

30 March 2023

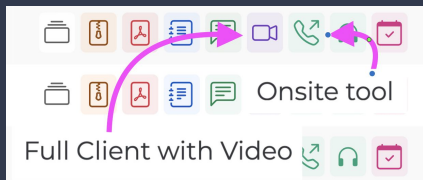
IETF 116 RASP RG

This session is being recorded

IETF 116 Yokohama
hosted by

WIDE
PROJECT

This session is being recorded



IETF 116 Meeting Tips

In-person participants

- Make sure to sign into the session using the Meetecho (usually the “Meetecho lite” client) from the Datatracker agenda
- Use Meetecho to join the mic queue
- *Keep audio and video off if not using the onsite version*
- **Wear masks unless actively speaking at the microphone.**

Remote participants

- Make sure your audio and video are off unless you are chairing or presenting during a session
- Use of a headset is strongly recommended

Note Well – Intellectual Property



- **The IRTF follows the IETF Intellectual Property Rights (IPR) disclosure rules**
- By participating in the IRTF, you agree to follow IRTF processes and policies:
 - If you are aware that any IRTF contribution is covered by patents or patent applications that are owned or controlled by you or your sponsor, you must disclose that fact, or not participate in the discussion
 - The IRTF expects that you file such IPR disclosures in a timely manner – in a period measured in days or weeks, not months
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Research and Analysis of Standard-Setting Processes Proposed Research Group

RASP RG - IETF116

A dark blue diagonal gradient bar that starts from the bottom left corner and extends towards the top right corner, covering the lower half of the slide.

Agenda



- **Welcome, Introduction & Agenda Bashing**
- RASP TALK #1:
Corinne Cath - *The Hard Work of the Hum: using ethnography to study power and politics in the IETF* (15 mins)
- Presentations:
 - a. Stephen McQuistin - *Data-driven Reviewer Recommendations* (10 mins)
 - b. Sebastian Benthall - *The Expanding Universe of BigBang* (10 mins)
 - c. Priyanka Sinha - *Some Research and Methodologies from IETF Data* (10 mins)
 - d. 'Effy' Xue Li - *Large Language Models in Standards Discourse Analysis* (10 mins)
- RASP RG going forward (15 mins)

Welcome to our first session!

Let's get ready to RASP!



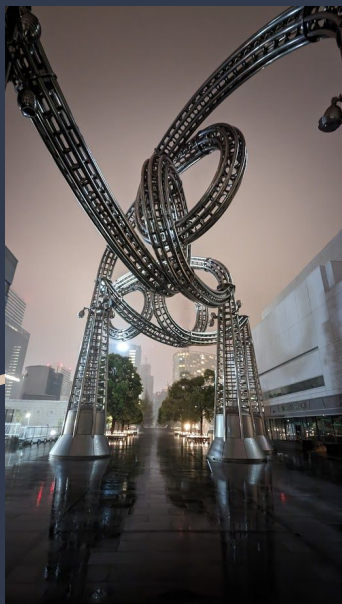
Image depicting traditional rasps from:
<https://artofmaking.ac.uk/explore/tools/3/Rasp>

Objective of RASPRG



The Research and Analysis of the Standard-Setting Processes Research Group (RASPRG) aims to **bring together researchers, practitioners, policy makers, standards users, and standards developers to study standardization processes across SDOs**, with a particular focus on Internet standard-setting in the [IETF](#). The research is aimed at **informing the comprehension of standardization processes and policies**, and possibly **providing tools and insights**. This will be done through the organization of working sessions, as well as contributions to open data and open source software for standard-setting analysis. The group aims to produce joint reports to inform the [IETF](#), the research community, and the broader standards-setting community. Other SDOs typically make much less data publicly available than the [IETF](#), but where data is available, comparative analyses may be undertaken. While comparisons to the [IETF](#) process are in scope, sole analysis of other SDOs are out of scope.

Possible research directions of RASP RG



- **Demographics of standard-setting:**
 - Historical development of **affiliation and leadership**.
 - Make up of **standard setting communities**, their diversity, and the impact it has on standard-setting.
- **Decision making processes** and how they lead to the production of standards.
- **Patents and standards** and the incentives for enterprises to develop these.
- **Standards and research communities.**

Potential outputs of the RG

- Open-source tools
- Hackathon participation
- Methods
- Labeled data sets
- Workshops
- Evidence-based reproducible work



Non-objectives of the Proposed RG

- Hierarchical comparisons between SDOs
- Directly influence IETF operations



Concrete asks



Share your

- code
- analysis/findings
- research questions: we might be able to answer them!
- suggestions for
 - interesting presenters
 - research methods

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The Hard Work of the Hum: Using ethnography to study power & politics in the IETF



Dr. Corinne Cath

Minderoo Centre @ Cambridge
Critical Infra Lab @ Amsterdam Uni

Agenda

IETF 116 Yokohama, 2023
RASP Meeting 1, Talk 1

Introduction

Ethnography

Case Study

Next steps & Q&A

Introduction

Hello World:

Anthropologist of Internet Governance

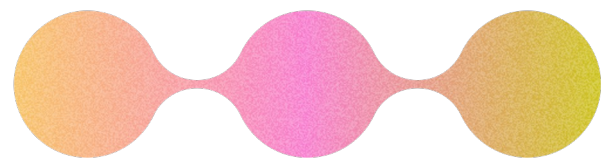
Minderoo Centre for Tech & Democracy @ University of Cambridge

Critical Infrastructure Lab @ University of Amsterdam

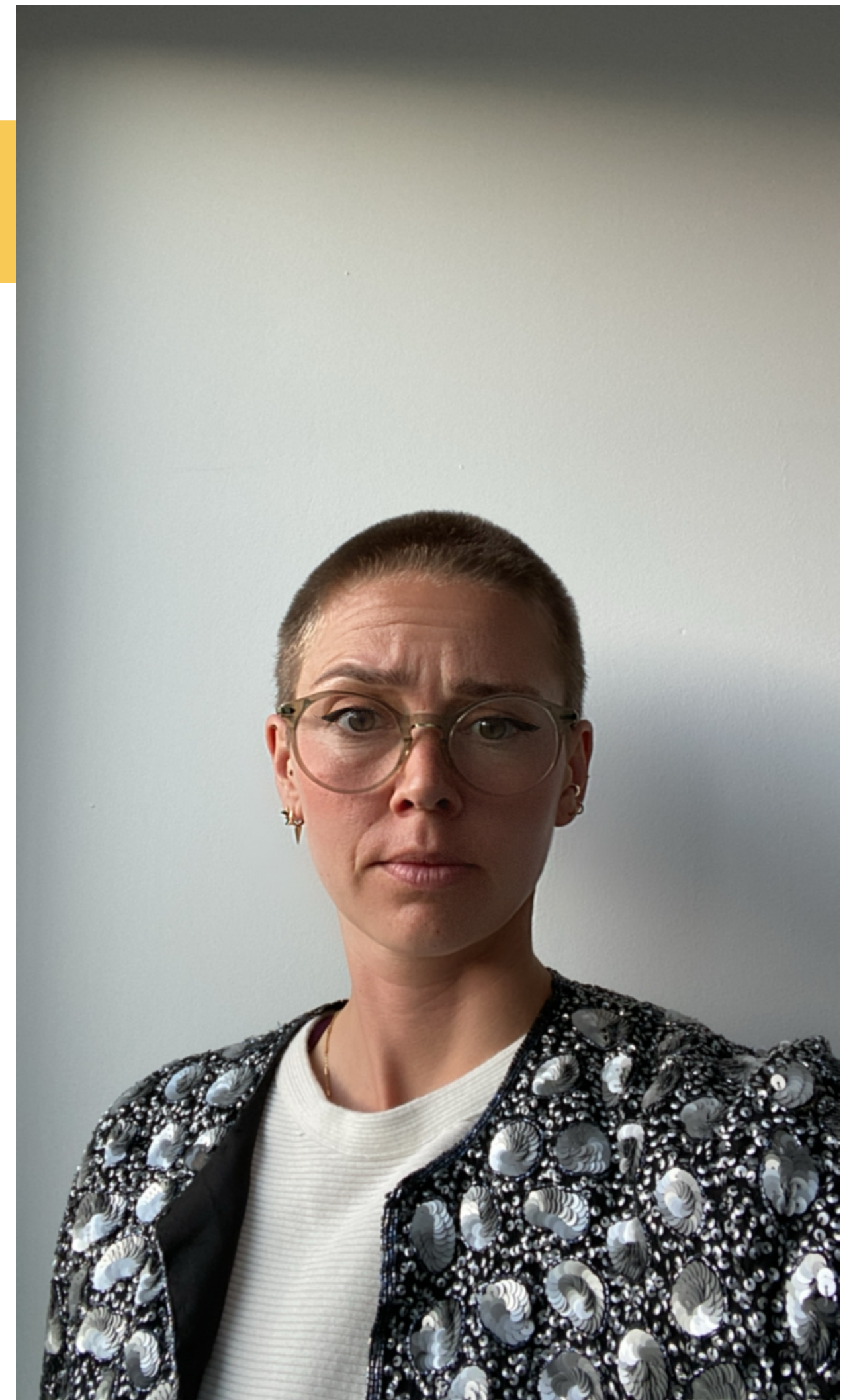
E: cc2162@cam.ac.uk

T: C__CS

W: corinnecath.com



This work was generously supported by the Ford Foundation
[grant number 136179, 2020]





Changing Minds and Machines:

A Case Study of Human Rights Advocacy in the Internet Engineering Task Force (IETF)



Ph.D. about the IETF @ Oxford
Participating since 2015

Putting IETF culture into critical
view – how standardization work
in practice.

Found some discrepancies, that
matter.

<https://corinnecath.com/wp-content/uploads/2021/09/CathCorinne-Thesis-DphilInformationCommunicationSocialSciences.pdf>



How suitable is the IETF to
civil society participation?



IETF Holy Cows

Openness, not closed governance

Individual participation, not
org affiliation

Best technical solution,
not political or economic

Humming, not voting

Ph.D. research

Right?



Wrong.....



Wrong.....

Wrong.....

Wrong.....

Wrong.....

Wrong.....





