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Keywords:
platform cognition, network phenomenology, addressing systems, indeterminacy, network topology, geocoding, vagueness, null island

THE DARK CORNERS OF UNADDRESSABILITY: VAGUE AND ERROR ADDRESSING AS GEO-GEOMETRIC PLATFORM COGNITION

Abstract:

By design a network excludes. As a managerial layer between nodes it draws boundaries between inside and outside, belonging and not belonging. This essay examines the pathologies of seeing and being seen that emerge from the interplay of platform sensing and node addressing systems. It does so by providing a taxonomic overview of what shall be called “unaddressability”, encompassing not only an *inability* to sense addresses, but equally an ability to proactively *avoid* the addressing of nodes within a network’s spectrum.

From there we will embark on a speculative journey into the relevance of two particular aspects of unaddressability: vagueness and indeterminacy. The essay invites the reader to look at the manifold worlds produced by vague addresses, defined as positional inaccuracies in tracking and geolocation technologies, and error addresses, which include null islands, fictional geographic entities used to troubleshoot geocoding errors. It uses these two concepts to speculate on forms of “geo-geometric platform cognition” as a design template for new network ontologies.

The Dark Corners of Unaddressability: Vague and Error Addressing as Geo-geometric Platform Cognition

by Anna-Luise Lorenz

"There are all these non-existent objects out there just waiting for someone to talk about them."
— Tim Crane, Knightsbridge Professor of Philosophy at the University of Cambridge [1]

In his philosophy of phenomenology, Husserl elaborates on his understanding of kinaesthetic consciousness not as 'a consciousness of movement, but a consciousness or subjectivity that is itself characterized in terms of motility, that is, the very ability to move freely and responsively' [2]. Through sensation as an interface to the world, the human body becomes the pivot from which the world continuously unfolds itself *in-relation-to* [3]; this ever-changing relationality becomes the key to building not just one, but a multiplicity of subjective worlds, all of them self-contained and unique within a mutually shared space of embodied agents. Beyond this infinite swarm of worlds, there is no outside, no absolute truth, no Aleph (the fictional point described by Borges in one of his short stories, from where the world would infinitely reveal itself from all angles at all times).

Network regimes

In 1989 when Tim Berner-Lee proposed his vision of a 'global mind', a shared universal space of humans and machines in the form of the World Wide Web at CERN, he drew inspiration from Ted Nelson's Project Xanadu, a digital repository scheme for world-wide electronic publishing which would facilitate non-sequential writing. Of the two, the Web, originally conceived and developed to meet the demand for automated information-sharing between scientists in universities and institutes around the world via a unidirectional concept of hypertext, established itself successfully [4]. Nelson's proposal of a bidirectional link system never gained momentum — as an idea it was too far ahead of its time. A seemingly minor detail lead to an entirely different network architecture: 'Redefining information not as an index of a past or present event but as the potential for future actions (not what you *say* but what you *could* say)' remains the fundamental inspirational concept for engineers, understanding communication in a network as a set of interactions 'between sources of signals, in a move that mirrors the turn in design to complexity, process, and connection'. [5]

In common metaphoric understanding, the architecture of a network is idealized as de-territorialized, non-hierarchical, flexible and durable.[6] Practices such as internet routing significantly influence the architecture of a network's topology. The network as a highly managed space results from a genealogy of socio-technical negotiations and competing designs, perpetuating biases from the past and present, producing not the Internet, but 'just this Internet' [7]. As Eric Snodgrass remarks:

> *'Indeed, key forces in contemporary platform practices, like the establishing of individual user identity, were not necessarily given trajectories in the formation of the Internet as originally conceived. As Wendy Chun highlights, "IP addresses, even when fixed, were not viewed as permanently tethered to a computer, let alone a user" (Chun 2016b, 57). Rather, it was only with the introduction of changes to IP addressing and, even more importantly, via the introduction of techniques like those of HTTP cookies and cross-platform logins, that such a mode of continuous tracking of "unique identifiers" in connected environments became what is now a default and taken for granted practice that undergirds so*

