





Ethics of Internet Measurements

Example of RIPE Atlas

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Overview

- Technical is political
- Ethics of Internet Measurements
- RIPE NCC's RIPE Atlas design
- Conclusion: Question Everything!
 - *Longer version at SHA2017: "Ethics in Technology"*
 - lecture & video
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 - lecture & video



Main Inspirations

- [r] Phillip Rogaway: "The Moral Character of Cryptographic Work" (2015)
- [p] Allison Parrish: "Programming is Forgetting: Toward a New Hacker Ethic" (2016)
- [ensr] "Philosophy meets Internet Engineering: Ethics in Networked Systems Research" (2015)
- [art] Langdon Winner: "Do Artefacts Have Politics?" (1980)
- [u] Ursula K. Le Guin: "A Non-Euclidean View of California as a Cold Place to Be" (1989)
- [rfc8280] "Human Rights Protocol Considerations" (2017)

Ethics

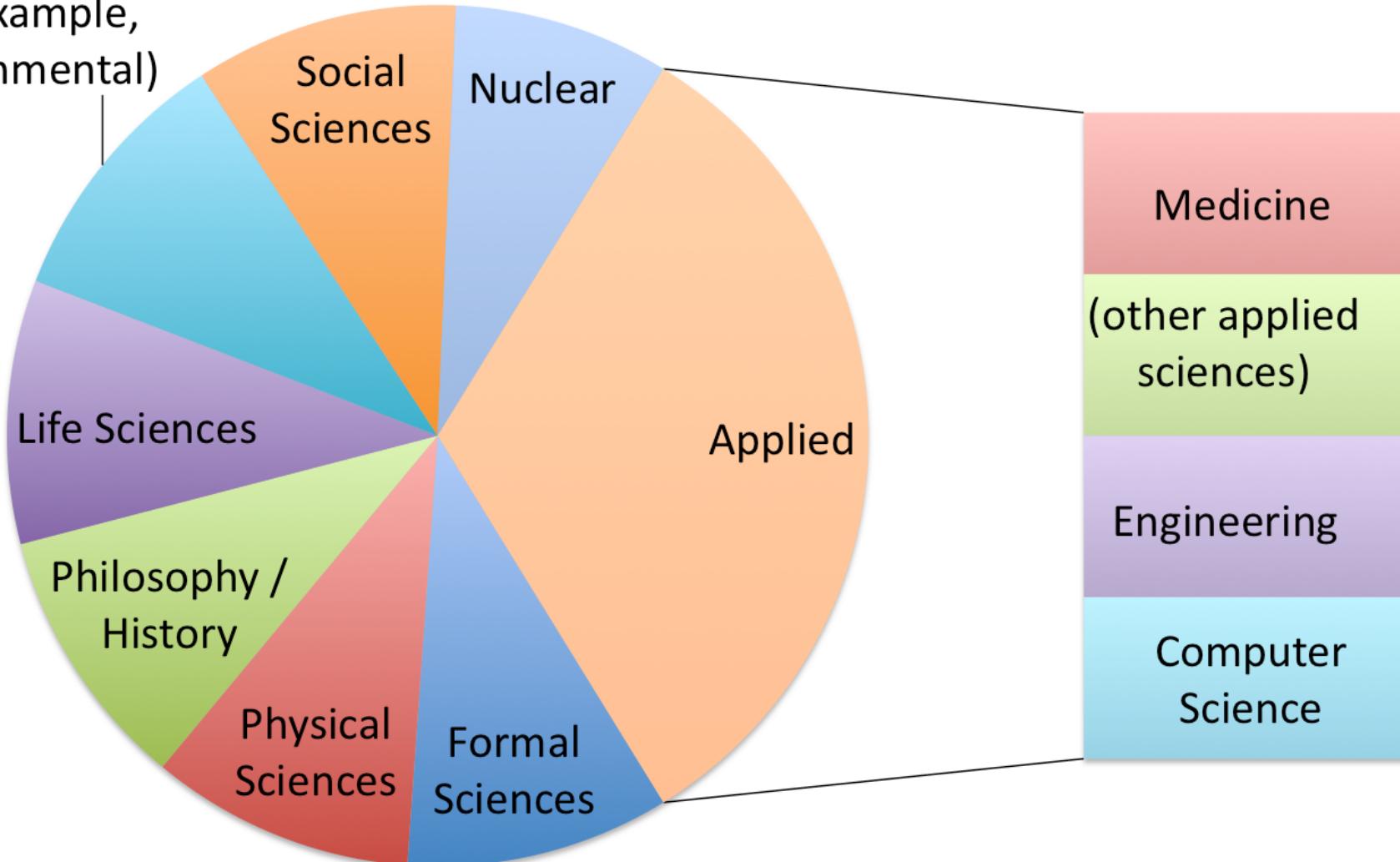
[edit](#)

Ethics (via Latin *ethica* from the Ancient Greek ἡθική [φιλοσοφία] "moral philosophy", from the adjective of ἥθος *ēthos* "custom, habit"), a major branch of philosophy, is the study of **values** and **customs** of a person or group. It in simplest terms is the philosophy on how to act. It covers the **analysis** and employment of **concepts** such as **right** and **wrong**, **good** and **evil**, and **responsibility**. It is divided into three primary areas: *meta-ethics* (the study of the concept of ethics), *normative ethics* (the study of how to determine ethical values), and *applied ethics* (the study of the use of ethical values).

