Building a relational infrastructure – the launch of the critical infrastructure lab

critical
infrastructure
lab

UNIVERSITY OF AMSTERDAM

Ford Foundation

Internet Society Foundation

OMIDYAR NETWORK

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1. Introduction

This is the report of the launch event of the critical infrastructure lab, which took place on April 13-14 2023 at the University of Amsterdam in the Netherlands. The critical infrastructure lab interrogates media and control infrastructures that are critical to societies. It does so through a critical analysis of power, regimes, and conflicts in infrastructure governance. With this it aims to co-develop infrastructural futures and ideologies that centre people and planet over profit and capital. The lab members are convinced this work is only possible if the lab itself functions as a relational infrastructure that enables interoperability between industry, state, civil society, and academia. The launch event was an early experiment with this approach.

For some, *natural numbers* start with 0, for others, with 1. By splitting the ceremonial birthday of the lab over two days (day 0 and day 1), we tried to cater to both kinds of people, but more importantly, to facilitate collaboration across radical epistemological division lines.

In the two days of the critical infrastructure lab launch event a diverse group of practitioners, policymakers, activists, researchers, activist, and industry representatives discussed the topics of geopolitics, environment, and standards in relation to infrastructure in workshops, presentations and discussions, a data centre walk, and over food and drinks.

This report is co-authored by all participants of the critical infrastructure lab launch event–but only the lab members are responsible for the mistakes found herein. This report does not attribute remarks, findings, or opinions to individual participants, but we very much recognize the labor, experience, and expertise that were needed to produce them.

The report is not meant to be comprehensive. Nonetheless, we aim to make inroads into nurturing progressive perspectives on infrastructure design, production, and maintenance. Our ambition is to contextualise infrastructural developments within planetary limits, geopolitical conflicts and alignment, and standard-setting practices.

This is just the start. We hope and trust that this is merely the beginning of a conversation to produce new infrastructural ideologies that depart from myths about abundance and infinite growth, but rather revolve around limits and redistribution.

2. Environment

Contemporary struggles over communication infrastructures are intertwined with environmental crises. Protests against the arrival of new data centres, piles of e-waste, and climate-related infrastructural insecurities are examples that bring struggle to the fore. To explore and understand this relationship, presenters at the launch event offered different theoretical and empirical lenses.

Terror environments

In times of war, environments become infrastructures of terror. In the 18th century the notion of environment was part and parcel of the modern mythology that powered the industrial revolution. In the 20th century environment became an intrinsic part of contemporary warfare, targeting the enemy's environment over the body. Environmental pollution became a tactic of war, inflicting slow violence. In such wars, weapons are deployed to create *death-worlds* (Mbembe, 2006 :92) for the maximum destruction of persons through their environments. In the war against Ukraine, physical and digital environments are polluted to people and (de)stabilize societies.

Legal environments

The expansion and operations of infrastructural components — such as data centres — are enabled by local regulatory environments and national industrial policies. Awareness, digital literacy, community resistance, and collective action are presented as a counter-balance to these industrial forces. Legal environments become a loci of struggle for land and resources. Community resistance meets industrial tools and strategies for creating hostile environments.

From planned obsolescence to planned longevity

Infrastructural configurations aim to ensure resilience through redundancy, in which up-time and availability are central concerns. Infrastructural resilience thus depends on extreme forms of resource consumption, as seen in the disposability of hardware. But a political and industrial agenda to move beyond the growth paradigm to one of sustainability might require us to let go of the notion of robust infrastructures. What would infrastructure look like if we would conceive them within planteary limits instead of framing them in an infinite world? Presenters who situated resilience within planetary limits argued for systems thinking that aim for waste prevention in media and control infrastructures through data and energy minimization, and conversely, the maximization of hardware lifespans.