Cultural Dynamics	Exclusionary Effects
1. Denial of politics in technical discussions	Empowers corporations, disempowers civil society
2. Procedural openness as a distraction	Delegitimizes civil society critique of industry influence
3. Reliance on informal networking	Marginalizes minority voices through exclusion from social circles
4. Abrasive working practices	Enables sexism and racism to persist, hindering civil society

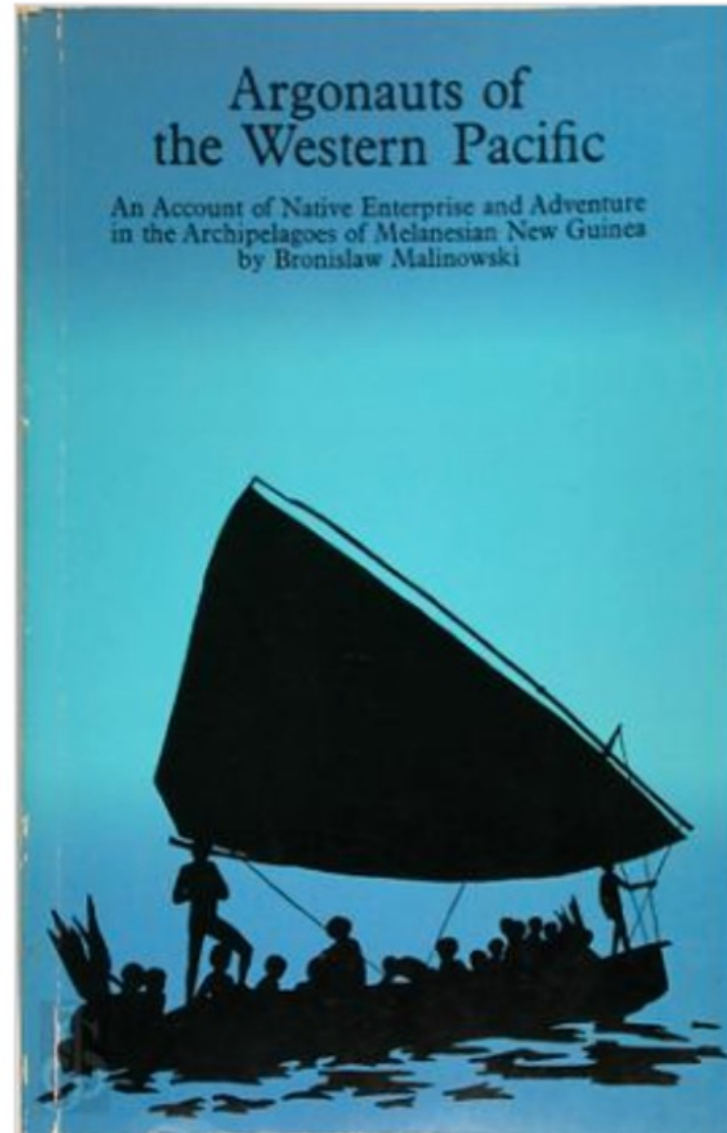




An IETF anthropologist

Am I lost?

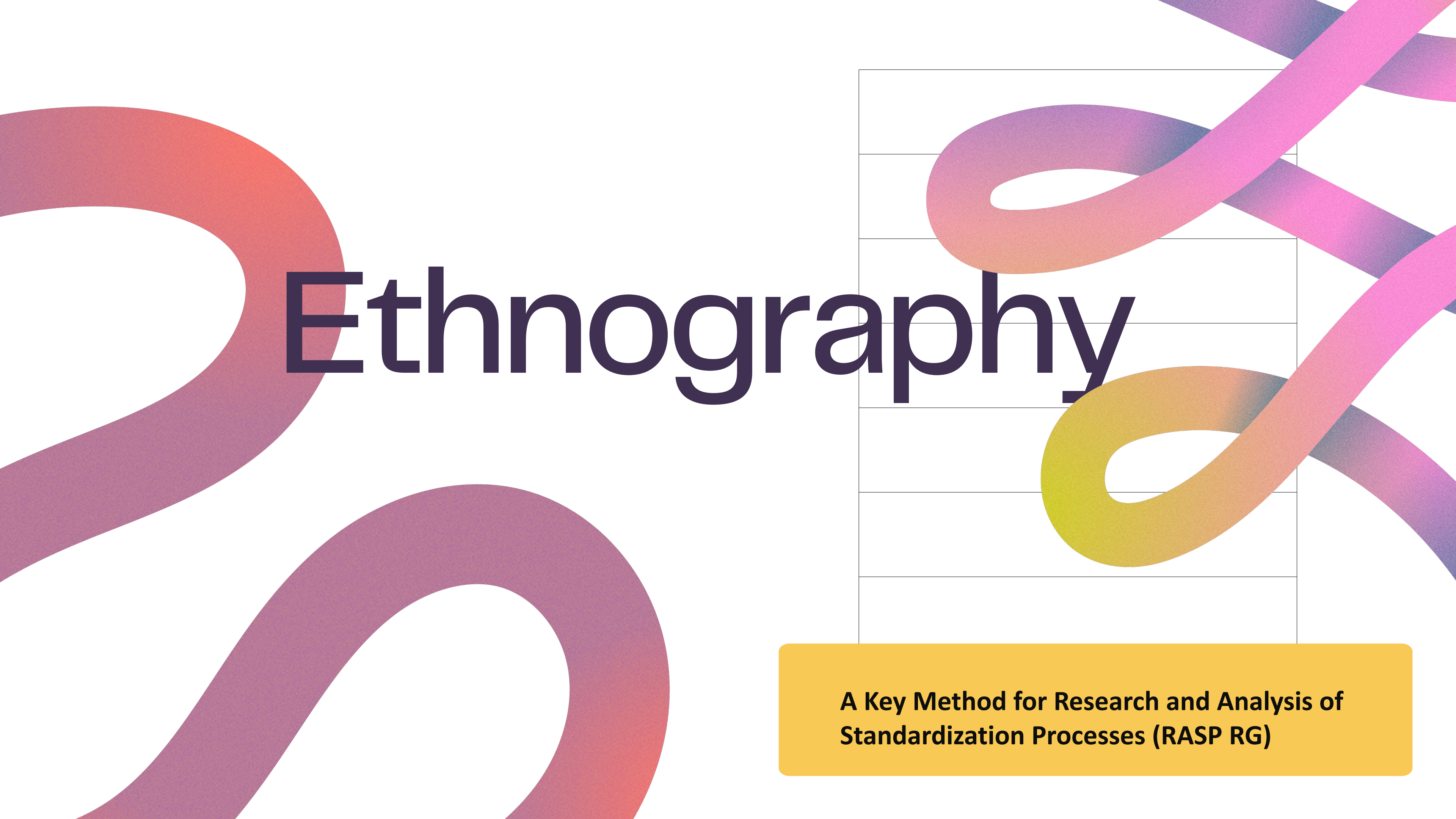




ABOUT US

Anthropologists are everywhere, we study "up" (i.e. powerful people) and "at home" (i.e. our own societies).



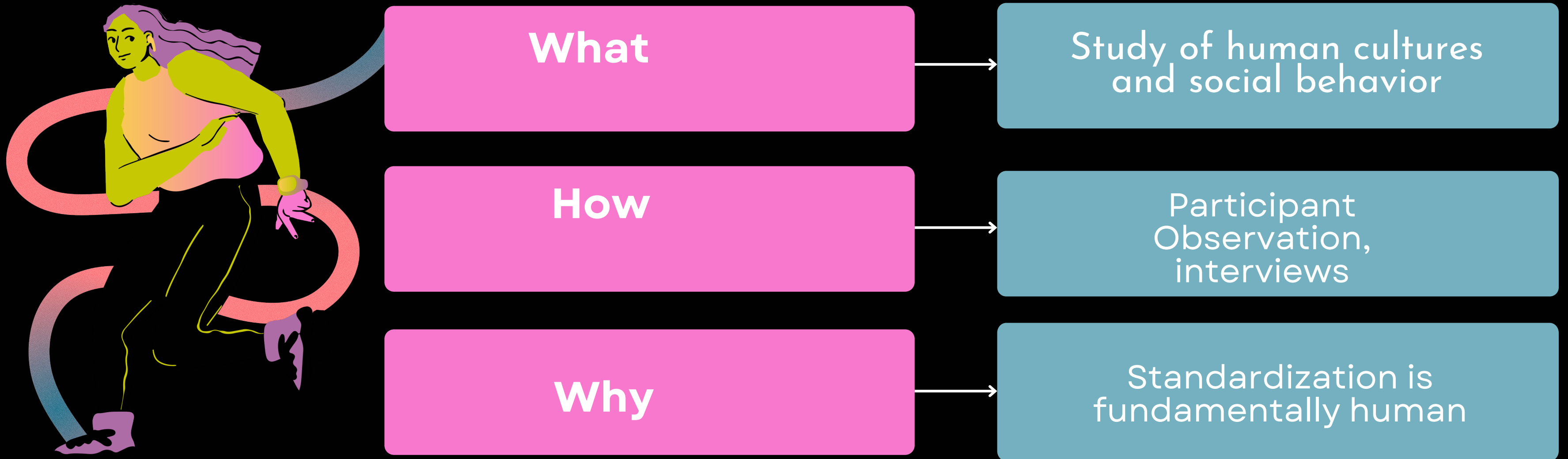
The background features several thick, wavy, overlapping lines in shades of purple, pink, and orange. On the right side, there is a light gray grid with 6 columns and 8 rows. The word 'Ethnography' is written in a large, dark blue, sans-serif font, centered horizontally and partially overlapping the grid.

Ethnography

**A Key Method for Research and Analysis of
Standardization Processes (RASP RG)**

What We Want To Study

The cultural conditions that shape society



Case Study: Hard Work of the Hummm



The hum

As a relevant social ritual

What does it do?

What is the purpose of the hum?

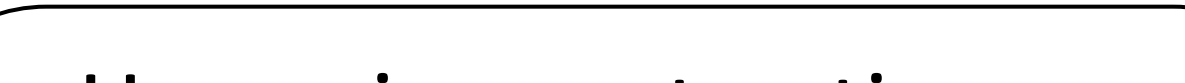


What people say
vs what they do

Who and what the hum protects

HMMMMMMMMMM

Humming, not voting



Humming, not voting

HMMMM on paper

The relative privacy of collective resonance

The hum

Another aspect of Working Groups that confounds many people is the fact that there is no formal voting. The general rule on disputed topics is that the Working Group has to come to "rough consensus," meaning that a very large majority of those who care must agree, and that those in the minority have had a chance to explain why. Generally consensus is determined by *humming*: if you agree with a proposal, you hum when prompted by the chair. Most hum questions come in three parts: you hum to the first part if you agree with the proposal, to the second part if you disagree, or to the third part if you do not have enough information to make up your mind. Newcomers find it quite peculiar, but it works. It is up to the chair to decide when the Working Group has reached rough consensus; sometimes the responsible AD will also do so.

What does it do?

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Minimum:

Affiliation matters.

HMMM in fieldwork

What does it do?

Prevent majority rule, with
some caveats?

<https://www.rfc-editor.org/info/rfc7282>

Or something else?

Ethnographic scrutiny of the hum

Hum-outcomes rarely a surprise

Not used as often (anymore)

Consensus often clear in advance

Doesn't work well in hybrid context

Does not prevent majority rule but..

Obfuscates power dynamics



HMMMM in interviews

‘It avoids the legal scrutiny in participation, it is just a bunch of engineers talking.’



Theorizing the HMMM

The hum

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What does it do?

When we put the hum in the IETF's power dynamics.

Paradoxically, the IETF's narrative of individual participation and the hum persists because its most powerful (industry) participants benefit from it.

HMMM ethnography

An abstract graphic consisting of three thick, interlocking loops. The loops are colored in a gradient of green and yellow, with some areas appearing more saturated than others. They are arranged in a way that suggests movement and connection, with one loop at the top right, another in the middle left, and a third at the bottom left.

Thank you!

Rasp & Grasp Standardization Processes

Next steps & Q&A



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Data-driven Reviewer Recommendations

Stephen McQuistin University of Glasgow

Research and Analysis of Standard-Setting Processes Proposed Research Group — IETF 116

 sodestream.github.io



This work is funded by the UK Engineering and Physical Sciences Research Council, under grants EP/S033564/1 and EP/S036075/1.

