



5G standaardisatie en haar onbehagen

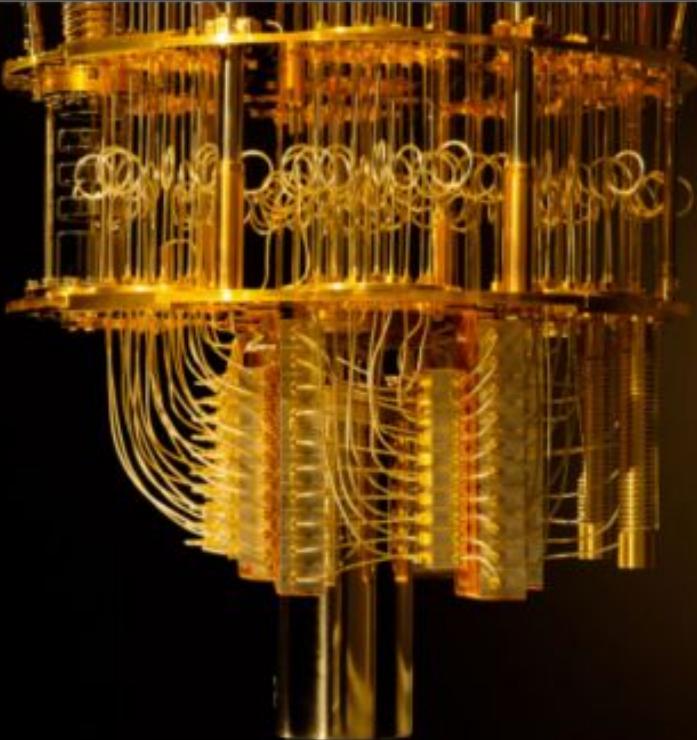
Platform Internetstandaarden
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Niels ten Oever, PhD
Postdoctoral Researcher
IN-SIGHT.it

University of Amsterdam
Texas A&M University

mail@nielstenoever.net
<https://nielstenoever.net>
[@nielstenoever](https://twitter.com/nielstenoever)



IN-SIGHT.it

Citizenship and standard-setting in digital networks

Co-designing for public values in standards-making and governance

University of Amsterdam - Media Studies & Datascience
University of Groningen - Law



Why?

‘Infrastructure sets the invisible rules that govern the spaces of our everyday lives’

‘changes to the globalising world are being written, not in the language of law and diplomacy, but rather in the language of infrastructure’

- Keller Easterling



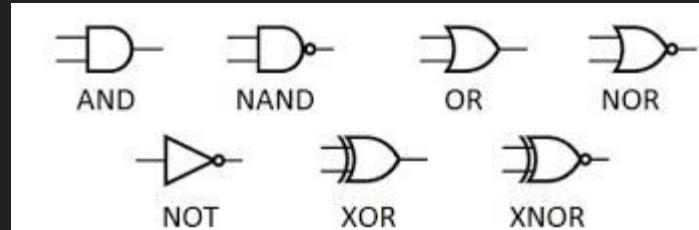
What? (i)

5G-NR (new radio) is a new set of standards and protocols for a Radio Access Network

- Massive MIMO (multiple input, multiple output devices)
- Beamforming (more efficient antenna usage)
- New frequencies (mmWave -> 28 GHz - 39 GHz)

This needs new hardware (routers + antennae)

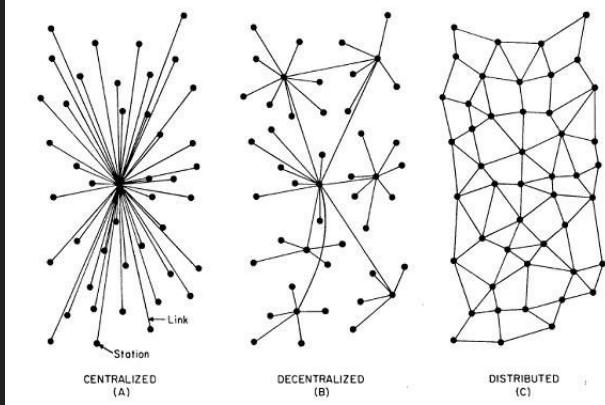
New generation routers are implementing many things in software what previous router did through dedicated hardware (such as logic switches)



What (ii)

Software based routers allow for network architecture re-engineering:

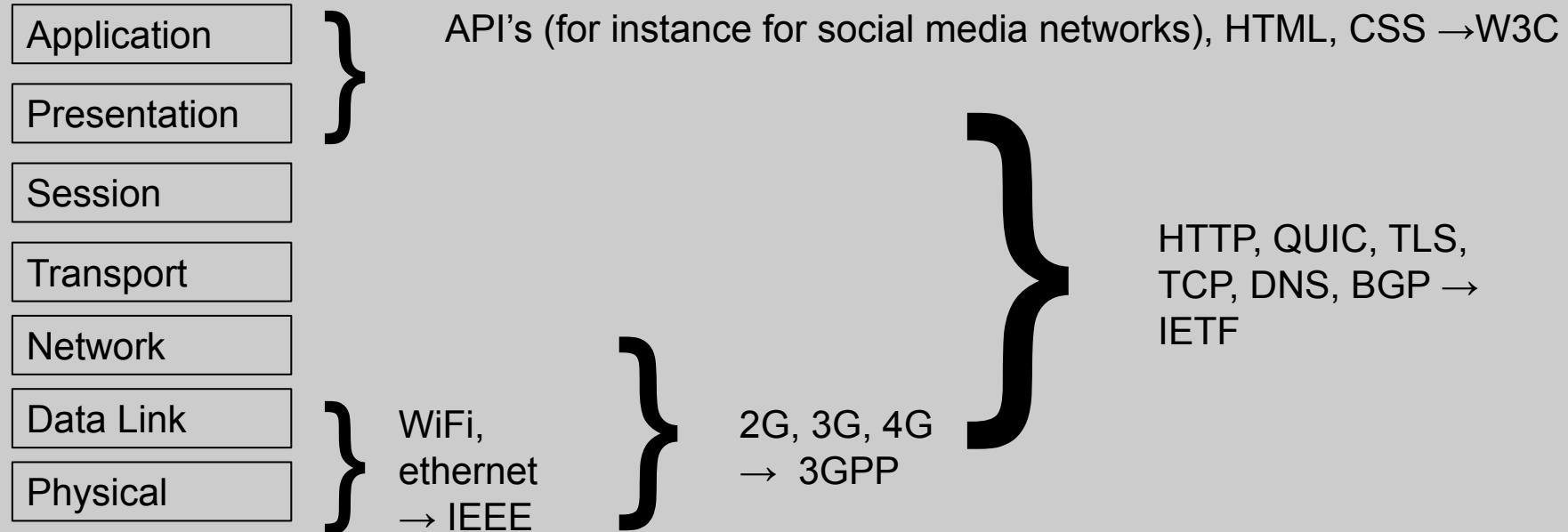
- Edge networks
- Software Defined Networking
- Network Function Virtualization
- Slices
- Distributed Computing



