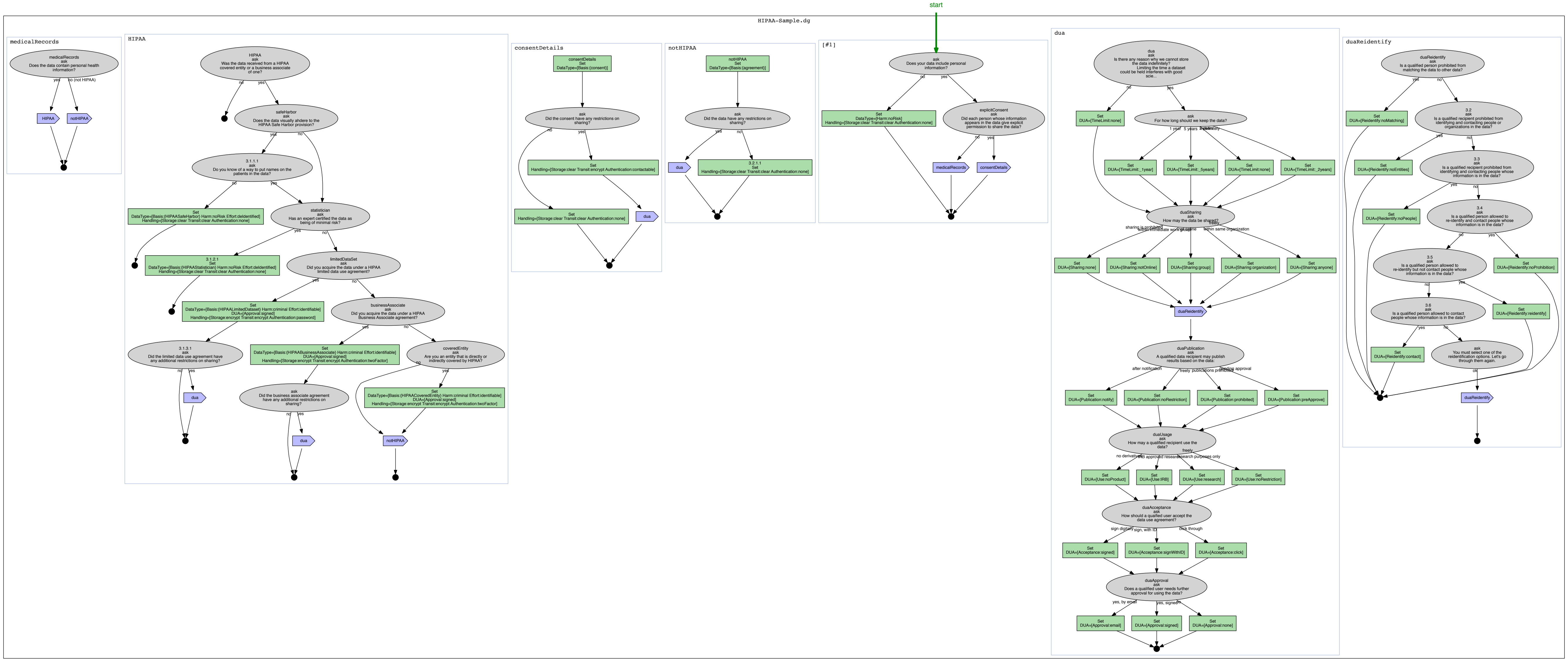
```
[ask:
  {text: Do the data concern humans?}
  {answers:
    {yes: [set: Assertions+=humanData]
          [ask:
            {text: Does the data contain educational records?}
            {answers:
              {yes: [call: eduCompliance]}
              {no:  [set: Transit=encrypt]}
            }]}
  }
]
[set: Storage=clear; Transit=clear] <-- defaults
[todo: Handle IP issues here]
[end]
<* Educational Compliance Section *>
[>eduCompliance< ask:
```