1 Tim Crane, "The Nature of Existence" (lecture, London School of Economics, October 8, 2013).
2 Elizabeth Behnke, "Edmund Husserl: Phenomenology of Embodiment," accessed April 30, 2019, https://www.iep.utm.edu/husspemb/.
3 The notion of 'worlds' echoes also, amongst others, in Donna Harraway's understanding of the female world gaze in "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective", or Uexküll's *Umwelt* theory in which he states that 'all reality is subjective appearance [Alle Realität ist subjective Erscheinung]' (as quoted in Brett Buchanan, *Onto-Ethologies: The Animal Environments of Uexkull, Heidegger, Merleau-Ponty, and Deleuze*. (Albany: State University of New York Press, 2008), 2.)
4 Yuk Hui, *On the Existence of Digital Objects*. (Minneapolis/London: University of Minnesota Press, 2016), 51. https://doi.org/10.5749/minnesota/9780816698905.001.0001.
5 Orit Halpern, *Beautiful Data: A History of Vision and Reason since 1945*. (Durham/London: Duke University Press, 2014), 103.
6 Martin Coward, "Against network thinking: A critique of pathological sovereignty." *European Journal of International Relations* (2017): 2.
7 Paul Dourish, "Not the internet, but this internet: how othernets illuminate our feudal internet." *CA '15 Proceedings of The Fifth Decennial Aarhus Conference on Critical Alternatives* (2015): 157–168.

much of the Internet as it is currently conceived.' [8]

While a network refers to the concept of connectivity, a platform — a standards-based system 'that simultaneously distributes interfaces through their remote coordination and centralizes their integrated control through that same coordination' [9] — can metaphorically be described as a multi-layered skin which manages the underlying network structures. APIs, network sockets, but also airport hubs or Amazon distribution centers are all semipermeable planes that regulate and mediate flows between a platform's innards and an exterior world while reinforcing the notion of an inside and outside in this very moment of exchange. Any element of a network's deep internal organs, its databases, functions, features, and procedures are concealed, rendered irrelevant or even nonexistent to the exterior world: what remains is only a black box of inputs and outputs, begging to be touched, 'to be *interfaced*' [10].

Compatibility is the necessary precondition ensuring a continuous network ecosystem: Type A plugs grant access to the American electricity grid, in opposition to their European equivalents that will find it a hard nut to crack due to their deviant physical designs. Whoever or whatever ignores the entrance criteria to these infrastructures by violating, neglecting or disrupting them, is punished with exclusion, invisibility, anonymity — and certainly no electricity. But what if these grey zones are less vulnerable than they seem? What if these abandoned, non-conforming entities mess with the inputs and outputs and therefore also with the black box coordinating them? What type of pixelated hallucinations or spawning emancipatory interactions could they produce? Before returning to this question, I will dig into the terminology and taxonomy of addressing systems, as they will serve as our common point of departure.

The pathologies of seeing and being seen: addresses and platforms

Addresses are coded linguistic expressions that point to a category of entities, a single entity or a component of it. Addressing systems play a key role in organizing and mapping network spaces. The address is the means by which the networked platform as a holistic, amorphous body interacts with its nodes as well as nodes of compatible addressing layers. Through this synthetic data layer, entities become localized according to a particular logic imposed by the platform, while at the same time becoming localizable, i.e., queryable [11].