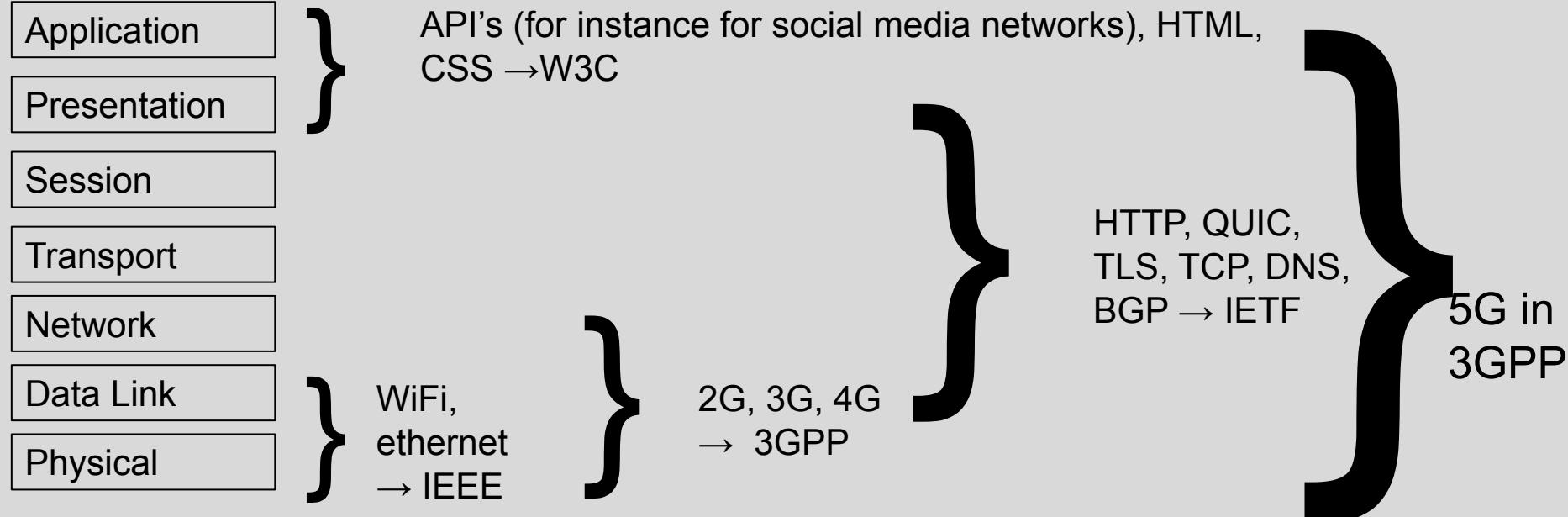
Together with network ownership consolidation, this could lead to a network that departs from the end-to-end characteristic of the Internet.

In other words: the network becomes smarter and gains more power, end-users lose transparency and control.

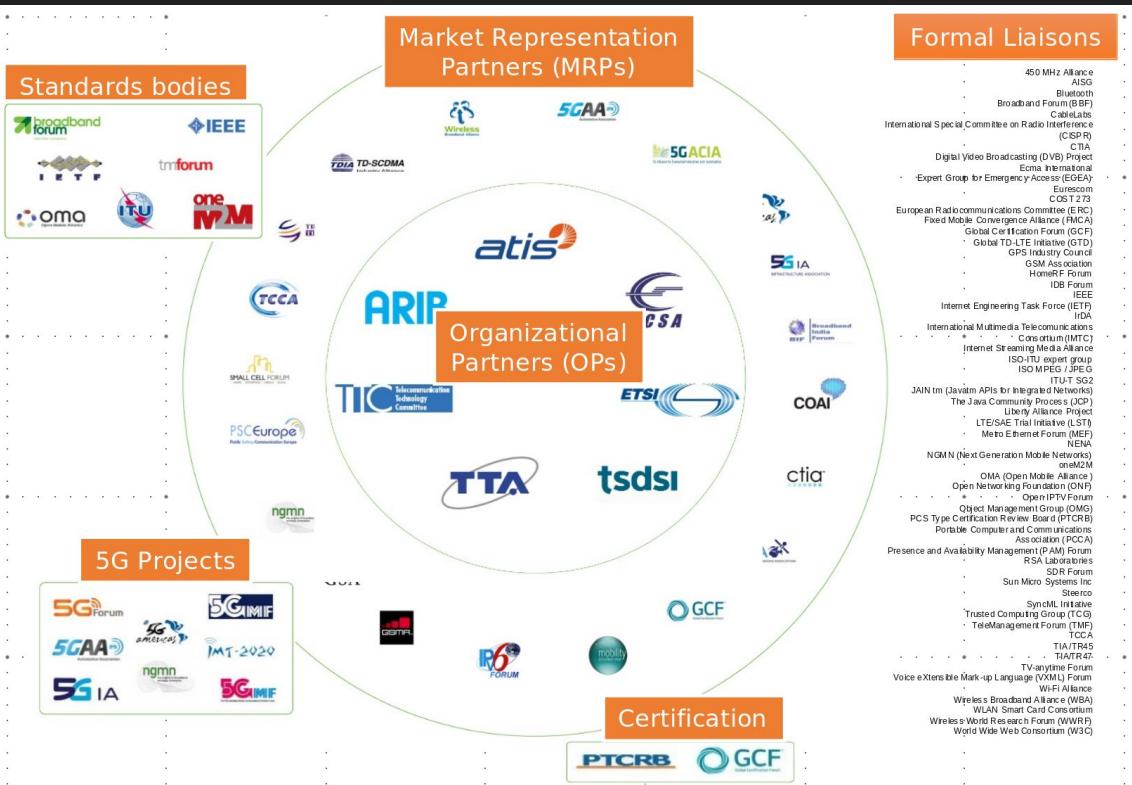
Infrastructure architecture intermezzo (vi)