Decision Graph - Visualized



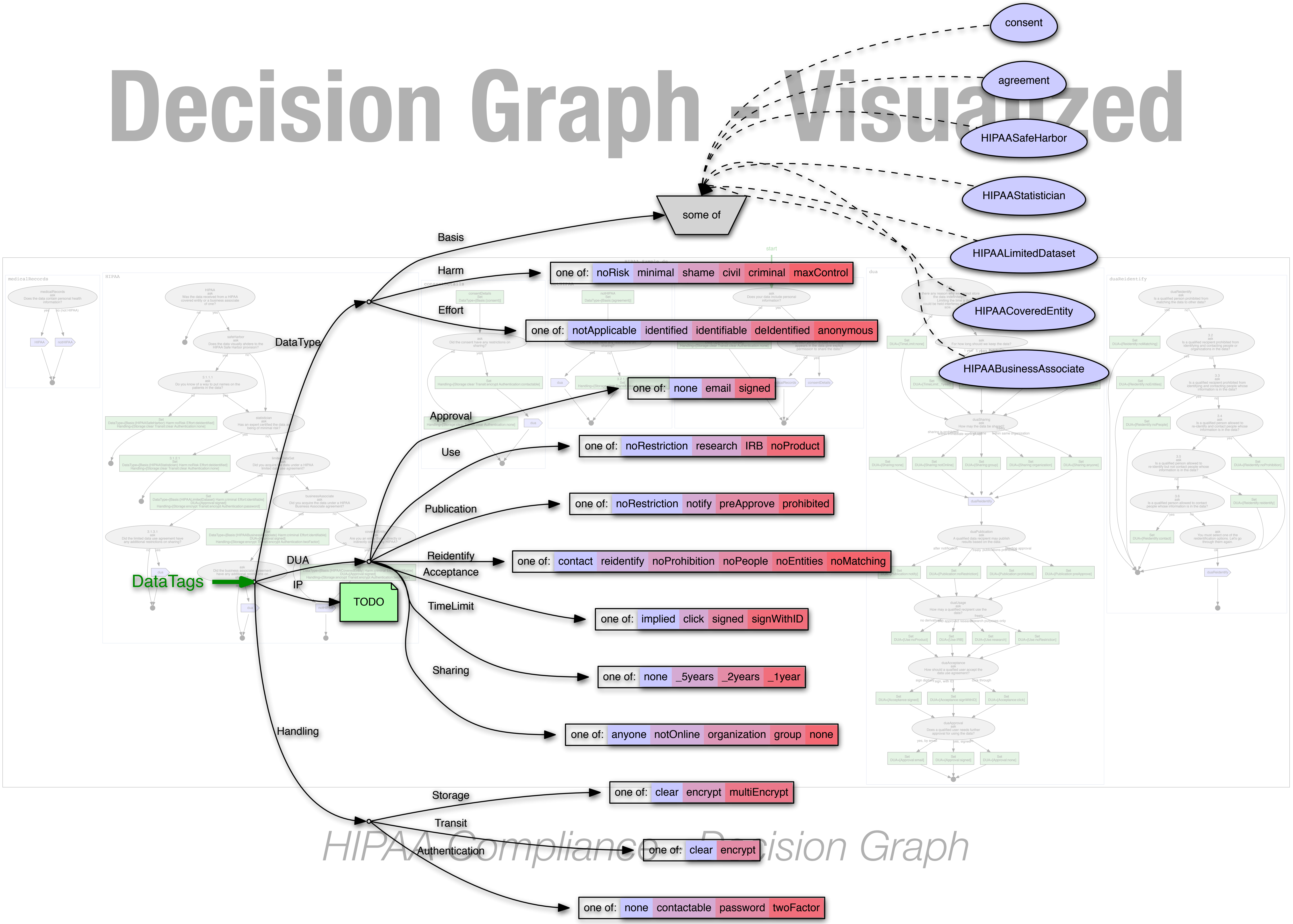
start
simple.dg
eduCompliance
eduCompliance
ask
Was written consent obtained?
no
yes
REJECT
Cannot handle educational records
without written consent.
Set
Assertions={educationalRecords}
Handling=[Transit:encrypt Storage:encrypt]
[#1]
ask
Do the data concern humans?
yes
no
Set
Assertions={humanData}
ask
Does the data contain educational
records?
no
yes
Set
Handling=[Transit:encrypt]
eduCompliance
Set
Handling=[Transit:clear Storage:clear]
todo
Handle IP issues here