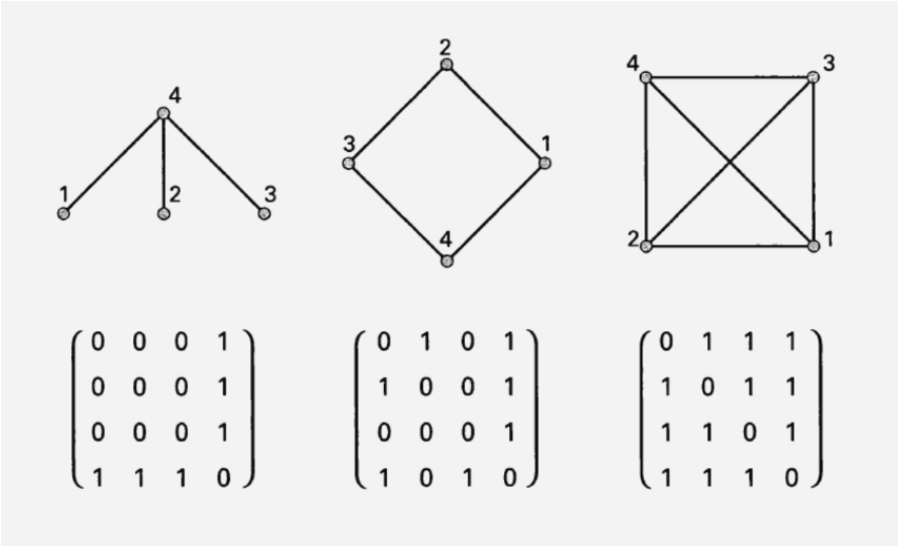

Fig. 1 — Matrix representations of networks: Eric W. Weisstein, "Adjacency Matrix," *Wolfram MathWorld*, http://mathworld.wolfram.com/AdjacencyMatrix.html, quoted in Wendy Hui Kyong Chun, *Updating to Remain the Same: Habitual New Media* (Cambridge, MA: The MIT Press, 2016), 53. (redrawn by Seungyeon Gabrielle Jung).

A node has only partial access to information on the textures and dimensions of the entire network, which is constituted through its awareness and relation to neighboring nodes. The pairing of two addresses opens a space of one- or bidirectional vectors. The flow between two nodes is hereby enabled either by a direct connection or channeled via intermediary nodes (stopover flights may serve as an example). The diagram in figure 1 illustrates such possible network topologies. Protocols define the rules, syntax, and synchronization of communication between nodes, turning nodes into senders, receivers, or both. The platform's *nomos*, i.e. its sphere of operation, is sketched along these lines of information flows. '"Liveness" [...], presume[s] flows between nodes' [12] — they are the juices that turn a network into a lively body and therefore bring it into existence, not its skeletal structure alone.

A singular entity can be indexed by various addresses at once. Ranging across all imaginable scales, manifold addressing generates unique and multi-perspectival views onto the same entity. The Domain Name System (DNS) for instance, a decentralized but hierarchical addressing scheme for the internet, resolves human-readable domain names into machine-readable IP addresses. However, as stated by Ted Byfield, it incorporates not only geographic references at every scale, 'but also commercial language of every type (company names, trademarks, jingles, acronyms, services, commodities), proper names (groups, individuals), historical references (famous battles, movements, books, songs), hobbies and interests, categories and standards (concepts, specifications, proposals) . . . the list goes on and on' [13].

8 Eric Snodgrass, *Executions: Power and Expression in Networked and Computational Media*. (Malmö: Malmö University, 2017), 161.

9 Benjamin H. Bratton, *The Stack: On Software and Sovereignty* (Cambridge, MA: The MIT Press, 2015), 42. While Bratton defines platforms as 'technical-economic systems', I deliberately broadened his definition. I would argue that not every system is born out of an economic drive, as well as has an underlying computational infrastructure, if we include, for example, vital processes in biological systems or linguistic transfers. Stephanie Sherman's reading of platforms provides a rather open approach: 'Platforms in this sense are frameworks, they don't delineate specified actions, but they set the terms and operating principles that precede actions and activities.' (Stephanie Sherman, "Platformation, or On the Fordian Slip" (lecture, Strelka Institute Moscow, Feb 11, 2019).)