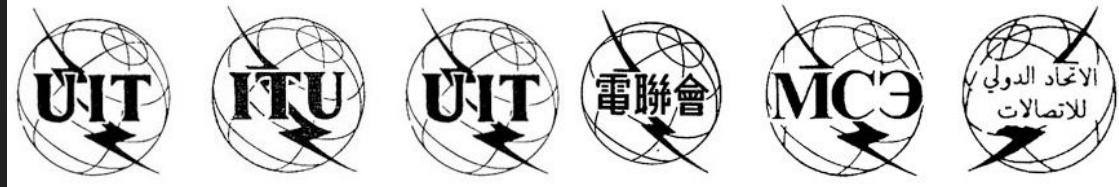
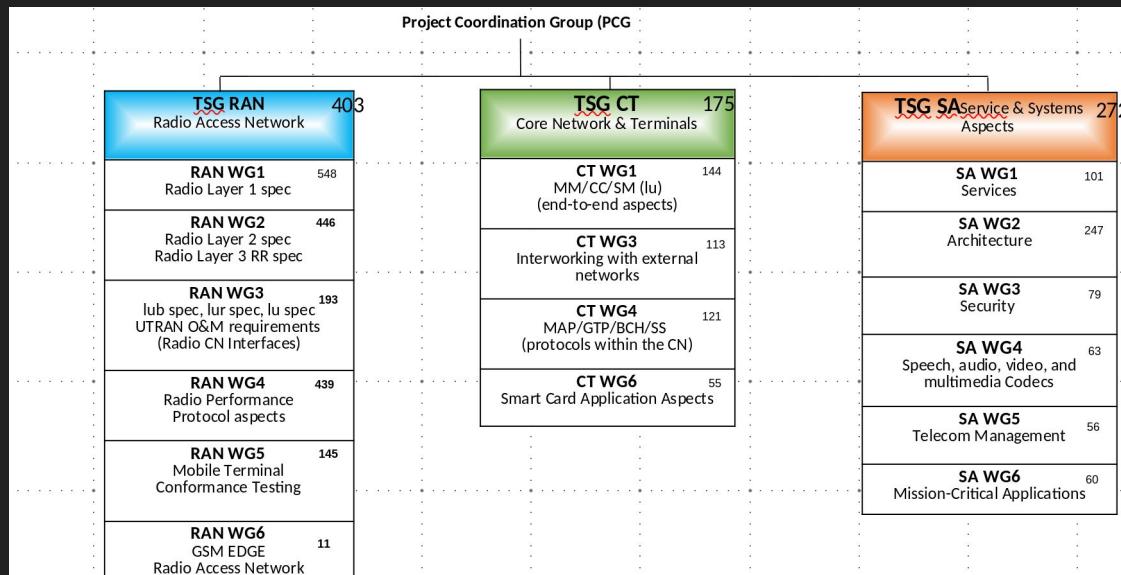
Infrastructure architecture intermezzo (viii)



Where (i)



Where (ii)



Who?

Equipment Vendors

Apple // Blackberry // Broadcom // CATT // Cisco // Ericsson // ETRI // Futurwei // Google // HP // Huawei // Infineon // Intel // Interdigital // Juniper // Kapsch // Kyocera // Lenovo // LG // Matrixx Sw // Mavenir // MediaTek // Mitsubishi // Motorola Mobility // Newtec // Nokia // OPPO // Samsung // Sandvine // Sharp // Sony // Spirent // Vivo // XiaoMi // ZTE