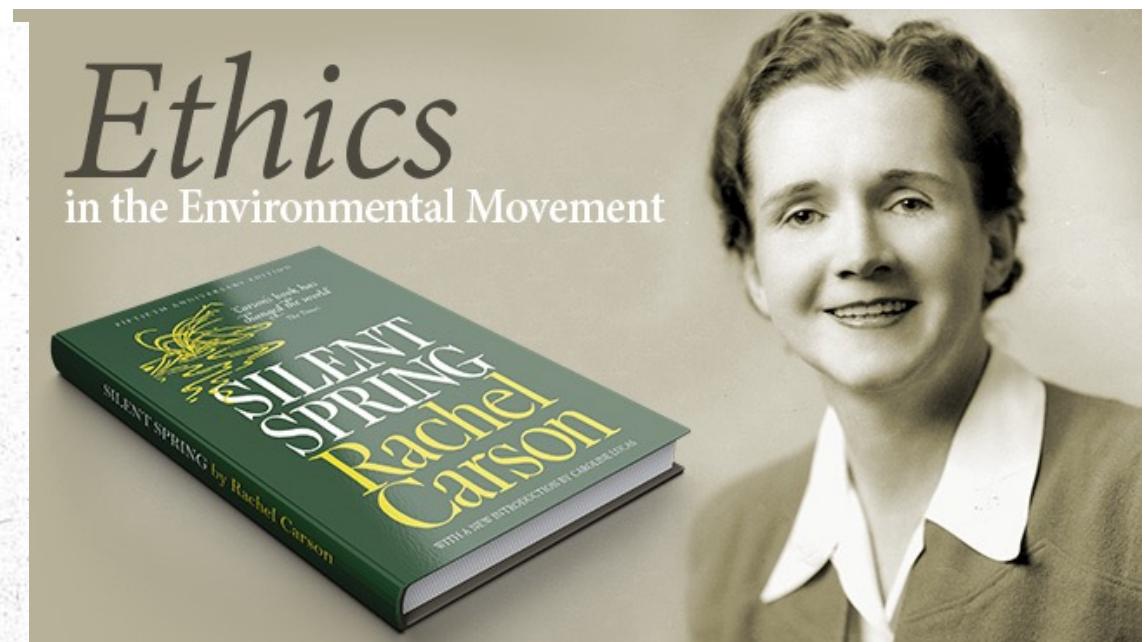
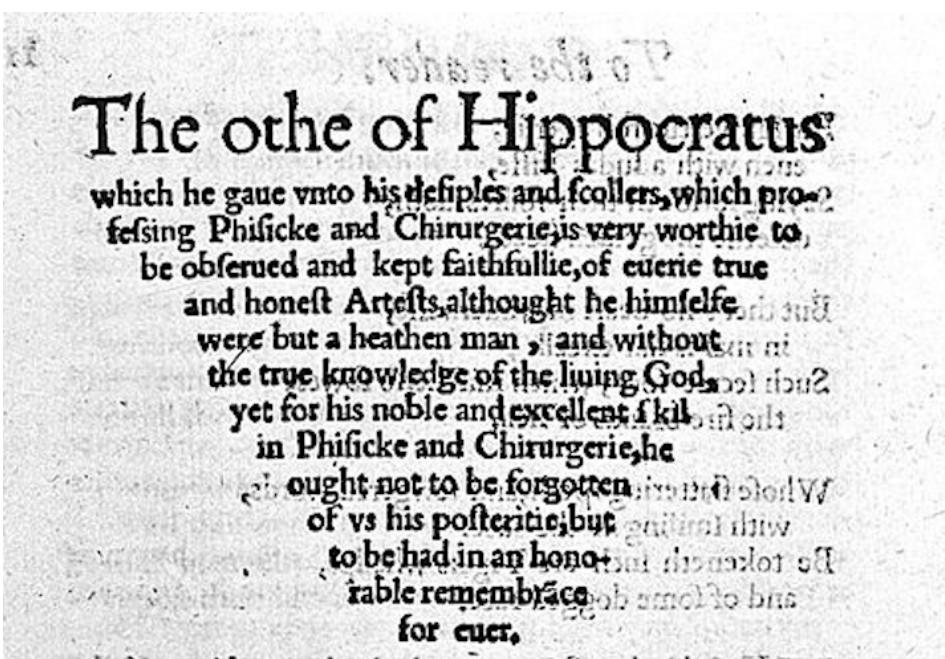
Science as a Force of “Good”