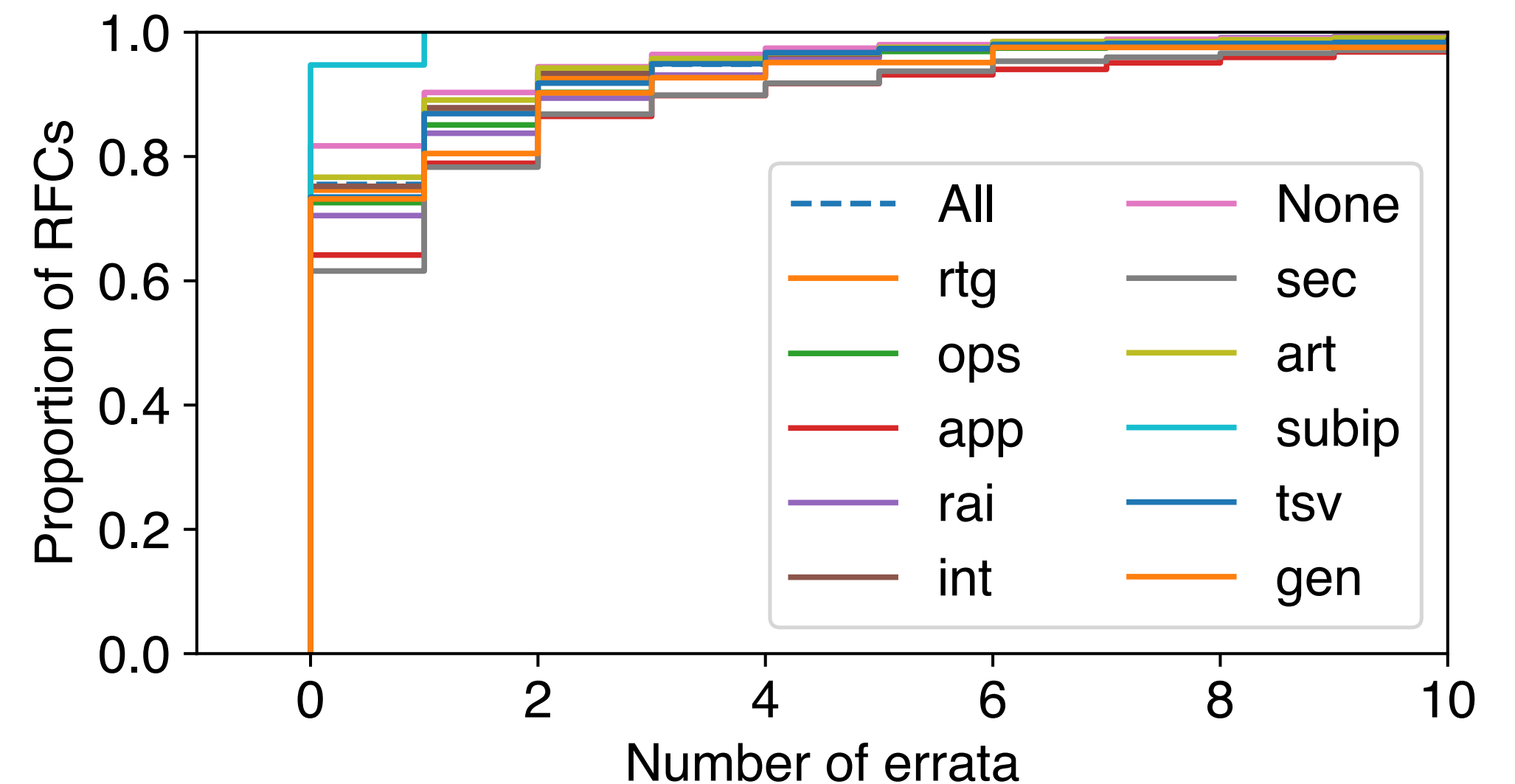
Streamlining Social Decision Making for Improved Internet Standards

- IETF decision-making is a complex, dynamic process, with interaction and communication between people with different interests and priorities
- Much of the data about these decisions is publicly available
- Can we use this data to identify bottlenecks, and produce tools to *improve* decision-making?

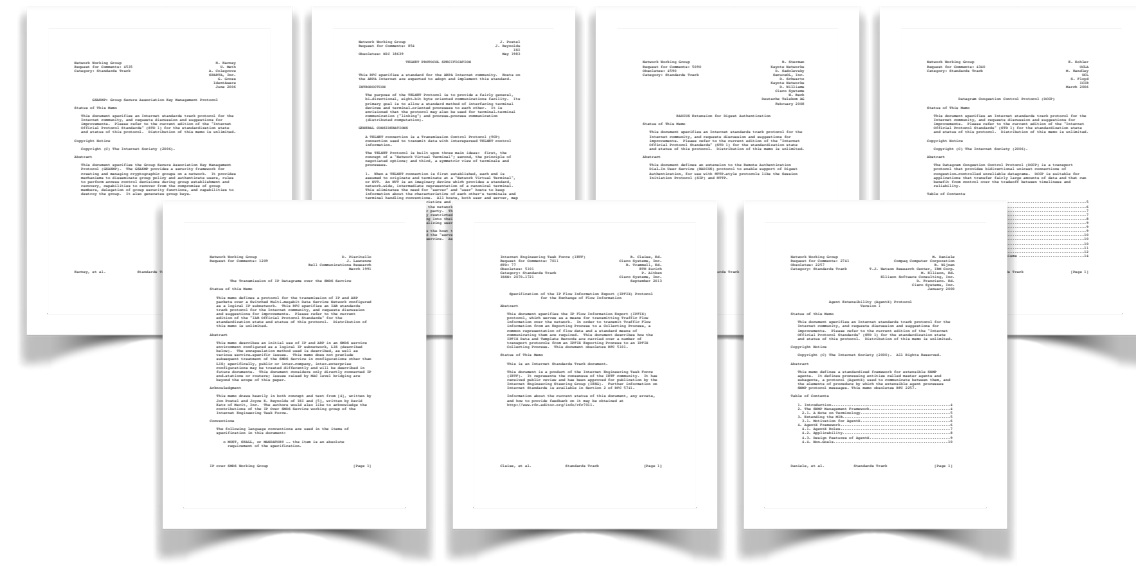


Example: Recommending draft reviewers

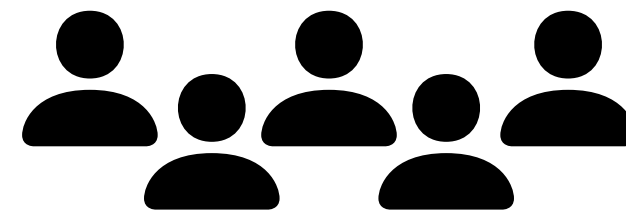
- 32.7% of standards-track RFCs have had at least one errata reported
- For Security area RFCs, that increases to 39%
- 7.3% of errata are filed within 30 days of RFC publication
- Can the review phase be improved to reduce the volume of errata that are filed?



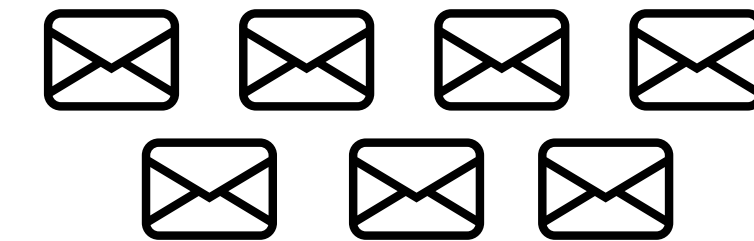
Example: Recommending draft reviewers



RFCs and
Internet-Drafts

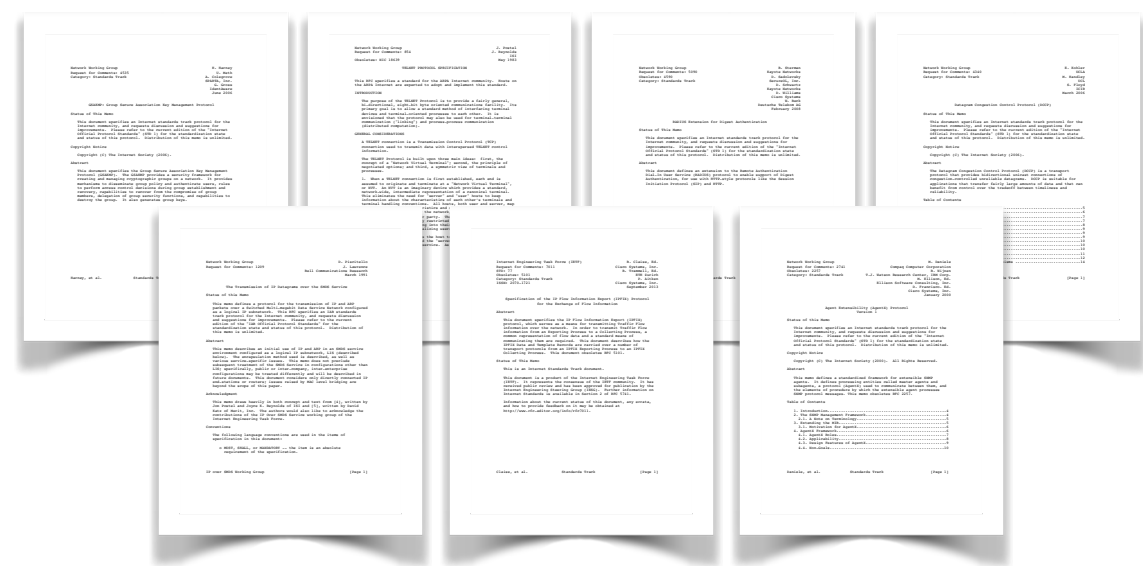


Participants

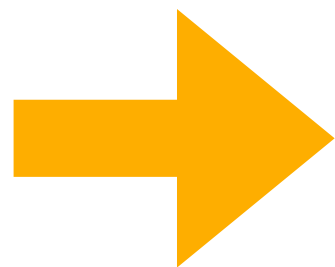


Mailing lists

Example: Recommending draft reviewers

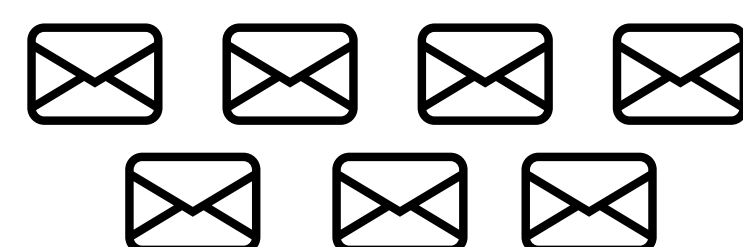


RFCs and
Internet-Drafts

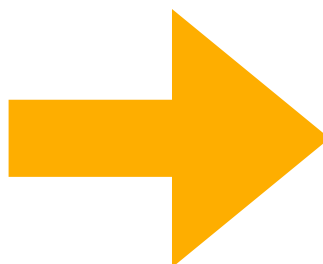


Term	Frequency	Inverse document frequency
quic	30	0.7
congestion window	40	0.4
must	80	0.1
the	341	0