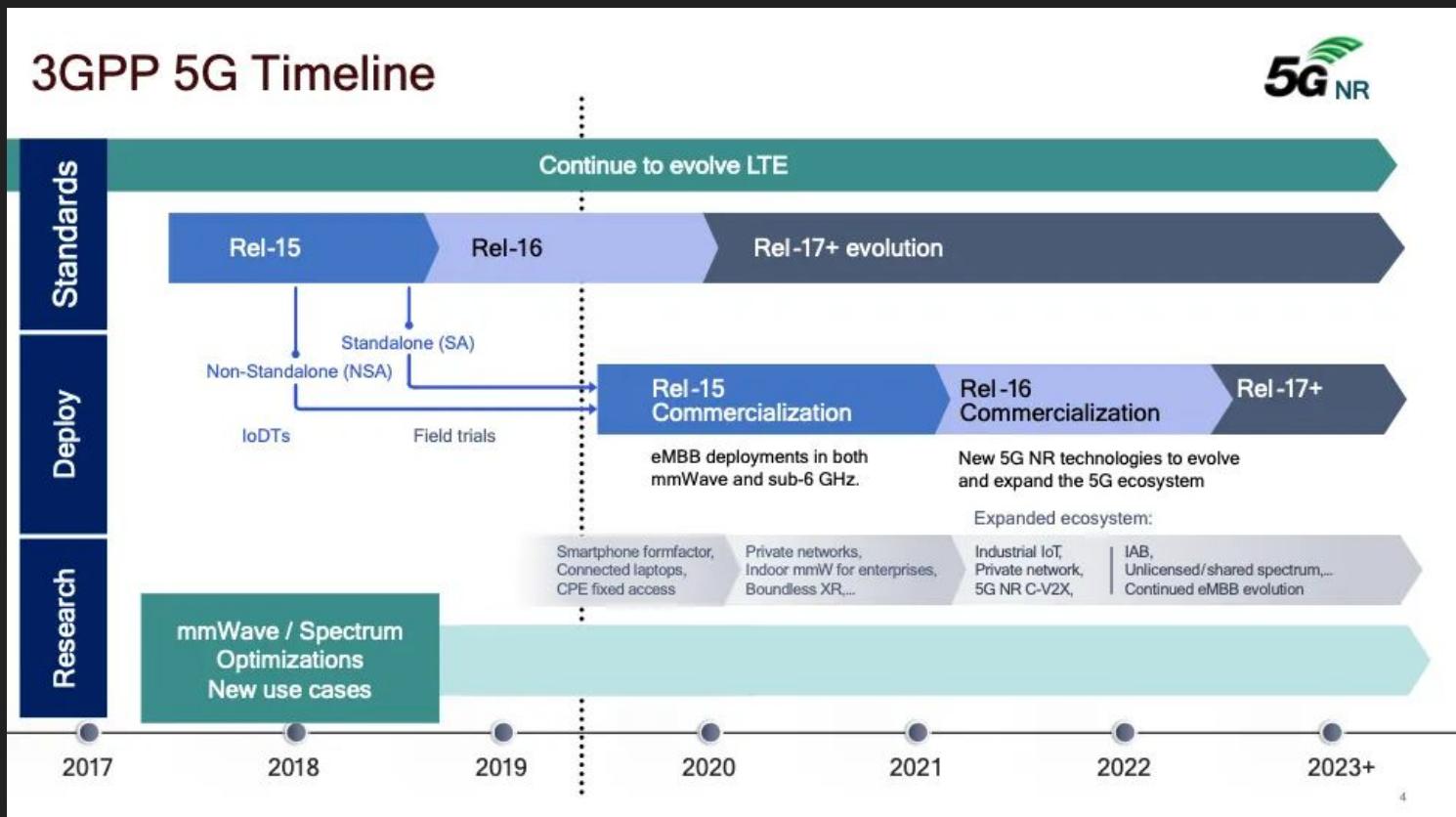
Network Operators

AT&T // Avanti // Bell Canada // BT // CableLabs // CAICT // Charter // China Mobile // China Telecom // China Unicom // CISA // FirstNet // Hughes // Inmarsat // Intelsat // KDDI // KPN // KT // LG U+ // NTT DoCoMo // Orange // Rogers // SES // SK Telecom // Softbank // Sprint // Telecom Italia // Telefonica // Telenor // Leonardo // Telia // Telstra // Telus // T-Mobile // Turkcell // UK HO // Verizon // Vodafone

‘Verticals’ (applications, end-users devices, cars, police, industry)

ABS, Airbus, Alibaba, BBC, Bosch, Convida, DLR, EBU, ESA, Eutelsat, Fraunhofer, IRT (Germany), IPCom, ITRI, ligado networks, NHK, Novamint, Omesh, Philips, Sennheiser, Siemens, Suomen Virveverkko, Tencent, Thales, NL Police, TNO, Toyota, UIC, Volkswagen, ZITiS

When?



What do we know:

- How 5G gets developed and standardized (in the 3GPP, ITU-T, ITU-R, etc.);
- How 5G works in edge networks (eg. [Facebook's Magma](#));
- How 5G frequencies are being auctioned and deployments are being financed by govts;
- How 5G will strengthen network consolidation.

What do we *not* know:

- How the societal impact of such standards can be taken into account in technology development, standardization and implementation ?
- How people think about 5G ?
- How critical interpretative frames could be used to improve policy+technology making?

FAQ

Myth	Reality
5G is only about radio network	<ul style="list-style-type: none"> If 5G is deployed in non-standalone mode then existing 4G core (EPC) is used. If 5G is deployed in standalone mode, then an all new 5G core that enables the use cases discussed in this presentation is used.
5G means extreme throughput or 5G means speed	<ul style="list-style-type: none"> 5G has different use cases – eMBB, URLLC and mMTC Different use cases have different throughput and latency requirements Throughput is a function of the radio bandwidth available, UE's location in the cell (which determines its SNR). <ul style="list-style-type: none"> Channel capacity limited by Shannon Theorem $C = B \cdot \log_2(1+SNR)$ bps
All use cases of 5G – eMBB, URLLC, mMTC will be seen as soon as networks launch 5G	<ul style="list-style-type: none"> NR radio design provides lot of flexibility. Flexibility comes at a cost. Its practically impossible to support all use cases on day 1. Initial deployments will mostly target eMBB. Where are the applications for URLLC and mMTC?
5G will kill WiFi	WiFi will co-exist. NR may be used for cases where grant based access and guaranteed latency is required.
5G is a health hazard	<ul style="list-style-type: none"> The hazard is not a function of "radio frequency" but it's a function of "exposed power or energy levels". Human body when exposed to any electro-magnetic radiation (including visible light) more than the prescribed power levels is harmful. Power dissipates as the square of distance from base-station. As long as the human body is away from the base station such that the receive power at the UE is < 32 dBm (~1.5 watts) the receive power is well within SAR limits (1.6 watts/Kg of tissue). <ul style="list-style-type: none"> $P_r = P_t / 4\pi d^2$ Typical $P_t = 40$ watts (46 dBm)

Research Questions

Research Question: What are the critical interpretative frames of 5G on social media platforms, especially in regards to the infrastructural claims of 5G conspiracy theorists?