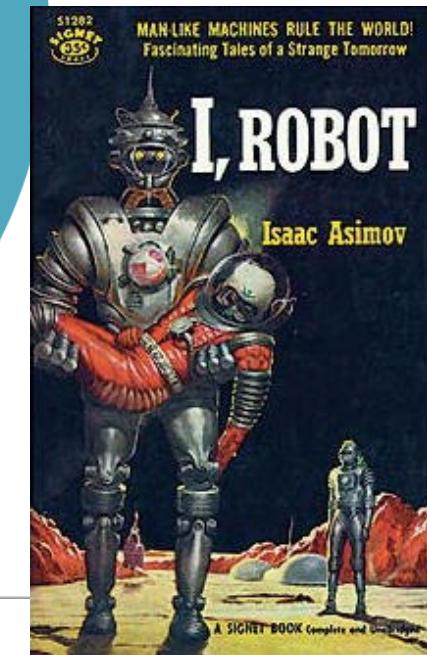
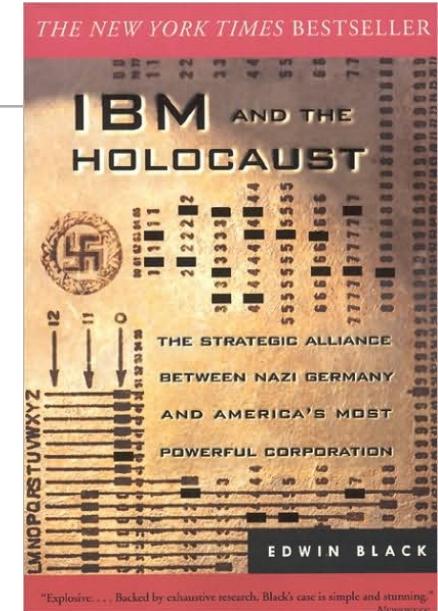
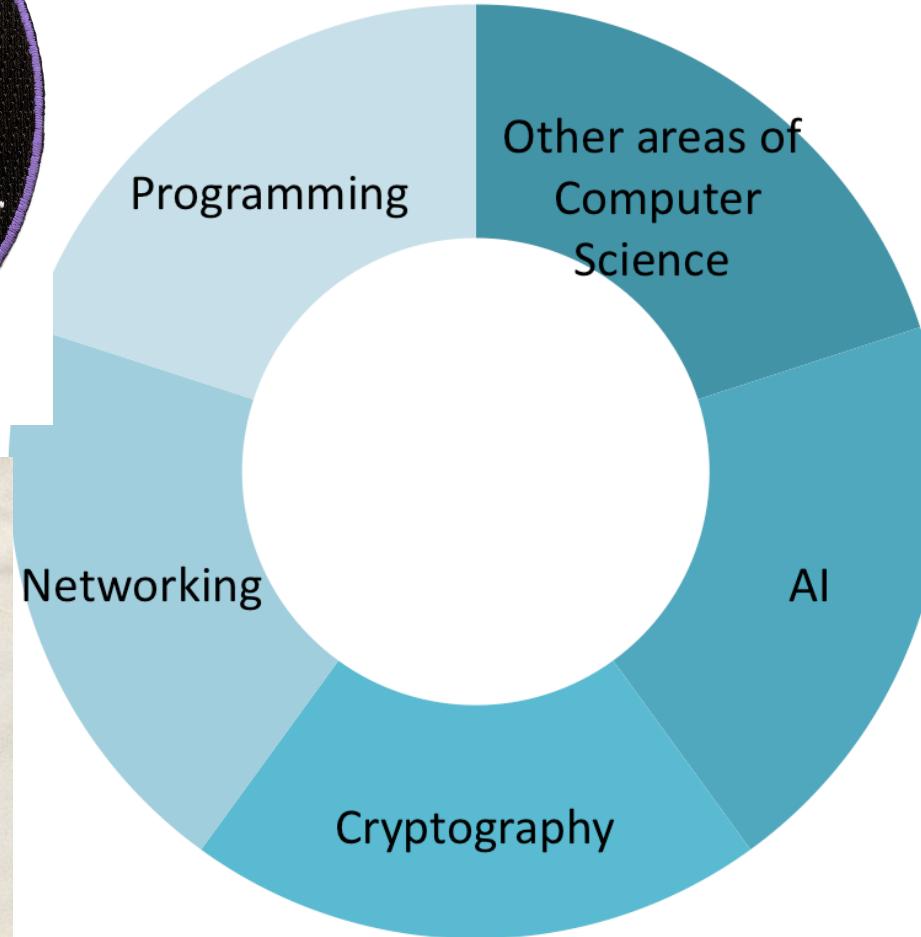
Interdisciplinary
(for example,
Environmental)



Classical Sciences Ethical Dilemmas



Computer Sciences Ethical Dilemmas





Technical is Political

- “Technological ideas and technological things are **not** politically **neutral**: routinely, they have strong, built-in tendencies. Technological advances are usefully considered not only from the lens of how they work, but also **why** they came to be as they did, whom they help, and whom they **harm**.” [r]
- “The machines, structures, and systems of modern material culture are (should be) judged for their:
 - Contributions of efficiency and productivity,
 - Positive and negative environmental side effects,
 - The ways in which they can embody specific forms of **power** and **authority**.” [art]



Internet Measurements Ethics



Theory of Applied Ethics

- Consequentialism (“the ends justify the means”)
 - Utilitarianism
- Deontology (“duty for duty’s sake”)
- A mix: “Virtue Ethics”
 - Right actions are those chosen by the actor of virtuous character
- Principlism
 - Respect for autonomy, beneficence, non-maleficence, justice
 - *But what if these are conflicting? What guides the action?*
- Casuistry: practical, case reasoning



Measurements Ethics [ensr]

- “Ethics in Networked Systems Research”
- Internet as socio-technical system
- Responsibilities resulting from power imbalances
- Meaningful informed consent
- Weighing risks, benefits and values for an ethical analysis
- Status of easily accessible data
- Not condoning potentially unethical research methods



- **Context:** How would you describe the context within which data is collected (or affected), or phenomena are measured?
- **Aims:** What are the aim and benefits of the project?
- **Benefits:** Why are the benefits good for stakeholders?
- **Purpose limitation:** Can the scope of data collection be limited whilst still achieving aims?
- **Politics and Power:** Are particular stakeholders empowered or disempowered by the project?
- **Risk of Harm:** Could the collection of the data in this study be reasonably expected to harm any person's well-being?
- **Law:** Which bodies of law are likely to be applicable to the operation of the project?
- **Values:** Which values will the project conceivably impact?
- **Burdens:** Who carries the burden of harms or impacted values, and how?
- **Technology Ethics:** Can the harms and impacted values be traced to parts of the project?
- **Function Creep:** Does the project potentially set a precedent for unethical practices?