10 Alexander R. Galloway, "Black Box, Black Bloc" (Lecture Transcript, New School, New York City, April 12, 2010)

11 Bratton, *The Stack*, 202.

12 Wendy Hui Kyong Chun, *Updating to Remain the Same: Habitual New Media* (Cambridge, MA: The MIT Press, 2016), 48.

Planetary-scale organisational systems, in particular the impending advent of Internet Protocol version 6 (IPv6), cocoon the globe in an increasing web of complexity. Launched in 2012 and soon to be fully deployed [14], the new protocol extends a pervasive, beyond human-scale information architecture, unleashing network visions such as media theorist Benjamin Bratton's *deep address*, a universal addressability scheme spanning 'between very different spatial and temporal scales, absorbing any addressable "haecceity" into vast, if also fragile, communicative fields that may exceed the limits of conventional control or literacy' [15]. Ed Keller muses on the phenomena of *massive addressability*: 'the muteness of matter begins to shimmer and unravel in a haze of information' [16]. While the addressing capacities of IPv4, a 32-bit address space, are already exhausted, IPv6 will be able to host an unimaginable number of more than 340 trillion, trillion, trillion unique IP addresses [17]. Such an enormous address space would theoretically allow it to criss-cross and pierce through *every-thing*, from the living to the nonliving, from the material to the immaterial, reaching out to the smallest bits of data, screws, cells, and the most minute fractions of interactions amongst all of these agents. All will be addressable, and — even more important — all will *want to talk*: slowly surfacing from the aether, a vast ocean of noise all of a sudden turns into signal[18]. Already in 2013, referring to the problem of linking addresses to their physical or non-physical counterparts, Padmasree Warrior, Cisco's chief technology and strategy officer, remarked: 'Only one percent of things that could have an IP address do have an IP address today, so we like to say that 99 percent of the world is still asleep.' She then continued: 'It's up to our imaginations to figure out what will happen when the 99 percent wakes up.' [19]

The dark corners of unaddressability: a taxonomy

Even more with IPv6 it becomes apparent that network visibility emerges from a particular grammar of addressing spaces. Examining the blind spots of addressing systems gives us an understanding of the elements and evolving patterns which ultimately contribute to structural network regimes: the preference and categorization of data, the exclusion or inclusion of participating agents, the mobility management of information flows. The following section, therefore, aims to outline an address taxonomy not so much by looking at what can be addressed and sensed, but rather what dwells in the 'dark corners' of unaddressability.

The taxonomy will be divided into three parts according to the following criteria: (i) the deliberate ignorance of nodes by the platform itself (despite their addressability); (ii) the temporary and/or accidental invisibility of nodes (which could be solved by an update either on the referent-address relationship or the platform-address relationship); and lastly, (iii) the temporary or irreversible inability of the platform to sense at all (due to internal or external factors).
Not taken into consideration are deceptive strategies such as phishing or spoofing, whereby a node camouflages itself by mimicking another node's address or identity. Deception constitutes a particular case with its central parameter focused on false recognition rather than the platform's inability to sense or its invisibility per se.

Please note that, although carefully collected, the following list and diagrams are a guideline to sketch the territories of unaddressability rather than to exhaust it completely.

13 Ted Byfield, "DNS: A Short History and a Short Future," Nettime, October 13, 1998, quoted in Alexander R. Galloway, *Protocol: How Control Exists after Decentralization*. (Leonardo. Cambridge, Mass: MIT Press, 2004), 50.
14 As of 23rd May 2019, the IPv6 connectivity among Google users averaged out at 24.01% (Google, "IPv6 Statistics," accessed May 23, 2019, https://www.google.com/intl/en/ipv6/statistics.html).
15 Bratton, *The Stack*, 71.
16 Ed Keller, "Alien, All Too Alien, An Infinitely Scaling Gesture" (Lecture, The Center for Design and Geopolitics, Calit2, University of California, San Diego, June 3, 2011), Video, 22:56, https://www.youtube.com/watch?v=-UgEIrebe68.
17 Alex Johnson, "The Internet Is Now Officially Too Big as IP Addresses Run Out," *NBC News*, July 3, 2015, https://www.nbcnews.com/news/us-news/internet-now-officially-too-big-ip-addresses-run-out-n386081.
18 Hito Steyerl wrote on the crisis of information extraction: Steyerl, Hito. "A Sea of Data: Apophenia and Pattern (Mis-)Recognition" *E-flux Journal #72 - April 2016*. Accessed May 3, 2019. https://www.e-flux.com/journal/72/60480/a-sea-of-data-apophenia-and-pattern-mis-recognition/
19 Jacob Silverman, "The Lights Are On but Nobody's Home," *The New Inquiry*, July 16, 2014, https://thenewinquiry.com/the-lights-are-on-but-nobodys-home/.