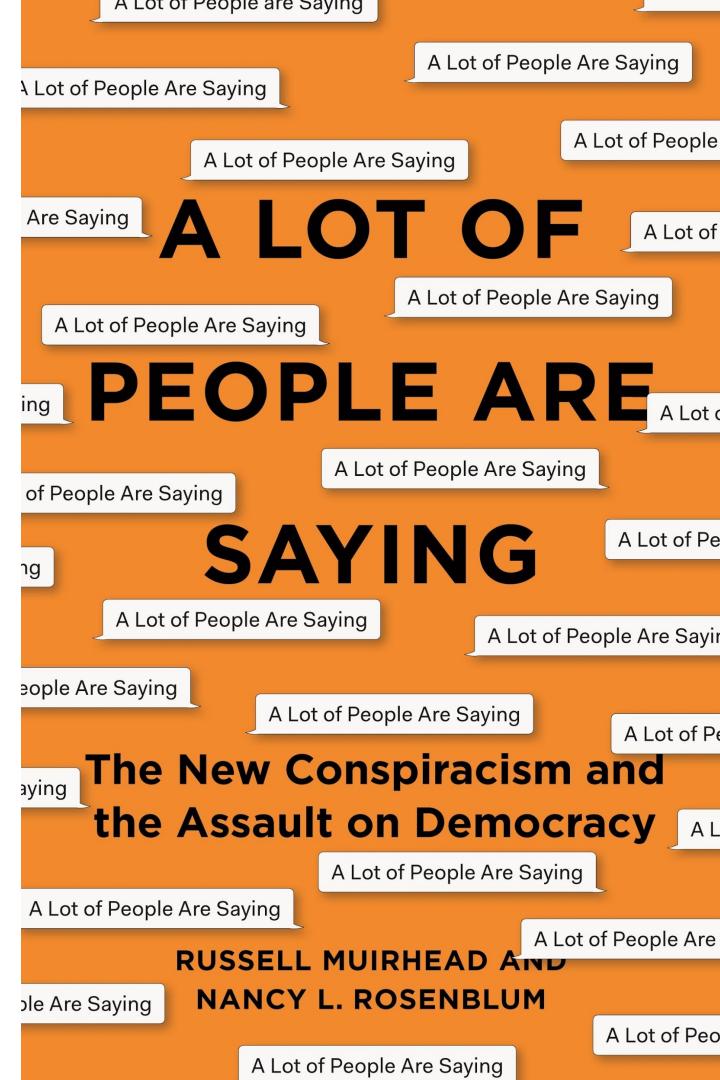
Sub-Question 1: What is a sub-categorization of the main motifs, symbols and epistemic phrases that epistemise 5G across platforms?

Sub-Question 2: How does 5G discourse evolve over time and space?

Sub-Question 3: Do 5G conspiracies mirror or overlap with the imaginaries of 5G providers?

Theoretical Framework

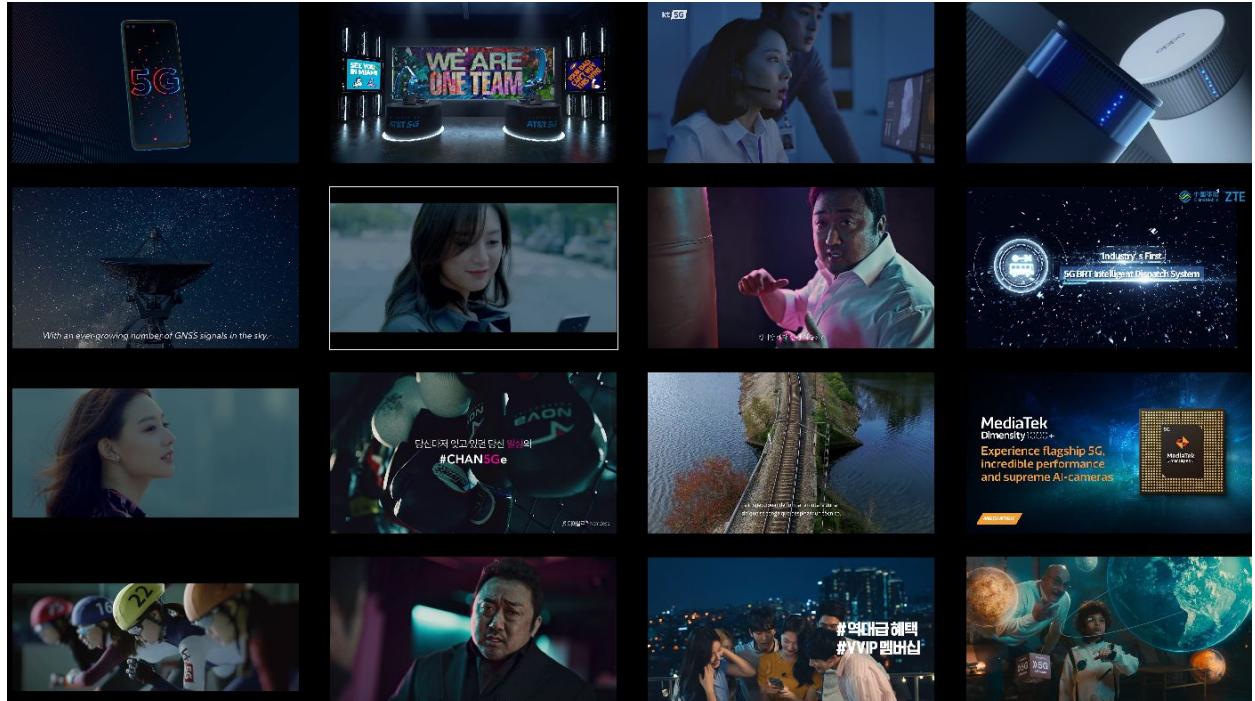
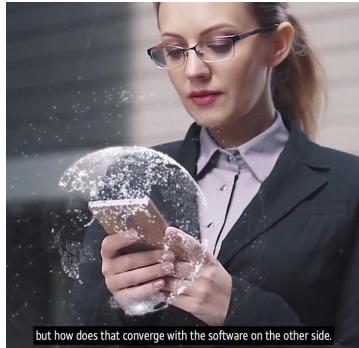
- Conspiracy without Theory (Muirhead and Rosenblum, 2019)
→ new conspiracism as conspiracy without explanation & argumentation
- Conspiracy Fragments vs. Theories
→ conspiracy theories as alternative forms of knowledge production



Main Takeaways

- 5G companies focus on marketing and self-presentation rather than concrete 5G technology benefits. Abstract language and images *fail to create a sociotechnical imaginary for 5G*.
 - This creates cognitive gaps that the users then fill with their own interpretative frames!
- Conspiracies arise and are mediated by the specificities of platform regulations & affordances (mainstream vs. fringe):
 - *Instagram*: discourse is fragmented due to robust pre-defined spaces and strict regulations: no in depth theories, this leads to “hardcore” users move to the fringe.
 - *Parler*: more argumentative, “scientific” discourse, more homogeneous user base, polarized towards few main narratives and conspiracy tribes