Example: Recommending draft reviewers

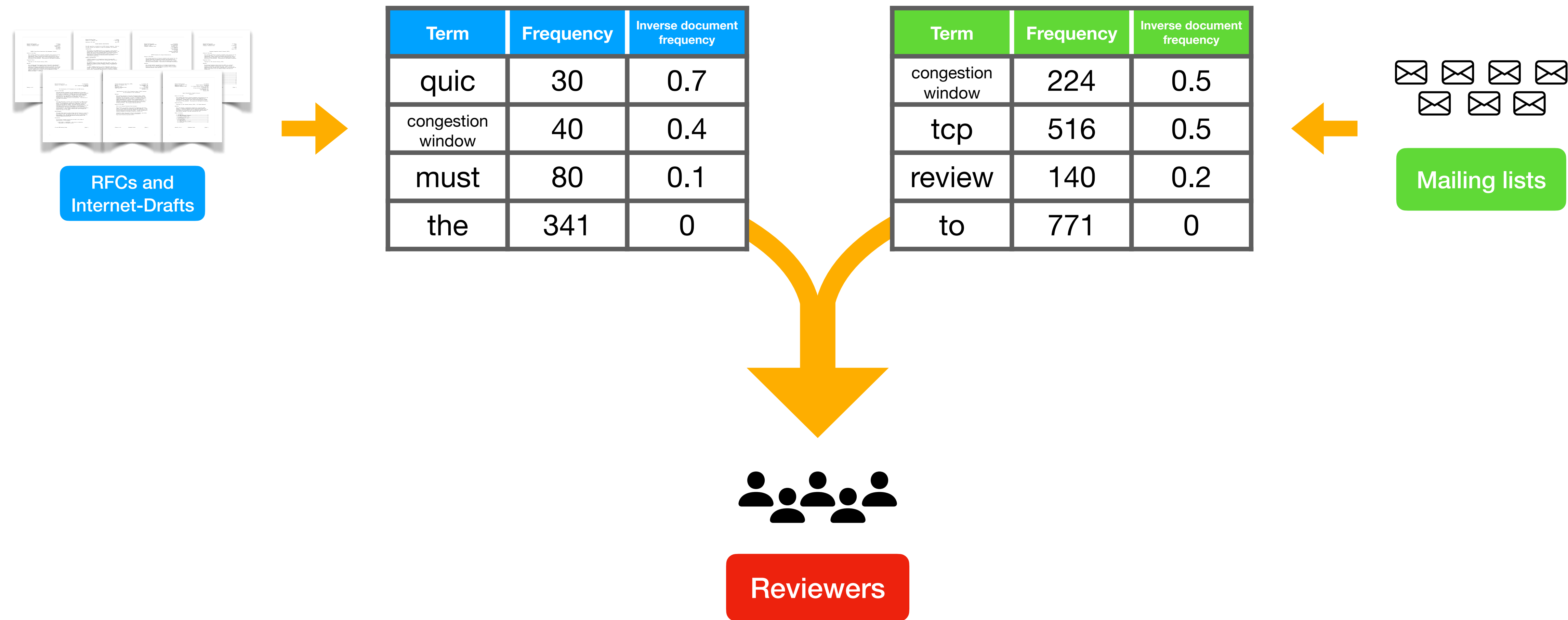


Mailing lists

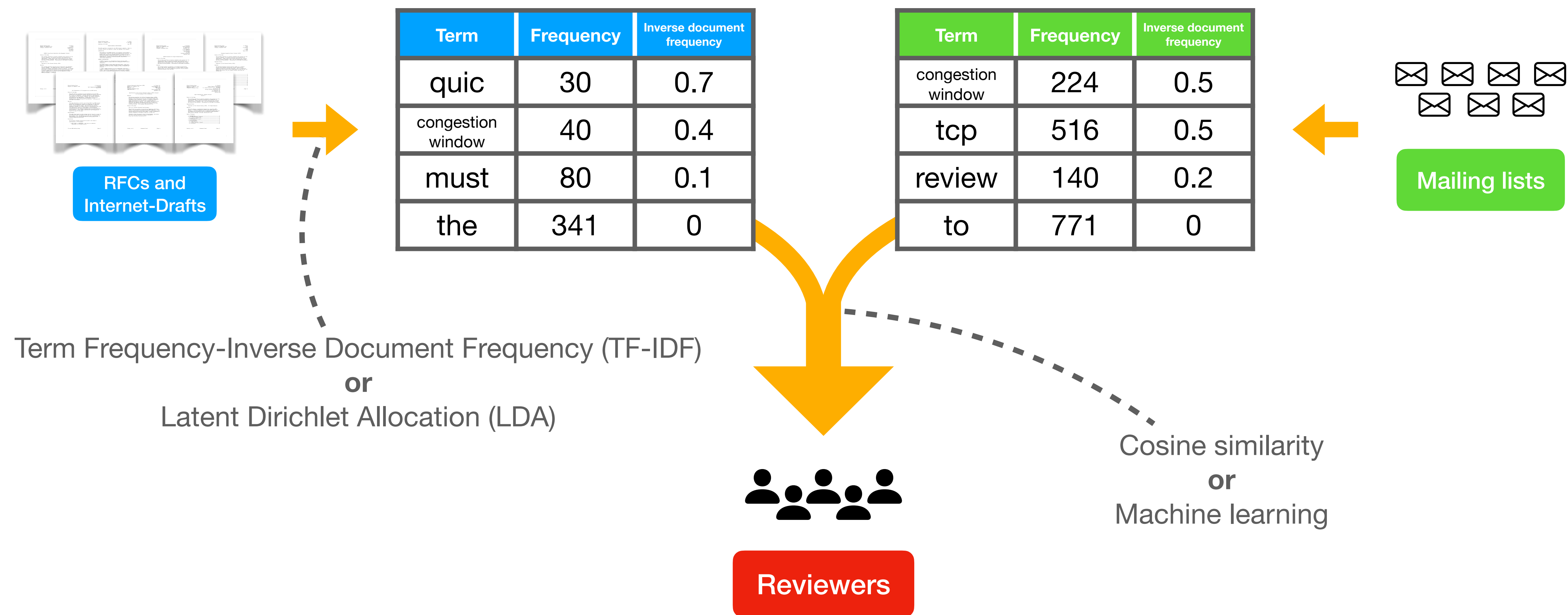


Term	Frequency	Inverse document frequency
congestion window	224	0.5
tcp	516	0.5
review	140	0.2
to	771	0

Example: Recommending draft reviewers



Example: Recommending draft reviewers



Example: Recommending draft reviewers

ietf-annotation.eecs.qmul.ac.uk

IETF draft reviewer suggestion tool

(experimental A/B test version)

Draft to consider:

draft-ma-moq-relay-for-deadline

Search

Mode:

Default

Results:

Participant	(Optional) Feedback
Xingwang Zhou Some authored drafts: draft-li-overlayed-path-segment-forwarding-ps; draft-li-tsvwg-overlayed-path-segment-fwding-ps; draft-li-tsvwg-loops-problem-opportunities;	
Andreas Kassler Some authored drafts: draft-amend-tsvwg-multipath-framework-mpdccp; draft-amend-tsvwg-dccp-udp-header-conversion; draft-amend-tsvwg-multipath-dccp; draft-bonaventure-quic-atsss-overview; draft-ietf-tsvwg-	

Example: Recommending draft reviewers



<https://sodestream.github.io/recommender.html>

Andreas Kassler

Some authored drafts: [draft-amend-tsvwg-multipath-framework-mpdccp](#); [draft-amend-tsvwg-dccp-udp-header-conversion](#); [draft-amend-tsvwg-multipath-dccp](#); [draft-bonaventure-quic-atsss-overview](#); [draft-ietf-tsvwg-](#)

Streamlining Social Decision Making for Improved Internet Standards

- Tools, datasets, and analysis that can help us to explore and support decision-making in the IETF
- Previous work looking at the social graph of the IETF, and the impact on the deployment of RFCs
- Keen to collaborate on answering questions about who, how, when, and why decisions are made in the IETF



<https://sodestream.github.io>

sm@smcquistin.uk

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The Expanding Universe of BigBang

IETF 116 - RASP RG

Sebastian Benthall
New York University School of Law



BigBang is

- open source community
- research infrastructure
- for analysis of
- infrastructure governance and standard setting processes



History

2018/6 - 0.2.0 Tulip Revolution

- Governance
- Code of Conduct
- Gender Participation

2021/3 - IETF 110 - Article 19 sponsors sprint

2021/5 - 0.3.0 Joie de Vivre

- Tenure calculation
- Affiliation analysis and entity resolution
- LISTSERV, W3C data sources

2022/4 - 0.4.0 Syzygy

- ReadTheDocs
- Included datasets (hand annotations, etc.)
- IETF DataTracker source: attendance and draft analysis
- Supported by Prototype Fund

2023/3 - IETF 116

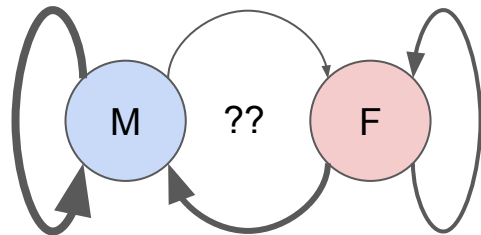
- **Dashboard prototype and design**
- **Hackathon contributions**
- **RASP RG**

Open Source Community Governance

- Lightweight process modeled on other successful open source communities
- The project is governed by consensus of the Core Developers.
- **Core Developers:**
 - are those whose *active and consistent contributions* are recognized by (formal) consensus of the other Core Developers.
 - are responsible for reviewing contributions
 - can phase out of leadership status through inactivity.
- **BigBang Improvement Proposal (BBIP).**
 - are iteratively edited and voted-on proposals for a far-reaching change.
 - are approved by consensus

IETF 116 Hackathon – new Pull Requests

- #585 Command Line Interface (Micah Lee)
- #586 Named Entity Recognition with LLMs (Effy Li)
 - Extracts entities from mailing list text
 - [Presented later in this session]
- #592 Intergender Sentiment Analysis (Priyanka Sinha)