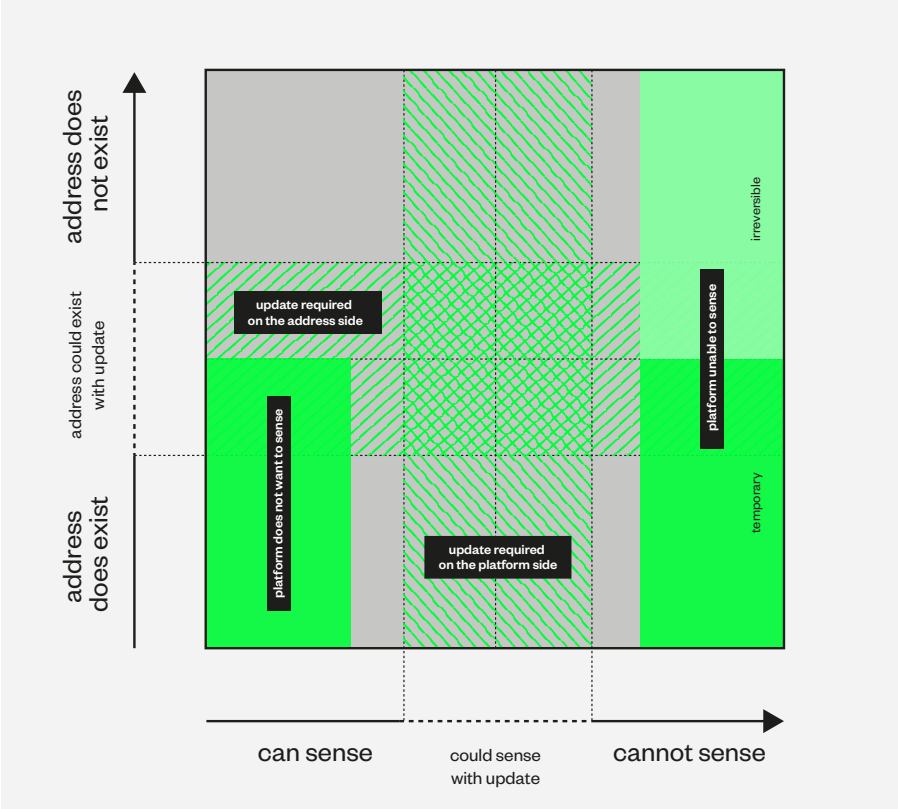

Fig. 2a — Unaddressability and its relationship to platform sensing (Source: author)

1 Nodes which can be sensed, but are deliberately ignored

- Temporary Noise Label: A node is not (yet) recognized as signal. Some networks, e.g., treat human users as noise until they are credentialed via Captcha technologies.
- Addressing Policies: A node is internally constrained or subjected to mandatory information. For example, many banks refuse their customers to open a bank account without proof of address. Another example is Google's page rank: The relevance of search results is not only determined by the user's search input, but is also presorted according to Google's internal policies such as domain registration length, keyword density, or the implementation of Google's own Youtube videos. [20]
- Node not feasible: The node is too distant from the core network, e.g., in the case of peripheral settlements which often lack access to public infrastructures.
- Node not efficient: To increase efficiency in a network, information is often willingly omitted. Although exposed to the entire traffic of a local area network (LAN), a connected computer, e.g., is set up to ignore all data packages which are not intended for it [21].
- Node is self-censored by platform: Information is black-listed and being filtered out on forehand, e.g. by GDPR upload filters which exclude content that doesn't comply with its regulations.

2 Nodes which could be sensed, but have a defective referent-address or platform-address relationship

- Address Rollover: Address rollovers appear when the storing capacities of the chosen data type are exhausted. GPS systems, e.g., are counting in a ten-bit parameter which means that the counter is reset every 1,024th week. Starting from January 6th, 1980, the counter so far had to be reset on August 21st, 1999 and again on April 6th, 2019. "If devices in use today are not designed or patched to handle this latest rollover, they will revert to an earlier year after that 1,024th week in April, causing attempts to calculate position to potentially fail. System and navigation data could even be corrupted." [22]
- Required Index Update: The platform is unable to locate previously addressed content. Software programs like Adobe Indesign, e.g., make use of relative image links when placing images into the document. When moving a file in the system, the relative link breaks and needs to be reassigned.
- Doubling: The same address is assigned twice or more to different entities. Double NAT, e.g., is a phenomenon that appears when two routers are wired in series, creating two private networks with a single WAN IP address. As a result, the public/private network boundary is abolished, incoming remote access requests are immediately discarded. [23]
- Disambiguation: An address is not pointing to one single entity, but offers several options which would need to be filtered further down the line. "A geocode, e.g., for "High St, Hastings" with components=country:GB returns a result in Hastings, England rather than in Hastings-On-Hudson, USA; without that filter, it might return several address points of the same type." [24]
- Missing Data Update: Due to pending or missing updates data becomes inconsistent or erroneous. Street networks, postal codes or other administrative boundaries, e.g., can frequently change, resulting in multiple versions of the same geographic location needing to be stored, with models then requiring periodic updates.
- Insufficient filtering: The address space is too big or too small to be recognized. A very broad search filter, e.g., is not sufficient or precise enough to make sense of