Provider imagery: Instagram & YouTube

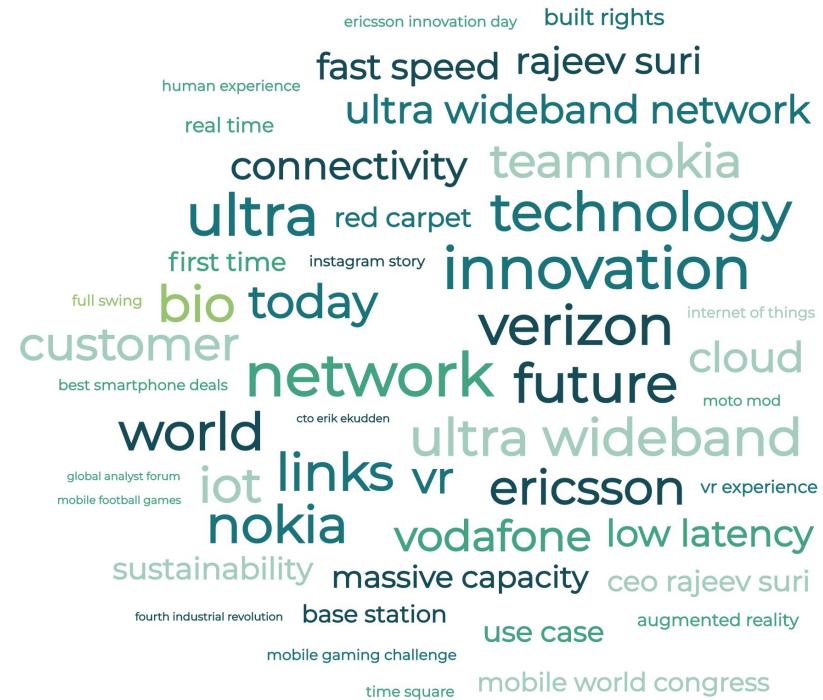


Instagram provider accounts sample posts

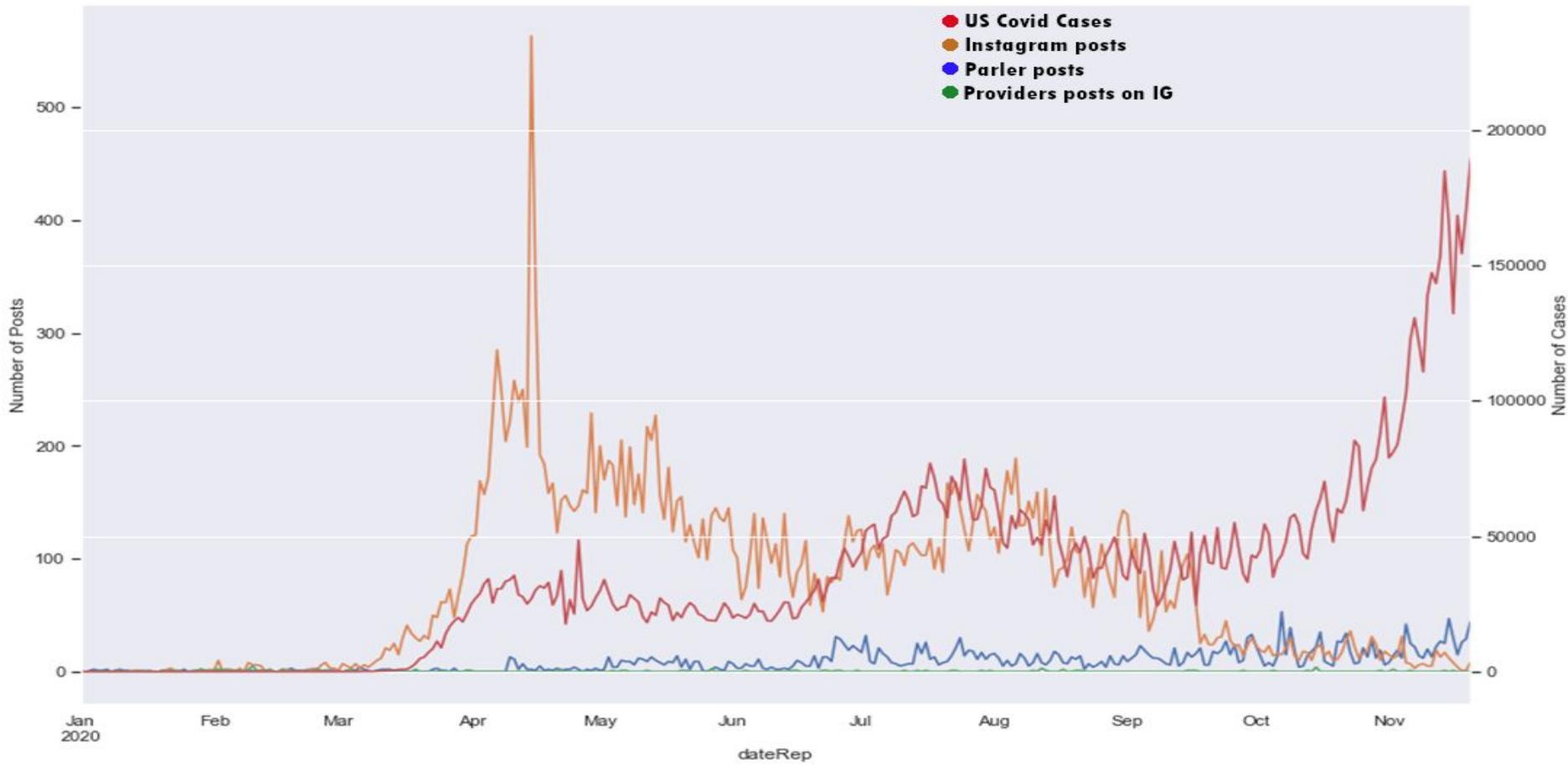
YouTube sample thumbnails from providers' videos