Dashboard Prototype

Complex installation blocks users

Hosted 'dashboard' to analytics

Respecting data protection rights

Legitimize processing: public interest

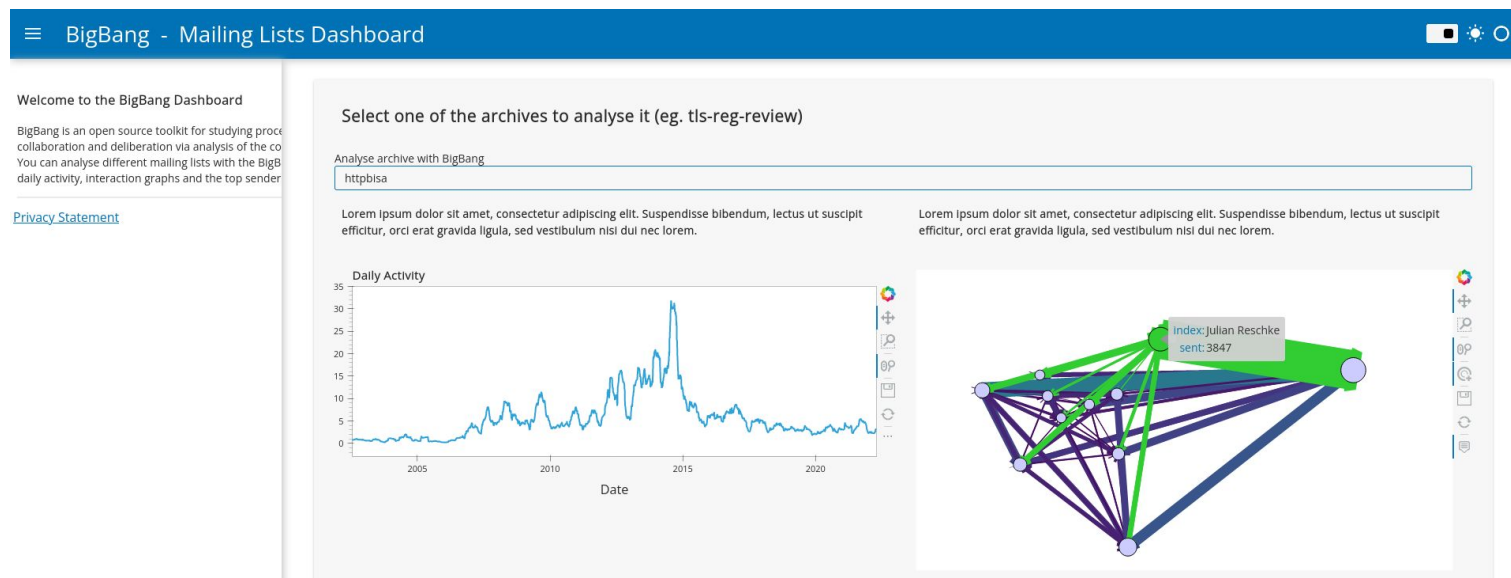
Welcome to the BigBang Critical Infrastructure Dashboard!
To access the dashboard you need to agree to the terms of data sharing and access. Please fill up this form to get your credentials.

Login

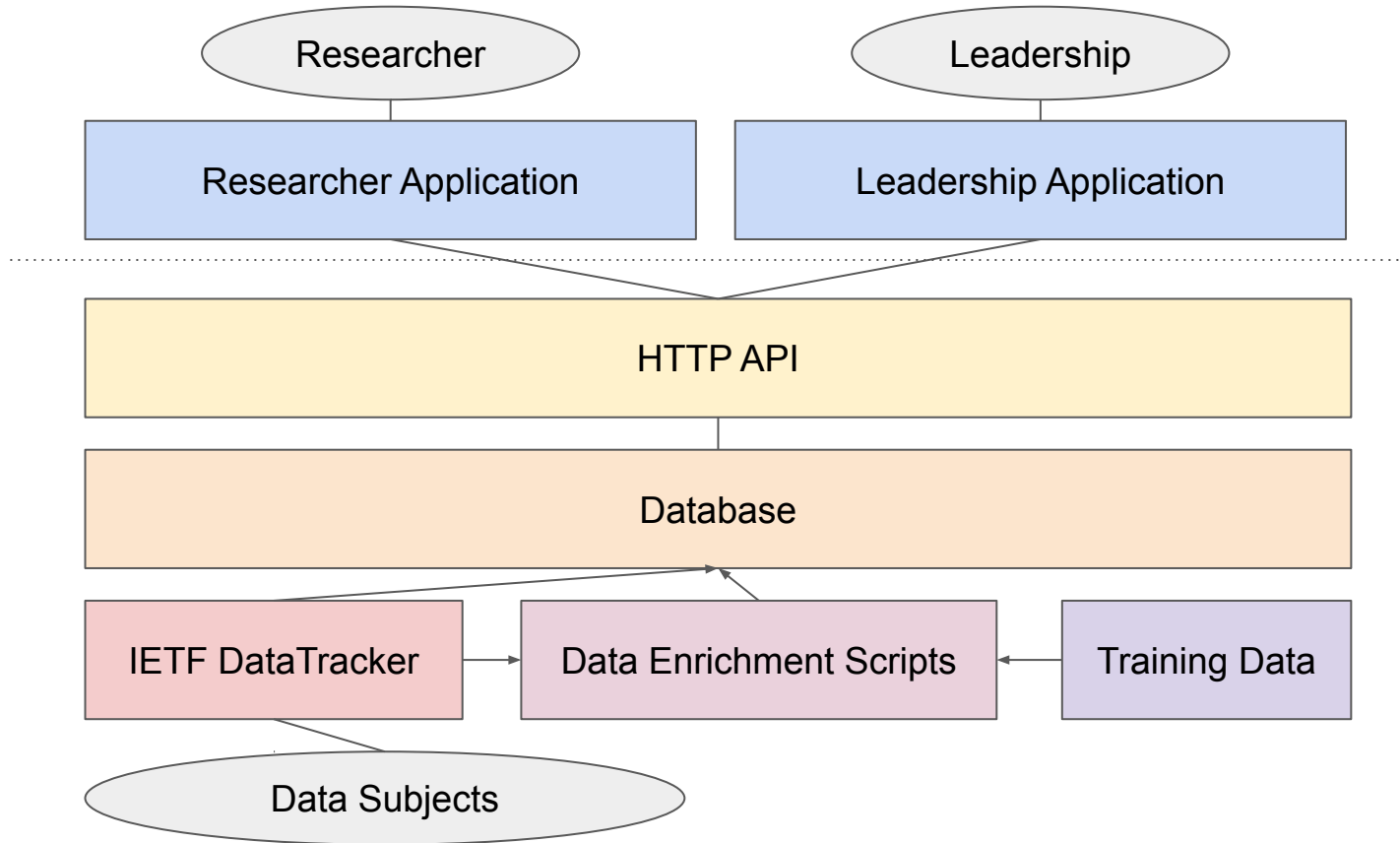
Prototype and design

Rapid prototyping of web interface to
Working Group analytics.

User studies and feedback to develop
designs for next phase.



Future RASP Research Infrastructure ?



Future RASP Research Infrastructure ?

Legitimate
Basis,
purpose
bound
(GDPR)

Researcher

Researcher Application

Leadership

Leadership Application

Data
Intermediation
Service?

HTTP API

Database

E.U Data
Governance
Act (DGA)

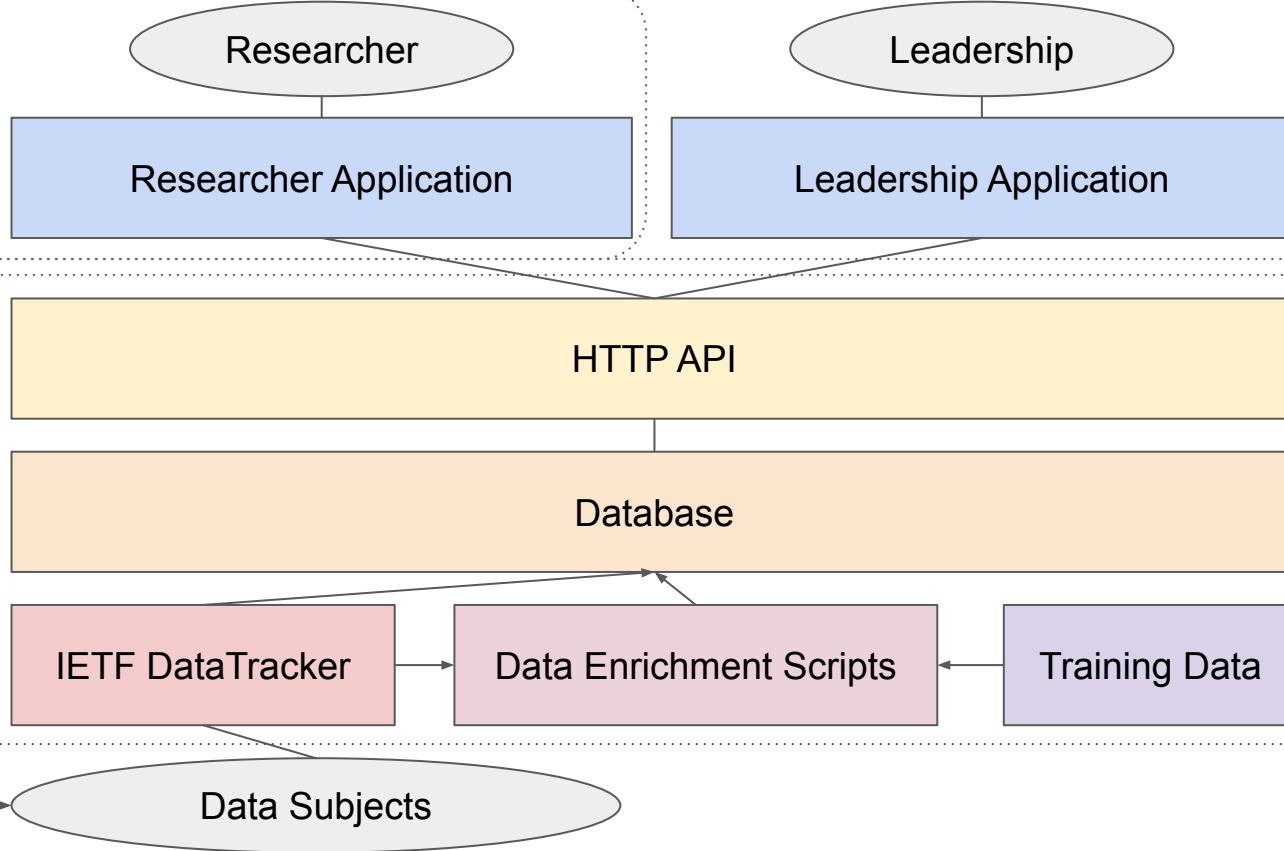
IETF DataTracker

Data Enrichment Scripts

Training Data

fiduciary duty

Data Subjects



Demo: <https://standardsandgovernance.net/>

GitHub:

- <https://github.com/dataactive/bigbang>
- <https://github.com/dataactive/dashboard>

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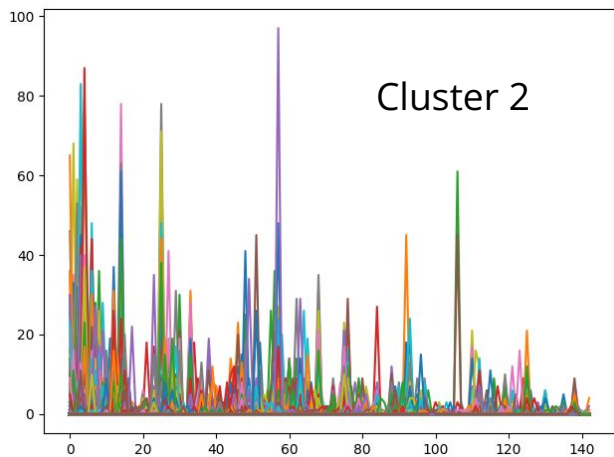
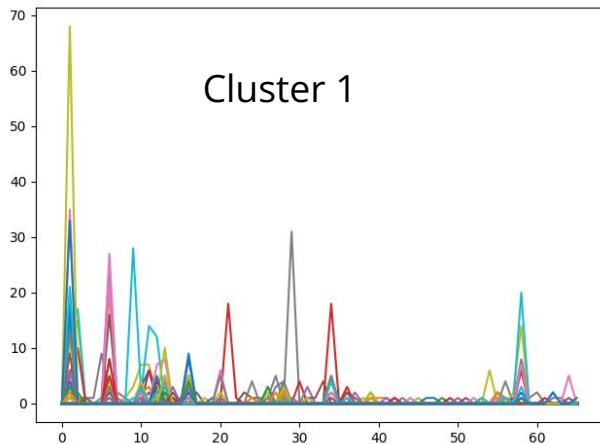
Some Research and Methodologies with IETF Data