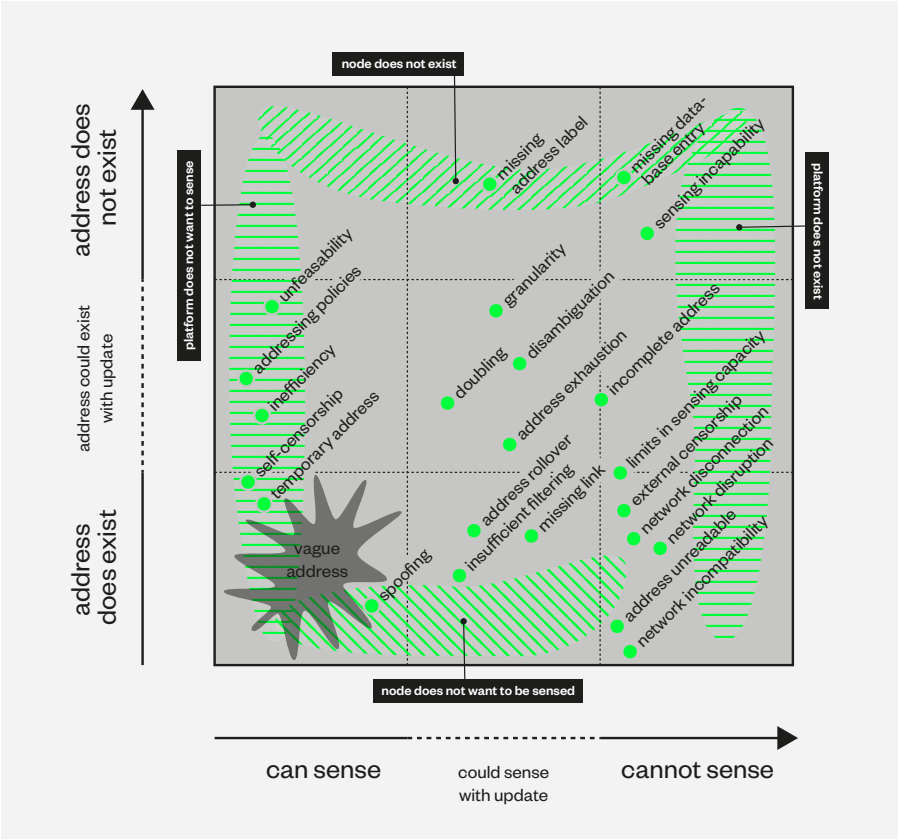

Fig. 2b — Unaddressability taxonomy. Depending on the particular examples chosen in each category, the position of the points might shift in the matrix. Some examples could also live in several categories depending on the position of the observer. (Source: author)

20 Danny Sullivan, "Google Panda 2.5: Losers Include Today Show, The Next Web; Winners Include YouTube, Fox News," October 1, 2011, https://searchengineland.com/google-panda-losers-today-show-winners-youtube-95257/.

21 Bradey Mitchell, "What Is a Network Sniffer?" July 15, 2019, https://www.lifewire.com/definition-of-sniffer-817996.

22 Shaun Nichols, "Fun fact: GPS uses 10 bits to store the week. That means it runs out... oh heck — April 6, 2019." *The Register*, February 12, 2019, https://www.theregister.co.uk/2019/02/12/current_gps_epoch_ends/.

23 Joe Moran, "Double Trouble: How to Deal with Double NAT on Your Network," accessed May 11, 2019, http://www.practicallynetworked.com/networking/fixing_double_nat.htm.

24 Gary Gale, "Digital maps' unsung hero: how the geocoder puts us on the grid," *The Guardian*, January 13, 2014, https://www.theguardian.com/technology/2014/jan/13/google-maps-geocoder.