Providers' discourse: Webpages & Instagram

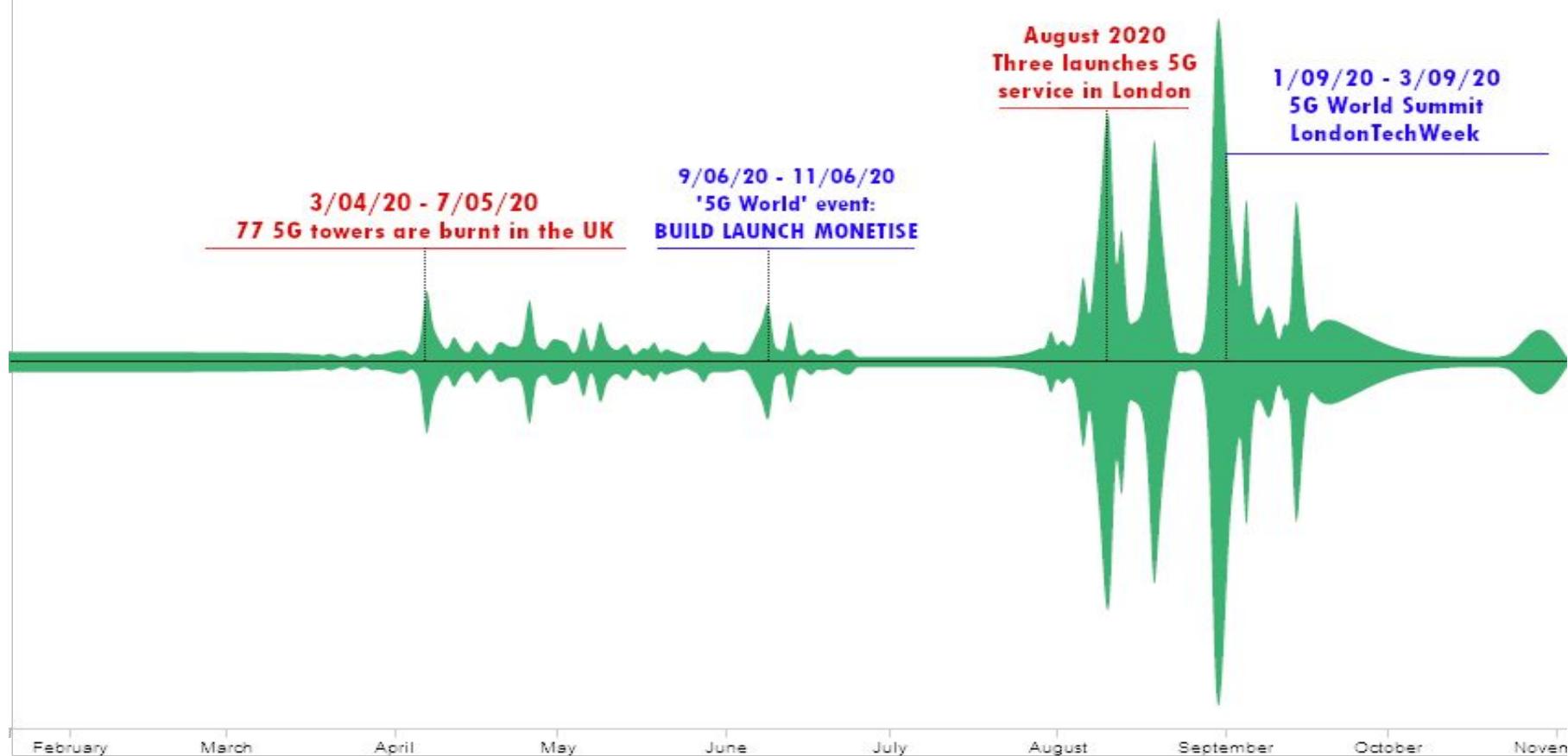
Word cloud comparison: Websites and Instagram posts of vendors and network operators