Measurements Platforms Comparison



Platform	Flexibility	Coverage	Blocking resistance	Main use
PlanetLab [16]	High	Low/Medium	Medium	Network measurements
Atlas [18]	Low	Medium/High	Medium	Network measurements
M-Lab [6]	Low	High	Medium	Network measurements
Tor [5]	Medium	Medium	Low	Low-latency anonymity
OONI [10]	High	Low	Medium	Interference analysis
Herdict [11]	Low	Low/Medium	Low	Interference analysis
OpenNet [14]	Low	Medium	High	Interference analysis

Table 1: Comparison between several popular filtering analysis platforms.

- “Global Network Interference Detection over the RIPE Atlas Network” (FOCI14)



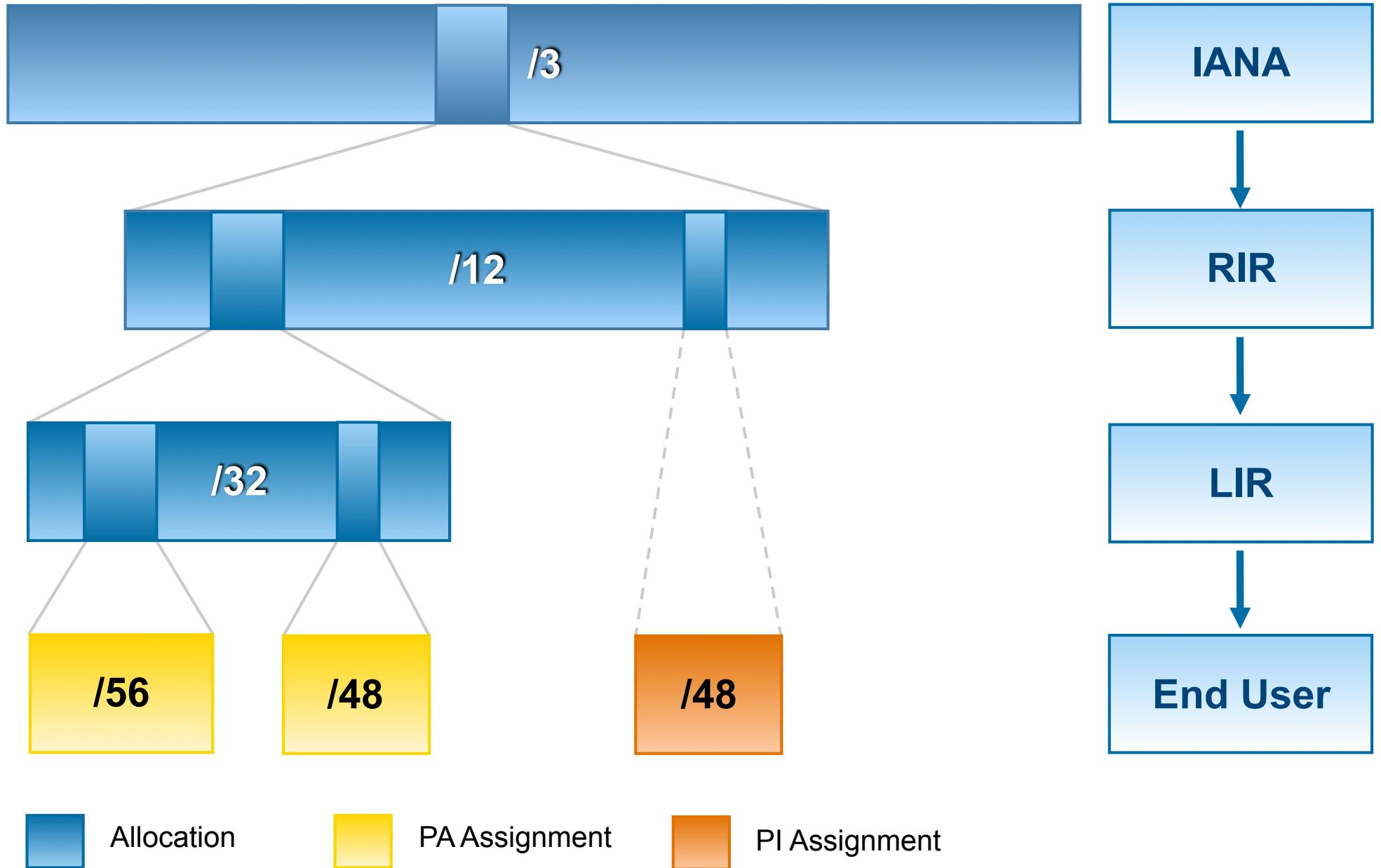
RIPE NCC, RIPE Atlas, Ethics Implemented

The Internet Registry System





IPv6 Addresses Distribution



RIPE Atlas



From Wikipedia, the free encyclopedia

RIPE Atlas  is a global, open, distributed Internet measurement platform, consisting of thousands of measurement devices that measure Internet connectivity in real time.