Infrastructural sustainability and insecurities

The notion of infrastructure is inherently intertwined with the ideal of permanence. Ensuring permanence requires planning for insecurity, and consequently, ensuring control over territories. The reality that different topographies are confronted with novel and ever more extreme ecological insecurities will affect the permanence of infrastructures in different ways that require state and industry to map risks and plan maintenance across various timelines.

3. Standards

If global changes are written in the language of infrastructure as Keller Easterling claims, then standards are the grammar of infrastructures. While Science and Technology Studies scholars have always been fascinated by these processes of categorization, standards are (again) seen as tools for world-building and control by policy makers, engineers, and politicians alike.

Infrastructure *as* policy rather than policy *for* infrastructures

Standards in the EU are increasingly used as a policy tool in response to contemporary societal challenges, rather than solely as innovations in engineering. This is an appropriate reaction to the particular position of the EU, which is both a key market and a particularly vulnerable end-point of global supply chains.

Civic engagement in standardisation needs traction

Since the commitment to technical openness does not translate to cultural openness, it is often the case that users, social movements and civil society organisations have little to no say in the standardisation of telecommunication, telecontrol and the internet. While there is attention to policy responses that centre people and planet over profit and capital, we would like to see more spaces to articulate standards from below in material ways. It is not only the industry that can have standards, resistance can also happen through *counter-standards*! Moreover, standards themselves can be used in non-standard ways. Participants at the Launch Event performed and documented and highlighted an array of social practices exemplifying these tendencies. A sense of collective action among civic actors is timely and necessary to organise and fund movements-building and mainstreaming of counter-standardisation efforts.

The public interest is articulated between standardisation and deployment

Publics meet standards and their infrastructures in the context of the lived experience of end users. Methodological breakthroughs can help to map out and address the tensions that emerge between standardisation efforts and deployment imperatives. Current work on the *sensory ethnography of radioscapes*, *supply chain analysis*, and the *infrastructural inversion* mobilise methods that extend the range and variety of data available for research, and the possibility of generating critical insights. These insights about the contradictions observed on the ground can be channeled upstream to inform conceptual debates, movement building as well as actionable policy proposals.

Predatory ideologies of openness

The infrastructural ideologies of standards — such as the ethos of openness and connectivity – have been *recuperated* by the more powerful actors in the networks around them. Horizontal networks have been turned into global supply chains where key vendors articulate open standards in the form of novel markets. In short, standards have been turned into markets: the open ethos did not turn out to be an exception to this historical tendency. We need novel ideologies that can articulate counter-hegemonic tendencies, while hegemonic ideologies behind open standards need to be exposed through critique and praxis.

4. Geopolitics

Technology and infrastructure policy is firmly placed back on the agenda of nation states and supranational bodies, such as the European Union. Where internet infrastructure governance for the last decades was dominated by the industry, states are flexing their muscles and deploying novel approaches.

The inscription of frictions and the enabling of flows in the EU

Communication and control networks are deeply embedded in society. Everyday life and the business as usual depends on their high availability. Therefore, even the most ambitious states cannot shape them directly. Rather, they keep adding new layers to protocol stacks through a variety of tools that we collectively call *Digital Policies*. While the re-fragmentation of networks to national or regional islands is not happening, states do seek to inscribe their norms and values. In the European Union, this happens through through regulations (GDPR, DSA, DMA, AI act, Data act) industry alignment (GAIA-X), policy packages (Standardization Strategy), Research and Innovation Projects (DNS4EU), and sanctions (against Huawei, for instance).

Rise of China as an infrastructural power

Where the rise of the hegemony of the United States came with a combined media and infrastructural power, China's rise seems largely focused on establishing infrastructural power. China is establishing infrastructural power by competing in a global market for data transit, networking equipment, and end-user equipment where it seeks to project its dominance and to internally establish infrastructural sovereignty. China is still using the international RIR and DNS systems and is seemingly not creating an uninteroperable networking and equipment stack and protocols and thus seems committed to internationalism.