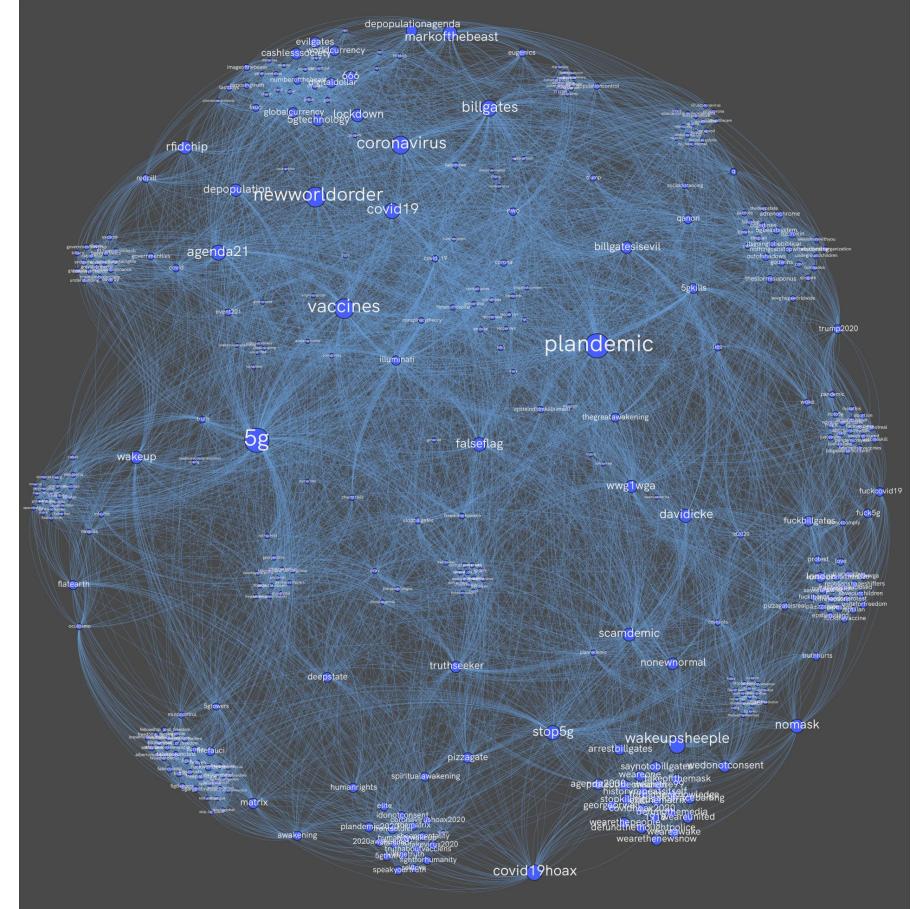


Time Series

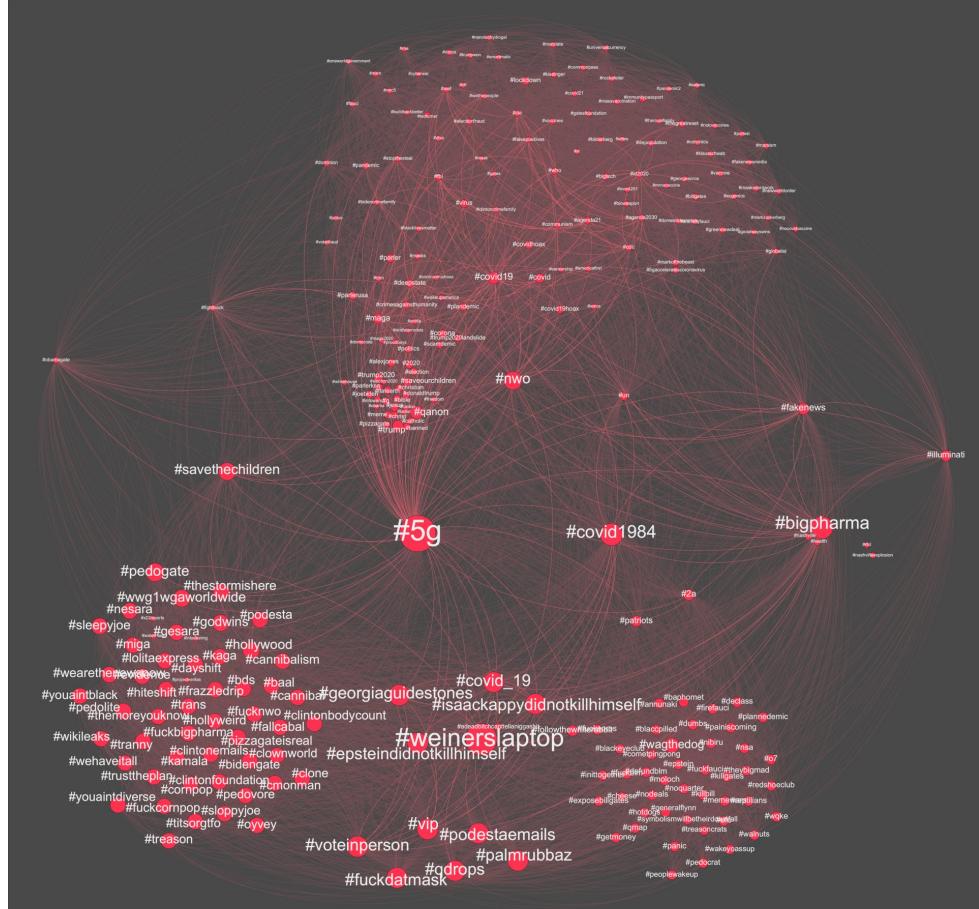


5G events and IG-conspiracy post frequency in London





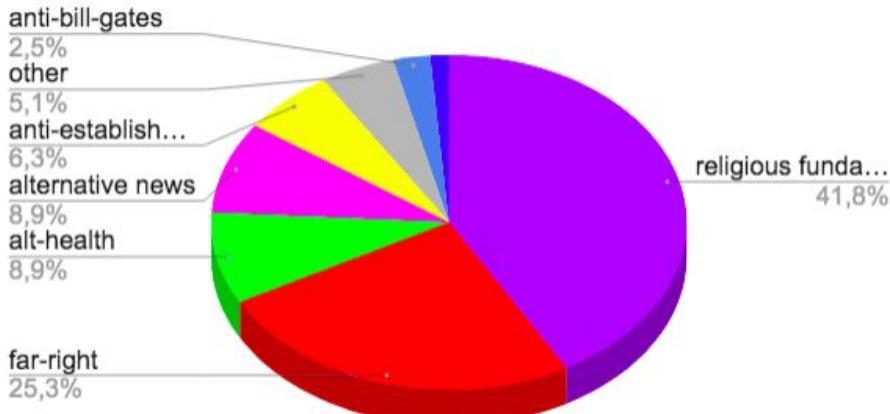
Instagram: Small, scattered clusters



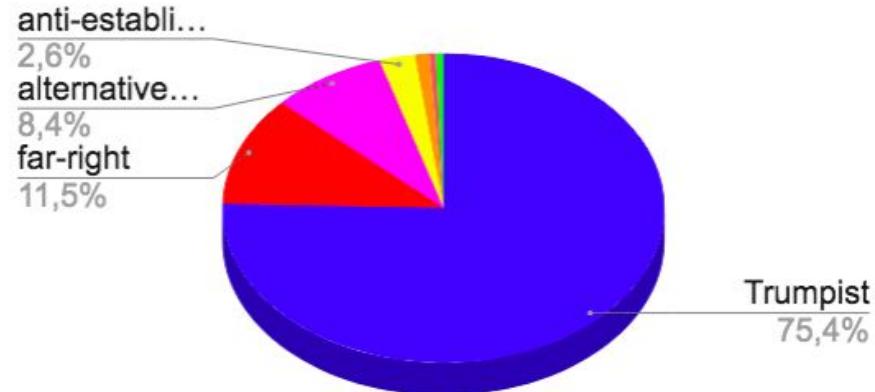
Parler: Large, organized clusters

Conspiracy Tribes Instagram vs. Parler

5G Instagram Conspiracy Tribes



5G Parler Conspiracy Tribes



- over 50% of accounts deleted
- nearly 40% conspiracy theorists
- 10% ordinary users
- more diverse users & tribes

- one deleted account
- over 95% conspiracy theorists
- no regular users
- few independent media accounts



asabove_asbelow44 • Follow ...



32 likes

DECEMBER 4, 2016

IG alt-health account sample post



Brian Peters

bpeterssquare

Salesman in the vacation industry forced to be a digital soldier. I post things that interest me as well opinions. Freedom loving, gun loving, woman loving, flag loving patriot defending his country.



eleven.eleven.humanity

elevenelevenhumanity

👉 Original Account Deleted 4 Times by Instagram 🐚 Truth Exposer 🐚 Follow the White Rabbit 🐚 The Truth is Powerful and It Prevails 🌎 New Earth 4D/5D Ascension 🐚 Critical Thinker ✨ We the People

Parler sample bios (fig 1: Trumpist, fig 2: migrated user)

Text Analysis Instagram vs. Parler