Decision Graph - Visualized


start
HIPAA-Sample.dg
medicalRecords
medicalRecords
ask
Does the data contain personal health information?
yes
no (not HIPAA)
HIPAA
notHIPAA
HIPAA
HIPAA
ask
Was the data received from a HIPAA covered entity or a business associate of one?
no
yes
safeHarbor
ask
Does the data visually ahdere to the HIPAA Safe Harbor provision?
yes
no
3.1.1.1
ask
Do you know of a way to put names on the patients in the data?
no
yes
Set
DataType=[Basis:{HIPAASafeHarbor} Harm:noRisk Effort:deIdentified]
Handling=[Storage:clear Transit:clear Authentication:none]
statistician
ask
Has an expert certified the data as being of minimal risk?
yes
no
3.1.2.1
Set
DataType=[Basis:{HIPAAStatistician} Harm:noRisk Effort:deIdentified]
Handling=[Storage:clear Transit:clear Authentication:none]
limitedDataSet
ask
Did you acquire the data under a HIPAA limited data use agreement?
yes
no
Set
DataType=[Basis:{HIPAALimitedDataset} Harm:criminal Effort:identifiable]
DUA=[Approval:signed]
Handling=[Storage:encrypt Transit:encrypt Authentication:password]
businessAssociate
ask
Did you acquire the data under a HIPAA Business Associate agreement?
yes
no
3.1.3.1
ask
Did the limited data use agreement have any additional restrictions on sharing?
no
yes
dua
Set
DataType=[Basis:{HIPAABusinessAssociate} Harm:criminal Effort:identifiable]
DUA=[Approval:signed]
Handling=[Storage:encrypt Transit:encrypt Authentication:twoFactor]
coveredEntity
ask
Are you an entity that is directly or indirectly covered by HIPAA?
no
yes
ask
Did the business associate agreement have any additional restrictions on sharing?
no
yes
dua
Set
DataType=[Basis:{HIPAACoveredEntity} Harm:criminal Effort:identifiable]
DUA=[Approval:signed]
Handling=[Storage:encrypt Transit:encrypt Authentication:twoFactor]
notHIPAA
consentDetails
consentDetails
Set
DataType=[Basis:{consent}]
ask
Did the consent have any restrictions on sharing?
no
yes
Set
Handling=[Storage:clear Transit:encrypt Authentication:contactable]
Set
Handling=[Storage:clear Transit:clear Authentication:none]
dua
notHIPAA
notHIPAA
Set
DataType=[Basis:{agreement}]
ask
Did the data have any restrictions on sharing?
yes
no
dua
3.2.1.1
Set
Handling=[Storage:clear Transit:clear Authentication:none]
[#1]
ask
Does your data include personal information?
no
yes
Set
DataType=[Harm:noRisk]
Handling=[Storage:clear Transit:clear Authentication:none]
explicitConsent
ask
Did each person whose information appears in the data give explicit permission to share the data?
no
yes
medicalRecords