<https://atlas.ripe.net>



Most Popular RIPE Atlas Features

- Six types of measurements: ping, traceroute, DNS, SSL/TLS, NTP and HTTP (to anchors)
- APIs to start measurements and get results
- Powerful and informative visualisations: “Time Travel”, LatencyMON, DomainMON, TraceMon
- CLI tools
- Streaming data for real-time results
- Roadmap shows what's completed and coming



Ethics Design Decisions

- Active measurements only
 - Probes do not observe user traffic
- Low barrier to entry
 - Free probes, funded by RIPE NCC members and sponsors
- Hosted by volunteers
 - Informed consent (accepting T&C)
 - Personal data never revealed
- Data, API, source code, tools: **free and open**
- Measurements set limited



Ongoing Moral Dilemmas

- 2013: Opening up source code
- 2014: Keeping “non-public” measurements available
- 2015: Not allowing HTTP measurements to random targets
 - September 2017: a proven workaround: <https://labs.ripe.net/Members/wilhelm/measuring-your-web-server-reachability-with-tcp-ping>
- 2016: Security audit

RIPE ATLAS





RIPE Atlas References

- <https://atlas.ripe.net>
- <https://labs.ripe.net/hackathons>
- “Global Network Interference Detection over the RIPE Atlas Network”
- [a] “Ethics of RIPE Atlas Measurements” (2016)
- “Ethics in Network Measurements” (2017)
- “A Field Survey of the Ecosystem Around Internet Censorship, Disruptions, and Shutdowns” (June 2017)



Strong Community Involvement

- Join the RIPE Atlas community!
 - Host a RIPE Atlas probe!
 - Use our (open) measurements data!
 - Use, modify and improve our (FLOSS) software!
 - Come to our hackathons!
- <https://atlas.ripe.net>
- atlas@ripe.net
- [@RIPE_Atlas](https://twitter.com/RIPE_Atlas)



Question Everything!

“Technological advances are usefully considered
not only from the lens of
how they work,
but also
why they came to be as they did,
whom they *help*, and
whom they *harm*.” [r]







Additional Slides



Internet Ethics: FLOSS, Hackers, Cryptographers





“Free Software” Values

- Individual freedoms:
 - To use the software as you wish;
 - To study the program and how it works (perusing its source code)
- At a collective level:
 - The freedom to distribute exact copies of the program, so you can help your neighbour, and;
 - The freedom to modify the source code and distribute these modified versions under the same conditions
- <https://gnu.org/philosophy/free-sw>
- Open Source vs Free / Libre Software?



Everybody needs a hacker





Hackers Ethics

Levy's Hacker Ethic

- Access to computers should be unlimited and total.
- All information should be free.
- Mistrust authority—promote decentralization.
- Hackers should be judged by their hacking, not bogus criteria such as degrees, age, race or position, **gender**
- You can create art and beauty on a computer.
- Computers can change your life for the better.



Tips for Academic Cryptographers

- ◇ Attend to problems' social value. Do anti-surveillance research.
- ◇ Be introspective about why you are working on the problems you are.
- ◇ Think twice, and then again, about accepting military funding.
- ◇ Regard ordinary people as those whose needs you ultimately aim to satisfy.
- ◇ Use the academic freedom that you have
- ◇ Be open to diverse models. Regard all models as suspect and dialectical.
- ◇ Get a systems-level view. Attend to that which surrounds our field.
- ◇ Design and build a broadly useful cryptographic commons.
- ◇ Take adversaries seriously.



<https://criticalengineering.org>

8. The Critical Engineer looks to the history of art, architecture, activism, philosophy and invention and finds exemplary works of Critical Engineering. Strategies, ideas and agendas from these disciplines will be adopted, re-purposed and deployed.
9. The Critical Engineer notes that written code expands into social and psychological realms, regulating behaviour between people and the machines they interact with. By understanding this, the Critical Engineer seeks to reconstruct user-constraints and social action through means of digital excavation.
10. The Critical Engineer considers the exploit to be the most desirable form of exposure.



Beyond Hackers Ethics

Question Everything!