Priyanka Sinha, RASPRG Meeting IETF116

Outline

- Summary from AID 2021 workshop participation and further discussions
- Relevant Methodologies for IRTF RASPRG Research
- How is IETF data valuable for Open Research?
- Summary of Hackathon

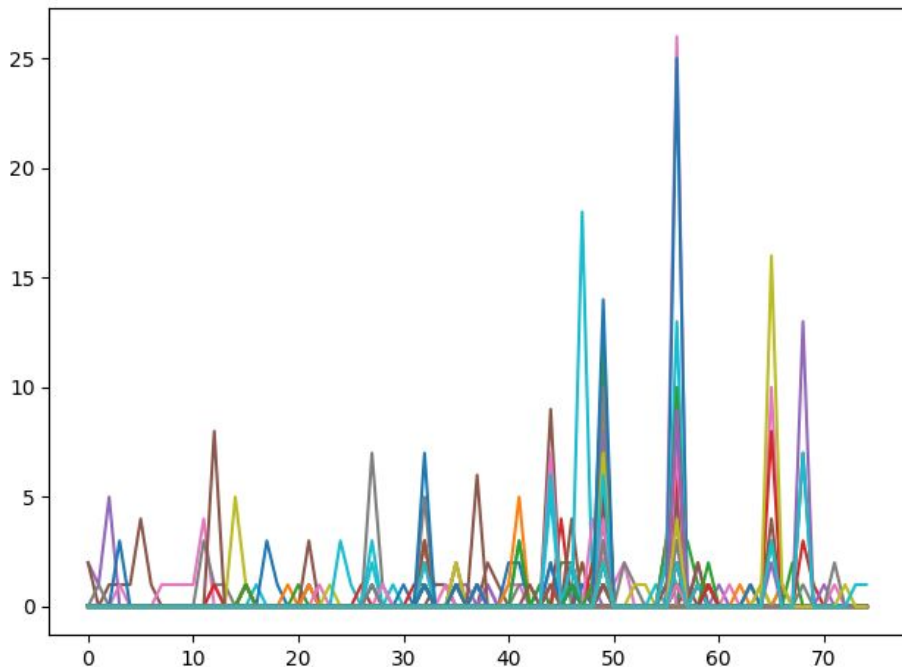
Number of emails sent by Person in the month



Time in months since v6ops WG started

- First level grouping of homophilic participants by their temporal activity within v6ops working group in 10 clusters
 - People in Cluster 1 are interested in different aspects of v6ops than those in Cluster 2.
 - **Jari Arkko, Mirja Kuhlewind** in Cluster 1
 - **Timothy Baldwin, Michael Richardson, Paul A. Vixie** in Cluster 2
 - **Fred Baker** in another cluster
 - Activity peaks consistently overlap indicating they are interested in similar issues - help identify advocates? Leaders?
- **Entity Disambiguation** - Same name, different email address found in same cluster - eg Eric Klein, Linjian Song, Christopher Liljenstolpe, m7m7, etc

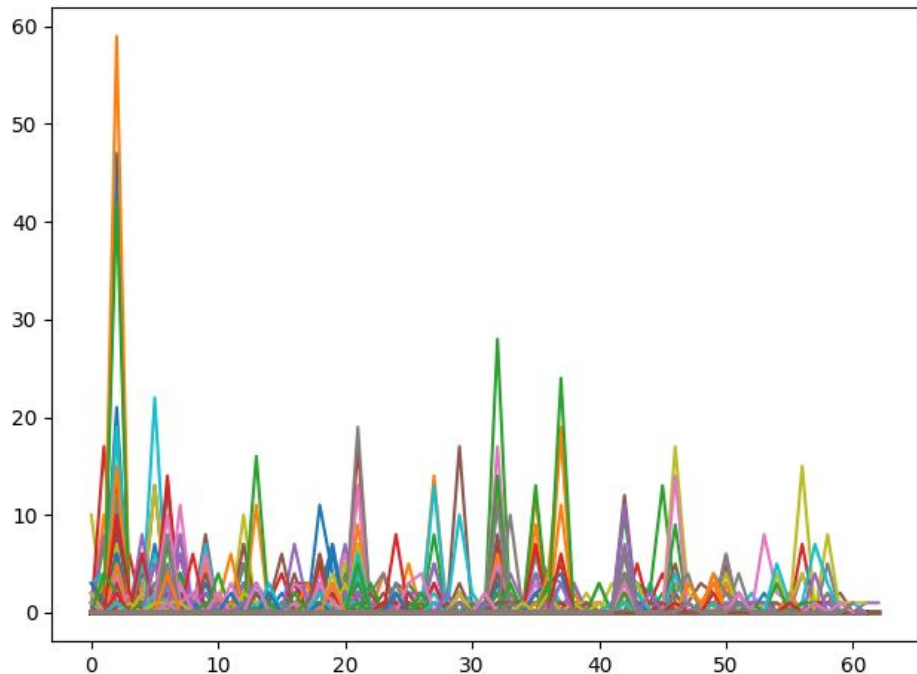
MPLS Cluster



- Adrian Farrel afarrel@juniper.net
- Gaurav agrawal gaurav.agrawal@huawei.com
- Himanshu Shah hshah@force10networks.com
- 정태식 cts@etri.re.kr
- 吴吉朋 wujipeng@gmail.com
- SP sp543@nyu.edu
- Raghu raghav.rao@wipro.com
- Arashmid Akhavain
arashmid@nortelnetworks.com
- AtrJoh@netscape.net
- Kullberg Alan-G19424
alan.kullberg@motorola.com
- DECRAENE Bruno RD-CORE-ISS
bruno.decraene@francetelecom.com
- "Naidu, Venkata" Venkata.Naidu@Marconi.com

With activity peaks aligned, these people possibly have the similar viewpoint or interest within MPLS WG. Further text mining on their content, would provide say topics and opinions for new participants at IETF to find shepherds and advocates.

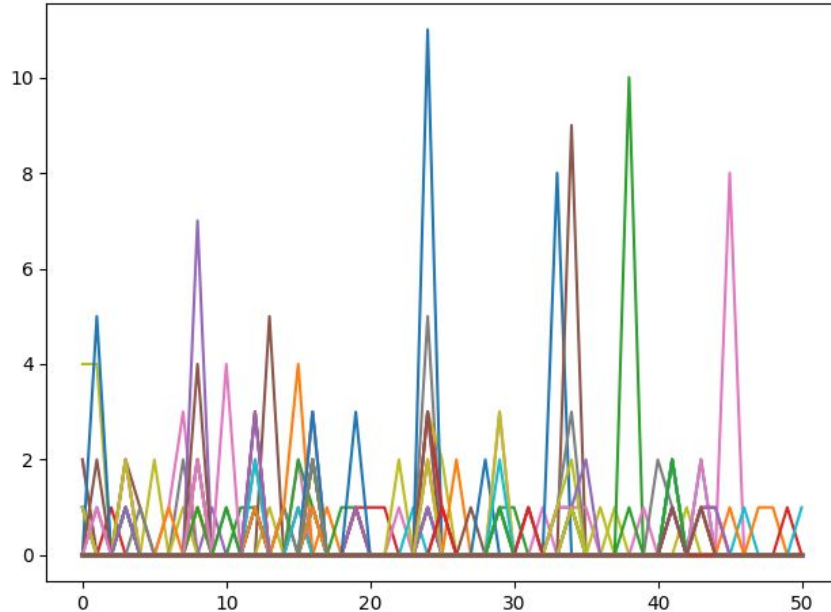
IDR Cluster



- Tony Li tli@juniper.net
- Jakob Heitz jheitz@redback.com
- Gargi Nalawade nalawade@redback.com
- Saikat Ray ray.saikat@ericsson.com
- Adrian Farrel adrian@olddog.co.uk
- Dhruv Dhody dhruv.ietf@gmail.com
- Yimin Shen yshen@juniper.net

Another example of entity disambiguation of emails and affiliations from temporal activity. I know some of these people have worked together in person earlier, even though their affiliation has changed, even last name! Likely have similar technical opinions and help IETF to speed process of consensus and maybe even adoption.

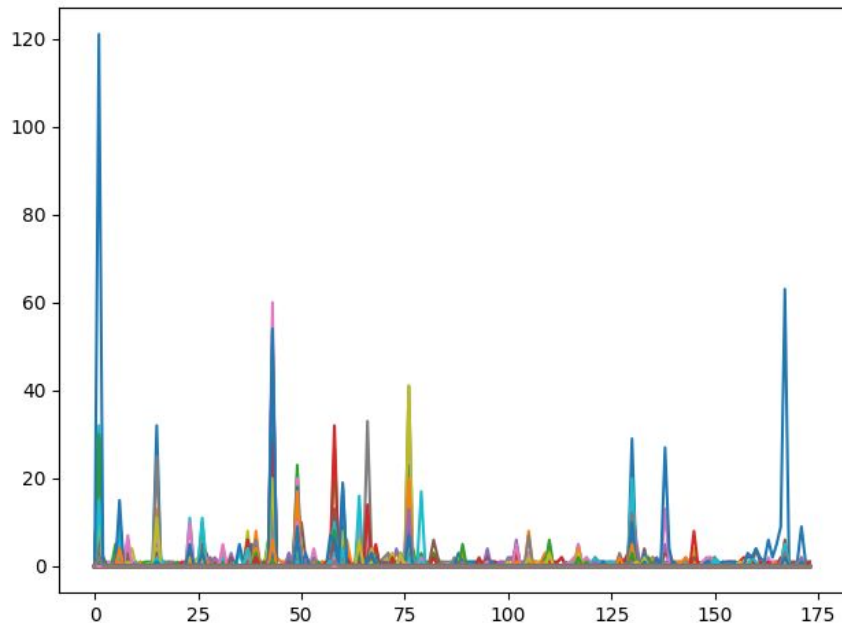
CCAMP Cluster



- ogino ogino@kddilabs.jp
- Wataru Imajuku
imajuku.wataru@lab.ntt.co.jp
- Acee Lindem acee@cisco.com
- Dhruv Dhody dhruv.ietf@gmail.com
- "Linwei (Wei)" wei.linwei@huawei.com
- Don Fedyk dwfedyk@nortel.com
- FEDYK Don
Donald.Fedyk@alcatel-lucent.com
- David Ward dward@juniper.net
- VICTOR LOPEZ ALVAREZ
victor.lopezalvarez@telefonica.com
- Francesco Lazzeri
francesco.lazzeri@ericsson.com

Seemingly different demographics and affiliations may have similar opinions or interests. Motivation for IETF to look beyond demographics and affiliations.