consentDetails
dua
dua
ask
Is there any reason why we cannot store the data indefinitely?
Limiting the time a dataset could be held interferes with good scie...
no
yes
Set
DUA=[TimeLimit:none]
ask
For how long should we keep the data?
1 year
5 years
2 years
indefinitely
Set
DUA=[TimeLimit:_1year]
Set
DUA=[TimeLimit:_5years]
Set
DUA=[TimeLimit:none]
Set
DUA=[TimeLimit:_2years]
duaSharing
ask
How may the data be shared?
sharing is prohibited
within immediate work group
not online
freely
within same organization
Set
DUA=[Sharing:none]
Set
DUA=[Sharing:notOnline]
Set
DUA=[Sharing:group]
Set
DUA=[Sharing:organization]
Set
DUA=[Sharing:anyone]
duaReidentify
duaPublication
ask
A qualified data recipient may publish results based on the data:
after notification
freely
publications prohibited
pending approval
Set
DUA=[Publication:notify]
Set
DUA=[Publication:noRestriction]
Set
DUA=[Publication:prohibited]
Set
DUA=[Publication:preApprove]
duaUsage
ask
How may a qualified recipient use the data?
no derivatives
IRB approved research
freely
research purposes only
Set
DUA=[Use:noProduct]
Set
DUA=[Use:IRB]
Set
DUA=[Use:research]
Set
DUA=[Use:noRestriction]
duaAcceptance
ask
How should a quaified user accept the data use agreement?
sign digitally
sign, with ID
click through
Set
DUA=[Acceptance:signed]
Set
DUA=[Acceptance:signWithID]
Set
DUA=[Acceptance:click]
duaApproval
ask
Does a qualified user needs further approval for using the data?
yes, by email
yes, signed
no
Set
DUA=[Approval:email]
Set
DUA=[Approval:signed]
Set
DUA=[Approval:none]
duaReidentify
duaReidentify
ask
Is a qualified person prohibited from matching the data to other data?
yes
no
Set
DUA=[Reidentify:noMatching]
3.2
ask
Is a qualified recipient prohibited from identifying and contacting people or organizations in the data?
yes
no
Set
DUA=[Reidentify:noEntities]
3.3
ask
Is a qualified recipient prohibited from identifying and contacting people whose information is in the data?
yes
no
Set
DUA=[Reidentify:noPeople]
3.4
ask
Is a qualified person allowed to re-identify and contact people whose information is in the data?
no
yes
3.5
ask
Is a qualified person allowed to re-identify but not contact people whose information is in the data?
no
yes
Set
DUA=[Reidentify:noProhibition]
3.6
ask
Is a qualified person allowed to contact people whose information is in the data?
yes
no
Set
DUA=[Reidentify:reidentify]
Set
DUA=[Reidentify:contact]
ask
You must select one of the reidentification options. Let's go through them again.
ok
duaReidentify