<http://linnytu.com/hacker>

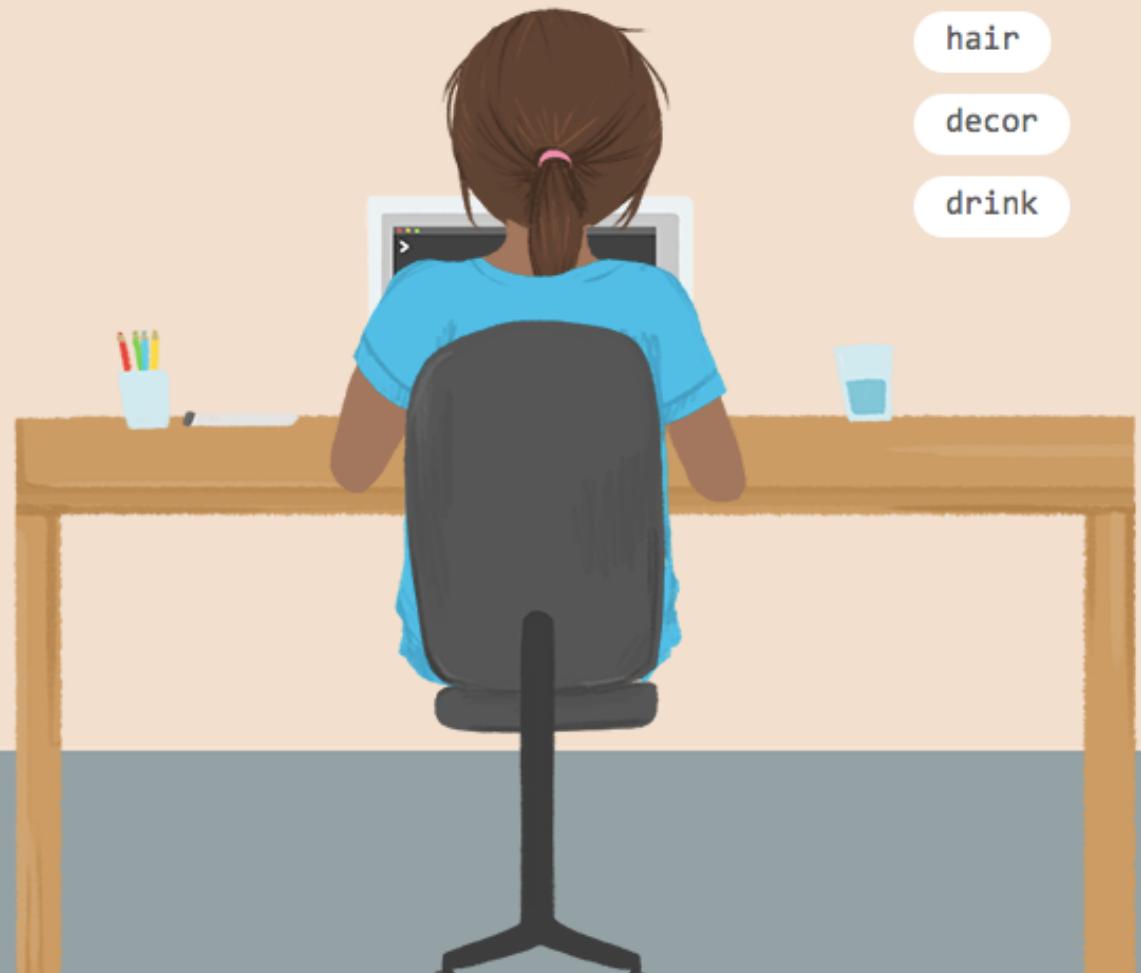
C ⌂ ⓘ linnytu.com/hacker

this is what a hacker looks like.

or is it?

the image of the white, male hacker in a hoodie is harmful and exclusive to people who don't fit that mold.

what if you could change that image?



Hacker ~~Ethic~~ Questions

- ~~Access to computers should be unlimited and total.~~ Who gets to use what I make? Who am I leaving out? How does what I make facilitate or hinder access?
- ~~All information should be free.~~ What data am I using? Whose labor produced it and what biases and assumptions are built into it? Why choose this particular phenomenon for digitization/transcription? What do the data leave out?
- ~~Mistrust authority — promote decentralization.~~ What systems of authority am I enacting through what I make? What systems of support do I rely on? How does what I make support other people?
- ~~Hackers should be judged by their hacking, not bogus criteria such as degrees, age, race or position.~~ What kind of community am I assuming? What community do I invite through what I make? How are my own personal values reflected in what I make?

Allison Parrish: “Programming is Forgetting: Toward a New Hacker Ethic” (2016)



With Great
Power
Comes
Great
Responsibility



With Great Power...

At a time when science plays such a powerful role in the life of society, when the destiny of the whole of mankind may hinge on the results of scientific research, it is incumbent on all scientists to be fully conscious of that role, and conduct themselves accordingly. I appeal to my fellow scientists to remember their responsibility to humanity.²¹⁰

- ... great responsibility
- to humanity...
- to the planet...
- and to squirrels!





Possible Alternatives / Additions to Hackers Ethics



<http://feministinternet.net>

1. A feminist internet starts with and works towards empowering more women and queer persons – in all our diversities – to dismantle patriarchy. This includes universal, affordable, unfettered, unconditional, and equal **access** to the Internet.

2. A feminist internet is an extension, reflection, and continuum of our movements and **resistance** in other spaces, public and private. Our agency lies in us deciding as individuals and collectives what aspects of our lives to politicize and/or publicize on the internet.

3. The internet is a **transformative** public and political space. It facilitates new forms of citizenship that enable individuals to claim, construct, and express ourselves, genders, sexualities. This includes connections across territories, demands for accountability and transparency, and significant opportunities for feminist movement-building.

4. **Violence** online and tech-related violence are part of the continuum of gender-based violence. The misogynistic attacks, threats, intimidation, and policing experienced by women and LGBTQI people are real, harmful, and alarming. It is our collective responsibility

9. The internet's role in enabling access to critical **information** - including conversations on health, pleasure, and risks - is essential, and must be supported and protected.

10. Surveillance by default is the tool of patriarchy to control and restrict rights both online and offline. The right to **privacy** is a critical principle for a safer, open internet for all. Equal attention needs to be paid to surveillance practices by individuals against each other, as well as the private sector and state actors, in relation to the state.