All Combined Cluster



- Adrian Farrel - adrian@olddog.co.uk,
olddog@clara.co.uk,
drian-nomcom@olddog.co.uk
- "Dutta, Pranjal (Pranjal)"
pdutta@alcatel-lucent.com,
pranjal.dutta@alcatel-lucent.com
- 정연쾌 ykjeong@etri.re.kr
- E.T.Metz@telecom.tno.nl
- Jakob Heitz jheitz+041207@redback.com
- Balaji Pitta venkatachalapathy
balaji_pv@hotmail.com

Entity disambiguation from temporal analytics helps identify the person, downstream text mining for richer analytics for IETF

Causal Learning Dialogue Outcomes

Attribute	Predicate	Value Domain
sentiment	SENTIMENT_VERY_NEG SENTIMENT_NEG SENTIMENT_LOW_POS SENTIMENT_MEDIUM_POS SENTIMENT_HIGH_POS	< -0.2 [-0.2,0) [0,0.5) [0.5,0.8) >0.8
EMPATH	CATEGORY_ABSENT CATEGORY_LOW CATEGORY_MEDIUM CATEGORY_HIGH	=0 (0,1) [1,2) >=2

Formal method text mining to study IETF mailing list conversations, their outcomes and causes of the same. May help in speeding consensus.

12:15:46 I feel Very **elated** to wish Happy Womens Day but really **sad** when its tailored as **Happy** and **safety** Womens day (... I can understand that society is changing in a very **bad** shape. Yes the **Men** Clan is **responsible** for This addition of **Safety** Womens Day tag. I know I cant change the whole **community** overnite, but yes, I can make an attempt to remove the Tag of **Safety** and convert it INTO just **HAPPY** WOMENS DAY :)

14:28:03 **Thank** you Sujal...

14:10:07 **Nicely** written Epsy. Time for all to change. **Girls** as well. Not your dressing. Not your **fun**. Far time for us to stop depicting ourselves as delicate darlings and bring the **evil** out. **Dont** make it easy for them. Let it not be a one sided war. Enough of branding ourselves as **physically weak** & mentally **strong** humans. **mental** strength will not work here.. have your tools.. have your **guts**. Cut it out. I mean it. **Dont** wait for soldiers.. we **dont** need them.. they have their own job to do.. be you own soldier. **Happy** Womens Day..

14:27:30 **Well** said dyana. **Happy** womens day..

21:31:33 **Good** post Epsy.. I have nothing but my words to ensure that I'll be a **good** person and **respect** women all my life.. I can extend my hand to help whenever and wherever is possible... Wish you all a very **happy** Womens Day..

**IDOMESTIC_WORK_ABSENT &&
MEDICAL_EMERGENCY_ABSENT**

**FAMILY_ABSENT && !SENTIMENT_POS
##[0:3000] FAMILY_HIGH &&
SENTIMENT_VERY_POS##[0:10000]
DOMESTIC_WORK_ABSENT**

+1 19:37:27 Yes I **agree** with you but I really **dont** like when it comes and lick you...!

+1 21:36:11 **ha ha ha** **thats** due to their **loving** nature. I guess :)

+6 12:12:47 Cleaning the desktop?????

+8 08:49:34 yaaa **frm** inside... :P

+64 13:12:40 what a story...**nd** people still fall for it :)

+64 14:36:22 yaa **this** the **trick**..... :P

+64 15:01:06 yeah **jus** like u fell for it :)

+64 20:27:50 yaa like **evryone** i also fell for it... :)

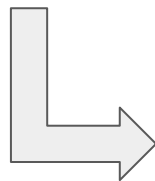
+65 11:27:47 u seem so **happy** that u fell for it :)

+93 19:58:05 So Hutch/Vodafone **dog** has got a new **job**... Cleaning or systems screen from inside.... :P

Multigraph Edge Features for Graph Mining Peer Groups

- Enron data set

	#words	#vocabulary	EMPATH	#emails sent	#emails recvd	sentiment	#entities	#capital words
avg	1047	949	0.004	2	3	0.3	109	222
max	101549	92491	4.31	226	343	22.8	9972	21504
min	1	1	0	1	1	-4.3	0	0



	#urls	#verbs	#auxiliaries	#symbols	#numbers	#nouns	#adjectives	#adverbs	#pronouns
avg	10	141	198	18	38	337	57	32	36
max	1002	13870	19680	2189	5910	32349	5403	3420	3848
min	0	0	0	0	0	0	0	0	0

- StackExchange data set

	#questions	#comments	comment sentiment	popularity	EMPATH
avg	1.17	1.17	0.14	3.12	0.002
max	23	23	5.28	276	0.63
min	1	1	-1	0	0

Findings from Computational Psycholinguistics

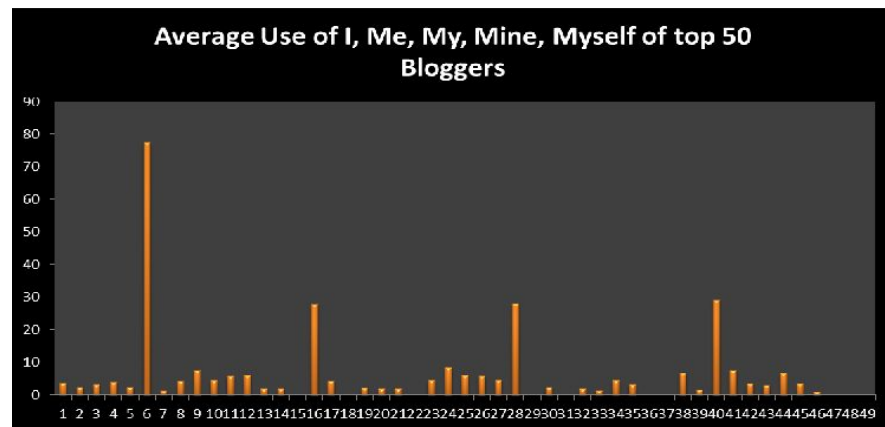
Coverage Evaluation

Proposed Method	#Words in dictionary	#Words found in dataset	%unique words in dataset	%usage in dataset	%coverage of users
HEXACO	245	152	0.08	0.22	13
HEXACO Extension	2,108	1,999	1.07	3.95	50.18
LIWC	4,487	3,993	2.16	43.77	90.51

Sentiment versus Traits

Corelation Between	Honesty	Emotionality	Extraversion	Agreeableness	Conscientiousness	Openness
posts versus feedback score	0.0882	0.1770	0.3362	0.3287	0.3471	0.4005
posts score versus positive emotions	-0.0914	0.2040	0.0873	0.0419	0.3476	-0.0937
Posts score versus negative emotions	-0.1316	0.1963	-0.0520	-0.0810	0.2556	0.0064
Positive emotions in posts versus feedback	0.3171	0.2700	0.3844	0.4334	0.3368	0.4689
Negative emotions in posts versus feedback	0.3147	0.5070	0.1544	0.4677	0.3845	0.3438

LIWC Stability Observation



Observations

- Openness is independent of use of emotive words
- Open, agreeable, extraverted, conscientious people evoke similar traits in the comments they receive from people.
- Use of 1st person personal pronouns is an indication of depression. Here the person has posted tragic short love stories.

Why study inclusion in the IETF

- IETF is a voluntary global organization with its communication, activities recorded and available for analysis and study
- Diversity, Inclusion and Representation make the consensus process robust.
- Do consensus mechanisms depend on in-person meeting, side talks and in person advocacy?
 - This puts participants who engage in remote-only mode (perhaps due to geographical, personal constraints) at a disadvantage
- People are multi-dimensional and their sense of community may not be appropriated by their observable demographic indicators
 - Data driven identification of influence that some members may have on consensus building

IRTF RASPRG Relevant Research Directions

- Analyzing the development of the make up of standard setting communities, their diversity, and the impact it has on standard-setting.
 - Study Contextual Integrity in terms of Group Behavior. Research to find out computational models of people's behavior from their perspective of privacy.
- Understanding the decision making processes that lead to the production of publications.
 - Identify key people who may help provide efficient and valuable consensus on drafts, proposals, rfc's and standards.

Open Research Problems for which IETF Data is valuable

- Good data source to build a Universal Behavior Model - quantitative studies for RASP RG
 - Large engagement from various demographics.
 - Semi Formal text. Less Noisy. Not short text.
 - Many turns of dialogues. Several messages in a Thread.
 - Active open source tools - BigBang
- Provide data driven insights into personality and group behavior for a population useful in say evaluating autonomous AI for vehicles - help IETF WG with human factors insight
- Provide data driven insights into diversity, norms
- A big data resource for psychologists and cognitive scientists to test their hypotheses computationally - confirm qualitative studies with data driven insights for RASP RG

Summary of Hackathon

Thank You

- https://scholar.google.co.in/citations?hl=en&user=ctlSowAAAAJ&view_op=list_works&sortby=pubdate
- <https://www.youtube.com/@PriyankaSinhaMahapatra>
- <https://www.linkedin.com/in/priyanka1982>
- https://twitter.com/priyanka_iitg

Agenda



- Welcome & Introduction
- RASP TALK #1:
Corinne Cath - *The Hard Work of the Hum: using ethnography to study power and politics in the IETF* (15 mins)
- Presentations:
 - a. Stephen McQuistin - *Data-driven Reviewer Recommendations* (10 mins)
 - b. Sebastian Benthall - *The Expanding Universe of BigBang* (10 mins)
 - c. Priyanka Sinha - *Some Research and Methodologies from IETF Data* (10 mins)
 - d. 'Effy' Xue Li - *Large Language Models in Standards Discourse Analysis* (10 mins)
- RASP RG going forward (15 mins)

Large Language Models in Standards Discourse Analysis

Effy Xue Li

x.li3@uva.nl

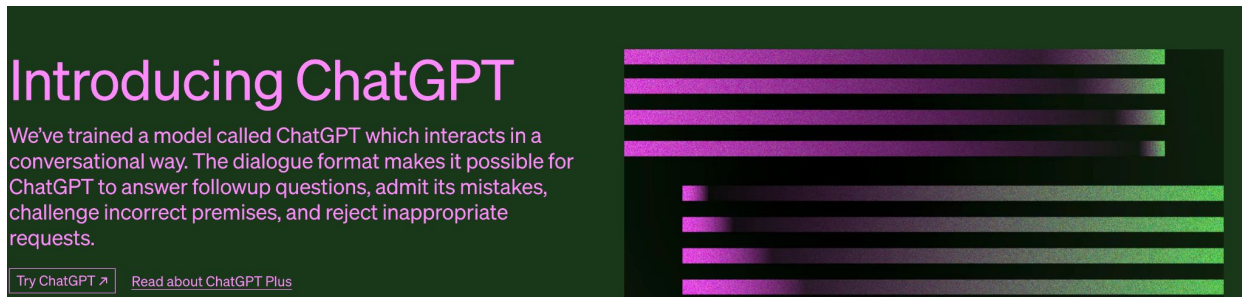
University of Amsterdam

March 2023

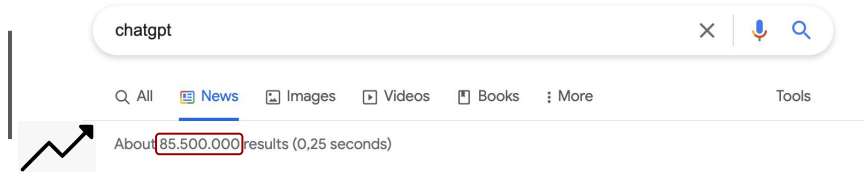
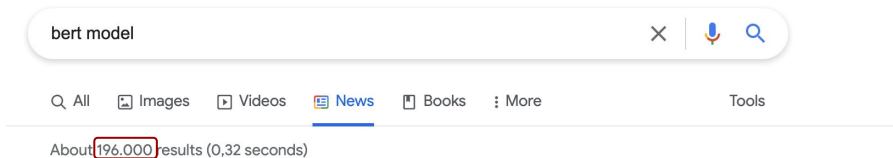
Table of contents