HIPAA Compliance - Decision Graph

Decision Graph - Visualized



consent

agreement

HIPAASafeHarbor

HIPAAStatistician

HIPAALimitedDataset

HIPAACoveredEntity

HIPAABusinessAssociate

some of

Basis

Harm

one of: noRisk minimal shame civil criminal maxControl

Effort

one of: notApplicable identified identifiable deIdentified anonymous

DataType

one of: none email signed

Approval

Use

one of: noRestriction research IRB noProduct

Publication

one of: noRestriction notify preApprove prohibited

Reidentify

DUA

one of: contact reidentify noProhibition noPeople noEntities noMatching

Acceptance

DataTags

IP

TODO

TimeLimit

one of: implied click signed signWithID

Sharing

one of: none _5years _2years _1year

Handling

one of: anyone notOnline organization group none

Storage

one of: clear encrypt multiEncrypt

Transit

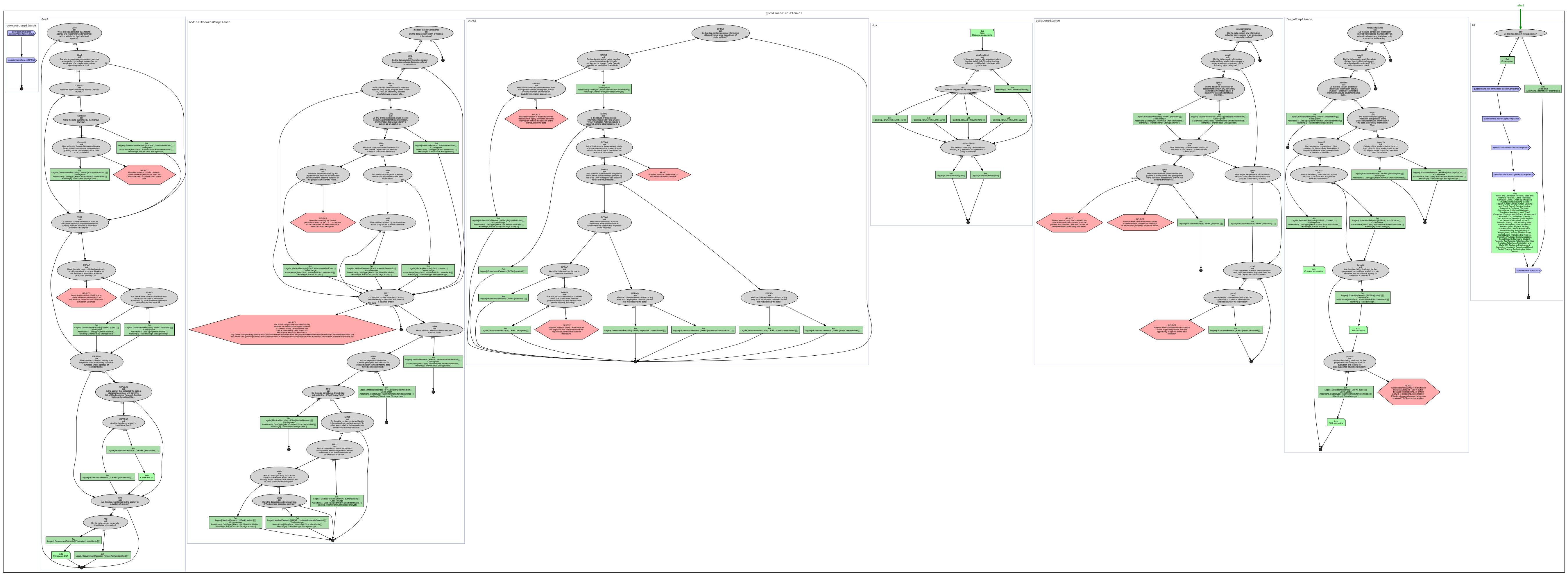
one of: clear encrypt

Authentication

one of: none contactable password twoFactor

HIPAA Compliance - Decision Graph

Arriving at a DHP

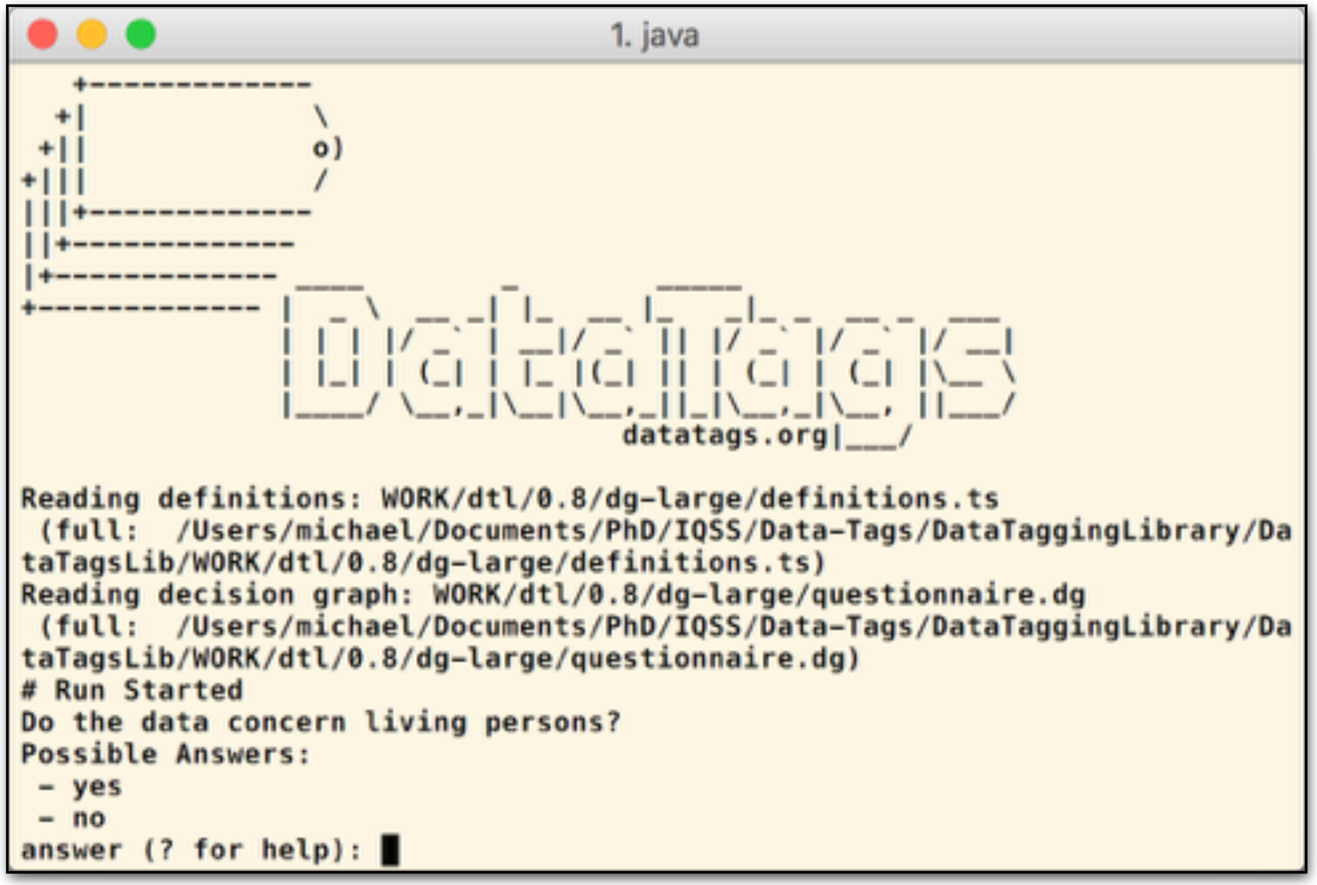


HIPAA, C.F.R Part 2, FERPA, PPRA,
Education Science Report Act (2002), Privacy Act (1974),
CIPSEA, Title 13, DPPA

PoC - not vetted for real world use

CliRunner

- Questionnaire Development Console
- Run, debug, visualize
- Query:
  e.g. *what answer sequences result in encryption=clear, harm=severe?*



```
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+-------------   |  _ \  __ _| |_ __ _|_   _|_ _  __ _ ___
                 | | | |/ _` | __/ _` | | |/ _` |/ _` / __|
                 | |_| | (_| | || (_| | | | (_| | (_| \__ \
                 |____/ \__,_|\__\__,_| |_|\__,_|\__, |___/
                                      datatags.org|___/

Reading definitions: WORK/dtl/0.8/dg-large/definitions.ts
 (full:  /Users/michael/Documents/PhD/IQSS/Data-Tags/DataTaggingLibrary/Da
taTagsLib/WORK/dtl/0.8/dg-large/definitions.ts)
Reading decision graph: WORK/dtl/0.8/dg-large/questionnaire.dg
 (full:  /Users/michael/Documents/PhD/IQSS/Data-Tags/DataTaggingLibrary/Da
taTagsLib/WORK/dtl/0.8/dg-large/questionnaire.dg)
# Run Started
Do the data concern living persons?
Possible Answers:
 - yes
 - no
answer (? for help): █
```

Privacy Tools for Sharing Research Data
A National Science Foundation Secure and Trustworthy Cyberspace Project

Ben-Gurion University of the Negev

NSF

DATA PRIVACY LAB

The Institute *for* Quantitative Social Science at Harvard University

This work was funded by grant CNS-1237235 from the National Science Foundation.

```
[set: Thank+=you]
[end]
```

I 🏷 Data

http://datatags.org

http://datascience.iq.harvard.edu/about-datatags