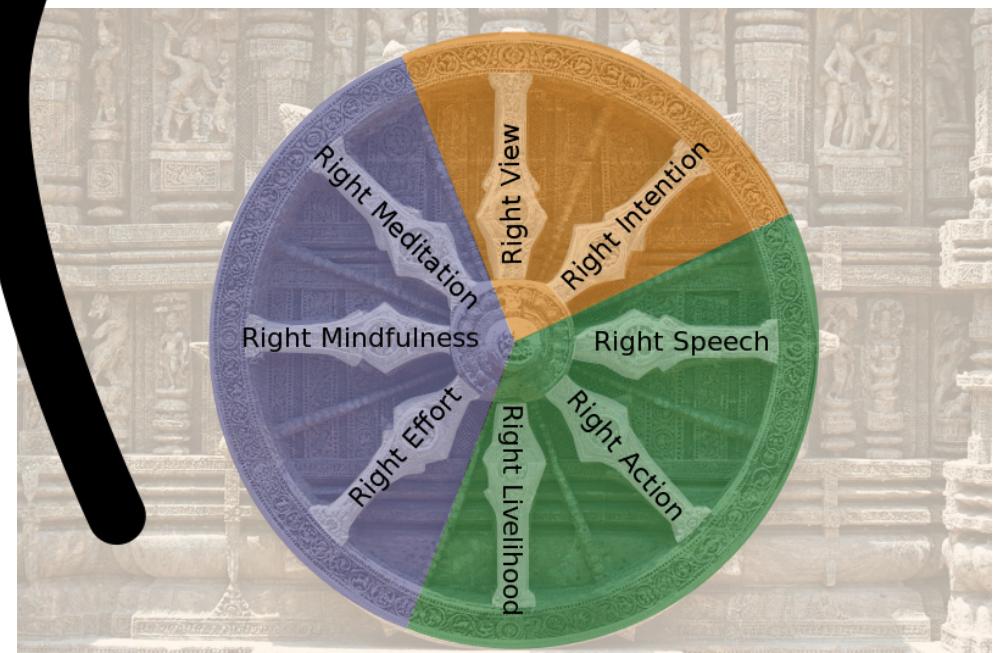
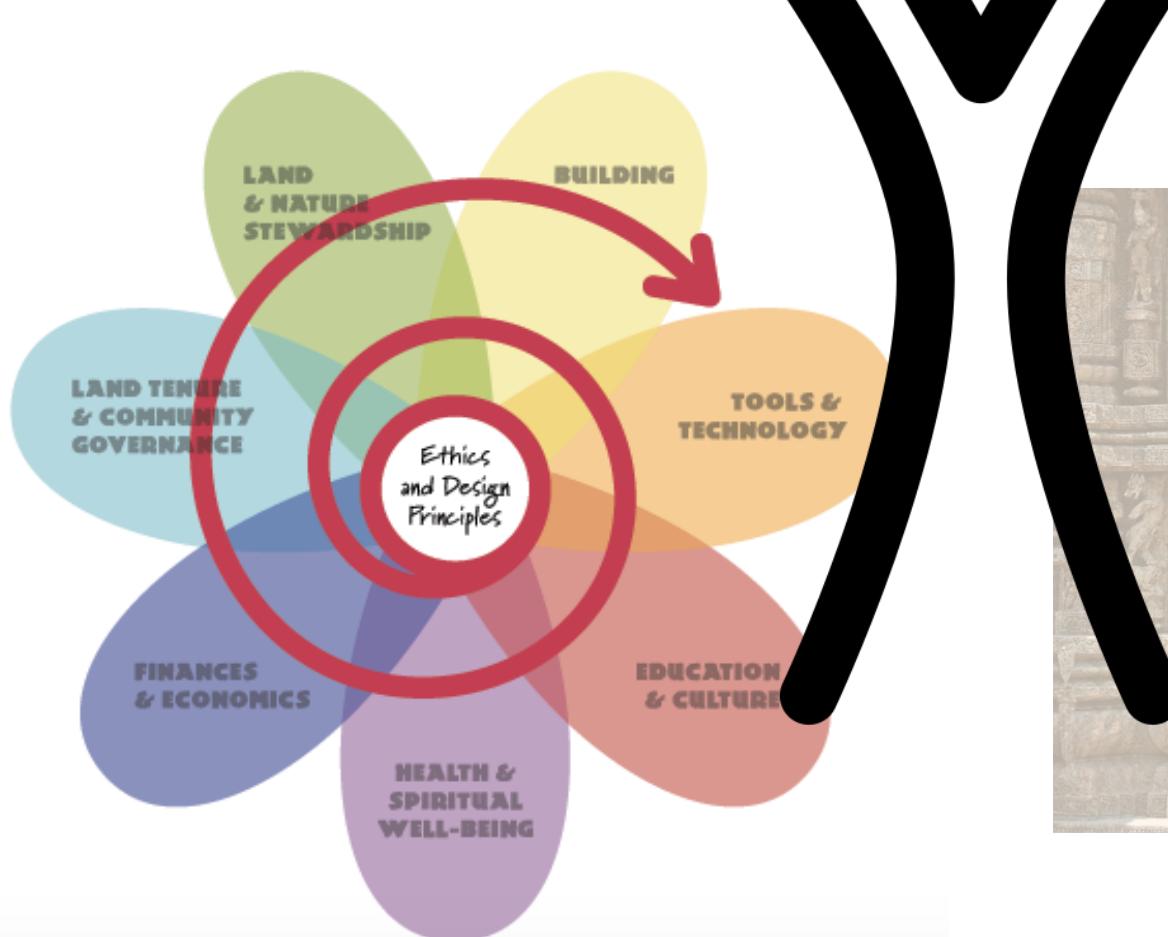
(Tech) Ethics of Non-violence

- Non-violent resistance philosophy of Gandhi and Martin Luther King Jr.
- Algorithmically-geeky “Non-violent Communication” by Marshal Rosenberg
- “Guide to Empathetic Technical Leadership”
<http://empathetictechnicalleader.com>
 - FREE to read online: <https://leanpub.com/littleguide/read>
- Open Source and Feelings (#OSSfeel)
 - <http://www.osfeels.com/>



Internet of Empathy

- Positive freedom of connectivity, interaction and involvement
 - Instead of libertarian “freedom” as independence and self reliance
- This freedom comes at the price of greater responsibility
- *“The intrinsic value of a network does not lie in the sovereignty and independence of its nodes, but in their connectedness,”*
- Empathy is willingness to engage with the Other, and willingness to enrich network with our contributions
- From: “To Our Friends” by The Invisible Committee
<https://mitpress.mit.edu/books/our-friends> “