- Large language models
- Named Entity Recognition (NER) with Bert in Emails
- Knowledge Graph (KG) extraction with GPT-3
- Limitations & Concerns

Large Language Models



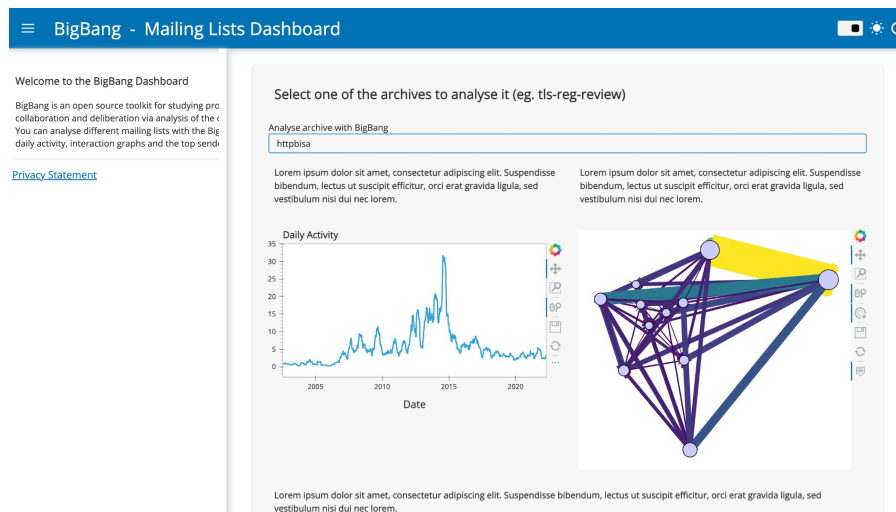
ChatGPT



RQ: How can we use it for standards discourse analysis?

BigBang Package

Toolkit for studying communications data from collaborative projects.



Bigbang dashboard

NER in Emails

- Bert-base model
- Fine-tuned with CEREC [1]

I would say the latter of the two I started linalg months ago and Travis O PER put a lot of effort into over the last several weeks I am not really familiar with we are really focusing on ATLAS ORG because it is so dang fast on most platforms It does not provide a full LAPACK ALLCAPS though so you have to merge it with another LAPACK ALLCAPS to get everything If you can figure out how to write a generic interface not too hard but only partially documented in linalgdocs more _ notes then have at it The actual fpy interfaces are generated from a python script The more interfaces the merrier but the compatibility issue has to be addressed On Unix MISC we could use nm to check if the function is there On windows it are not so easy Maybe it should just be an optional function for now ie defaults to being commented out for the widest compatibility eric

[1] CEREC: A Corpus for Entity Resolution in Email Conversations

Top 10 frequent entities

- We quantitatively extract the Top 10 frequent entities for each type.
- Sample mailing list: 3gv6

Top 10 occurrence for type: LOC

	entity	counts
0	San Francisco	9
1	USA	3
2	Shanghai	2
3	China	2
4	Anaheim	1
5	Tower Hui Hui Deng denghu@gmail.com	1
6	Vista level	1
7	Vista Room at the Hilton San Francisco The Vis...	1
8	Vista level of Tower	1
9	the Vista Room at the Hilton San Francisco The...	1

Top 10 occurrence (pronouns excluded) for type: PER

	entity	counts
0	Teemu	20
1	Cameron	15
2	Jari	11
3	Dan	10
4	Jouni	9
5	Cameron Byrne	9
6	David Crowe	9
7	Brian	8
8	Julien	7
9	Dan Wing	6

<= Extracted person entities align with sender-receiver analysis from meta data.

Top 10 frequent entities

Top 10 occurrence for type: MISC

entity counts		
0	Internet	4
1	Windows	2
2	RFC	1
3	Internet Protocol	1
4	MacOS	1
5	Windows OS	1
6	IGI	1

Top 10 occurrence for type: ORG

entity counts		
0	UE	34
1	IETF	24
2	GPP	20
3	UEs	17
4	IPvonly	16
5	DS	9
6	PDN	8
7	RFC	8
8	IMHO	7
9	GPP EPC	7

Top 10 occurrence for type: DIG

entity counts		
0	IPv	3
1	DHCPv	1
2	teemusavolainennokia.com	1
3	PGW	1
4	IHdpdGggREhDUFYIHNIcnZlciwgdGhlbiBaGVzZSBdGdREh...	1
5	ba sis	1
6	withIETFDocs	1
7	listA	1
8	STUNTURN	1
9	PNAT	1

Pros & Cons

Pros:

- Great quantitative tool for analyzing **email bodies** from large scale mailing lists.
- Extract information with types that users define.

Cons:

- Fine-tuning with labelled data makes results much better. But we don't have ...
- Fixed sets of types.
- Limited information.

Pros & Cons

Pros:

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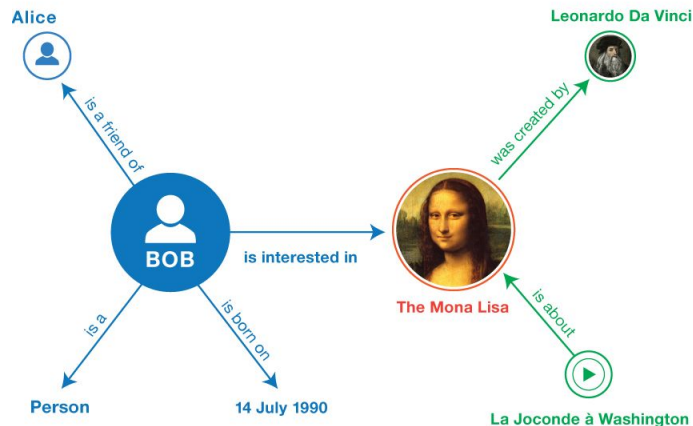
Cons:

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One step further...

Knowledge Graphs

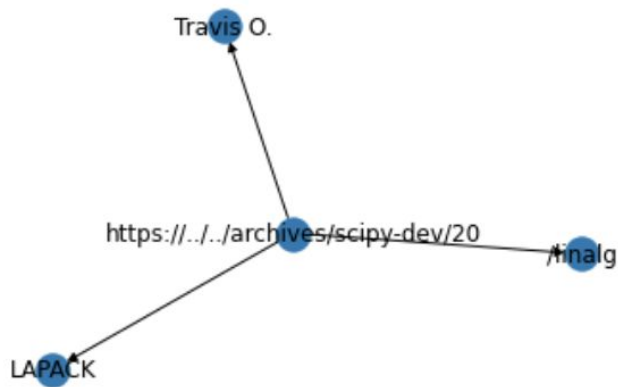
- Definition: Network of real-world entities and their relations.
 - Entity extraction; relation extraction.
 - Multiple tasks needed.
- Challenges: Specialized domains.
 - Standards in different domains.
 - No unified schema.
- Applications.
 - Structured data.
 - Connected data.
 - Can be intervened on.



GPT-3

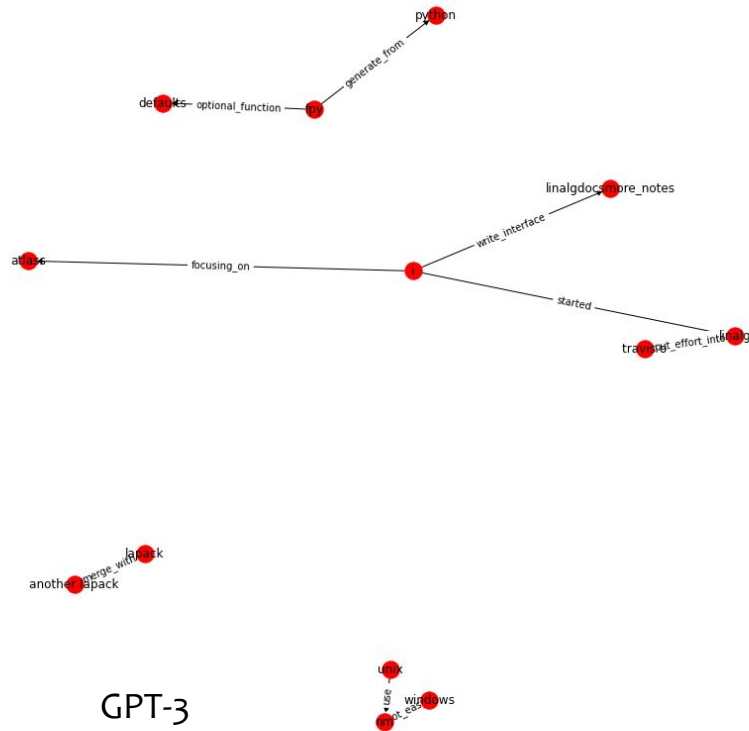
- Generative Pre-trained Transformers 3
- It is HUGE!
 - GPT-3 has 175 billion parameters. Bert has 110 million parameters.
 - 1,591 x larger than Bert! 100x larger than GPT-2.
- Prompt-engineering with OpenAI's APIs.
 - Task-agnostic.
 - No access to the underlying trained weights.
 - It costs money.

Knowledge Graph extraction with KGcreator and GPT-3



KGcreator[1]

[1] <https://pypi.org/project/kgcreator/>



GPT-3

Knowledge Graph extraction with KGcreator and GPT-3

	Entity	Type
0	Travis O.	PERSON
1	LAPACK	ORG
2	LAPACK	ORG
3	/linalg	GPE

KGcreator[1]

	source	source_attr	target	target_attr	edge
0	i	person	linalg	software	started
1	travis o	person	linalg	software	put_effort_into
2	i	person	atlass	software	focusing_on
3	lapack	software	another lapack	software	merge_with
4	i	person	linalgdocs	document	write_interface
5	fpy	software	python	programming_language	generate_from
6	unix	operating_system	nm	software	use
7	windows	operating_system	nm	software	not_easy
8	fpy	software	defaults	software	optional_function

GPT-3

[1] <https://pypi.org/project/kgcreator/>

Natural Language Prompt with One-shot Example

Extract all entities with types and their relations from texts:

John Doe works at Google.

Apple is located in Cupertino.

Results:

Entities:

Entity 1: John Doe Type: Person

Entity 2: Google Type: Company

Entity 3: Apple Type: Company

Entity 4: Cupertino Type: City

Relations:

works_at(person:john doe,company:google)

located_in(company:apple, city:cupertino)

Extract all entities with types and their relations from texts:

{Email body}

Results:

Limitation & Concerns

- Potential privacy and ethical issues.
 - We would like not to send our data to another company.
- It costs more when the amount of emails goes up.
 - For 2 million emails, it will cost ~17,900 USD.
 - It takes ~1 min for processing one API call.
- No control over the model.
 - The results are not deterministic.
 - No access to the underlying weights. No way to debug the model.

Future Directions

- Denoising results given constraints.
- Prompt optimisation.
- Local models that can achieve comparable performance with GPT-3.
 - GPT-3 as a labeler.
 - Hierarchical information extraction.
 - ...

Thank you!

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¿QUO VADIS?

UNDER REVIEW

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