Beyond Techno-Optimism



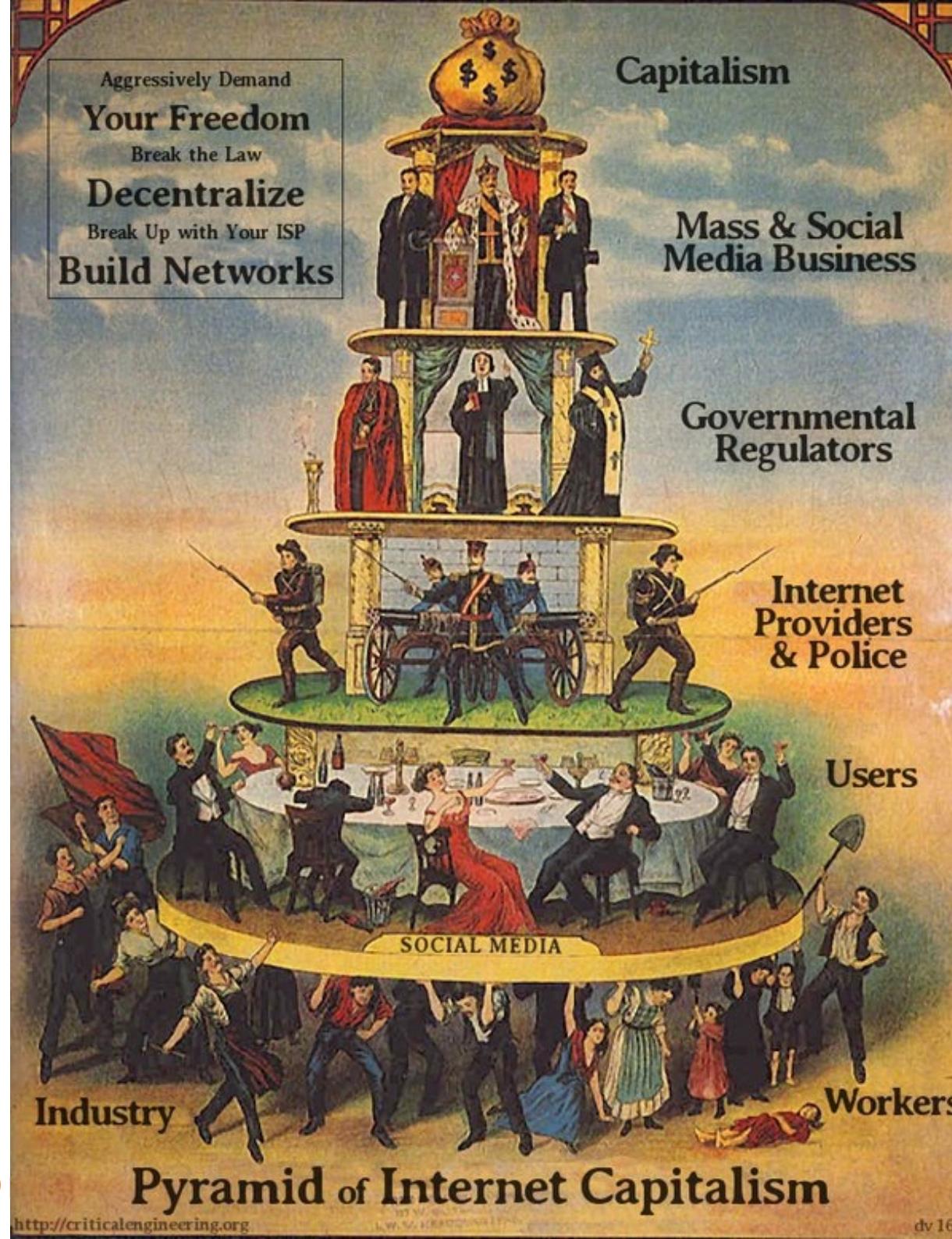
A NATURAL PAIRING A data center in Ashburn, Va., seen past a Dominion Virginia Power substation serving it. Worldwide, such centers use the rough equivalent of the output of 30 nuclear power plants.

Brendan Smialowski for The New York Times



Child miner in Burkina Faso — PBS NewsHour







A child at the Agbogbloshie electronic waste dump in Ghana. Photograph: Andrew McConnell/Alamy



Squirrels Winning the Cyber War ;-)



TOTAL SUCCESSFUL CYBER WAR OPS
AS OF 2017.01.08 - 1748

Agent	Success
Squirrel	879
Bird	434
Snake	83
Raccoon	72
Rat	36
Marten	22
China	0
Russia	0*
USA	1



- https://wiki.techinc.nl/index.php/Hackers_tribes#Squirrels_against_technology



Acknowledgements and References



More References

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- Philosophy of Hacking, by Groente
- Digital Tailspin: Ten Rules for the Internet After Snowden
- Tor, Technocracy, Democracy
- Heather Marsh
- [how] Software Freedom your Way
- Sebastian Olme
- <http://guymcperson.com/2013/12/hackers-ethic-for-the-world-after-collapse/>
- <http://becha.home.xs4all.nl/hackers-philosophers-utopian-network-dec-2012-becha.pdf>



Even More references, July 2017

- IETF, Human Rights and <https://www.rightscon.org/>
 - <https://www.ietf.org/proceedings/99/slides/slides-99-hrpc-presentation-milton-mueller-requiem-for-a-dream-00.pdf>
 - <https://www.article19.org/resources.php/resource/38819/en/ethical-approaches-to-artificial-intelligence-and-autonomous-systems-at-ieee-seas-2017>
 - <https://datatracker.ietf.org/doc/html/draft-nottingham-for-the-users-05>
- “To Our Friends” by The Invisible Committee
 - <https://mitpress.mit.edu/books/our-friends>
- “I Hate the Internet” <http://weheardyoulikebooks.com/releases/i-hate-the-internet/>
- Geoff Huston: "The Internet's Gilded Age" (March 2017) <http://www.potaroo.net/ispcol/2017-03/gilding.html>



Main Inspirations

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