Standardization of censorship in Russia

The internet in Russia emerged from a series of heterogeneous networks, and for a while this provided the guise for resistance against government-issued censorship solutions. However, through the standardization of censorship measures, network operators were forced to either put censorship boxes (TSPU) in their networks, or route their traffic through already censored networks. Other efforts, for instance the introduction of its own Certificate Authority, seems to have less impact so far.

The instability of stability

It is hard to unscramble an egg and to untangle a transnational layered networking infrastructure that has significantly evolved its function and purpose purpose over decades.

> *On the one hand [infrastructures] have an emergent character–*
> *meaning they are not [...] of conscious design. On the other hand,*
> *they [...] are 'sunk into' the social fabric and thus both invisibilised*
> *and perceived as relatively stable. — Meissner and Taylor 2023*

Transnational communication infrastructures have always been a tool to project nation state's power beyond territorial borders, however industry actions and technologial materiality do not always align with the interests of states, and the effectiveness of industrial policies is contested. If anything, the tensions between and among geopolitical power blocks show the possibility of technological reconfiguration and reordering.

5. Outroduction

This is not a conclusion because we have only just gotten started...

Participants of the critical infrastructure launch event

Here's a list of people who joined the launch event and wanted to be publically identifed as such.

Alek Tarkowski–Open Future Foundation
Alexandra Dirksen–TU Braunschweig, Censored Planet
Andreas Baur–Universities of Tübingen and Amsterdam
Anne Roth–senior advisor digital policy, Die Linke, German Bundestag
Carolina Maurity Frossard–University of Amsterdam
Clément Perarnaud–Vub
Corinne Cath
Daniela van Geenen–University of Siegen
Dwayne Ansah–Copernicus Institute of Sustainable Development
Felipe Schmidt Fonseca
Fieke Janssen–critical infrastructure lab–University of Amsterdam
Gijs van Maanen–Tilburg University
Iain Emsley
Irene Niet–TU Eindhoven
Jade Hutchinson
Jenna Ruddock
Jonathan Hankins–Bassetti Foundation
Katharina Meyer–Digital Infrastructure Fund
Linnet Taylor–TILT
Lisa Gutermuth–Mozilla Foundation
Lotte Houwing–Bits of freedom
Madeline Brennan–University of Amsterdam
Markus Stauff–University of Amsterdam
Martin Trans–University of Amsterdam
Maxigas–critical infrastructure lab–University of Amsterdam
Maya–Green Screen Coalition
Michael Collyer–University of Oxford
Mila T Samdub–Information Society Project, Yale Law School
Nadia Tjahja–United Nations University–cris
Nadine Schabét–fau / sfb1265
Niels ten Oever–critical infrastructure lab–University of Amsterdam
Paul Groth–University of Amsterdam
Paul Keller–Open Future
Paula Helm–University of Amsterdam
Raúl Zambrano–Independent researcher
Rene Tuma–TU Berlin
Roel Roscam Abbing–school of arts and communication, malmö university
Sander van der Waal
Sam Kellogg–NYU
Soizic Pénicaud
Thomas Berker–the good infrastructures lab
Torjus Solheim Eckhoff–University of Oslo
Valentina–University of Amsterdam
Victor Chaix

Day 0 // 13 April 2023

09:00 Coffee + Registration [UB/DH]

10:00 Welcome and opening [UB/D]
Marieke de Goede, Dean of the Humanities Faculty and critical infrastructure lab

11:00 Morning workshops [UB]

12:30 Lunch [UB/DH]

13:30 Afternoon workshops [UB]

16:30 Documentation, continuation & report back [UB/D & UB/P]

17:30 Surprise appearance

18:15 Walk to Waag

18:30 Dinner and drinks [W]

Day 1 // 14 April 2023

09:30 Welcome and opening [O/D0.09]
  critical infrastructure lab

10:00 Keynote 1 [O/D0.09]
  Standards *Ksenia Ermoshina*

11:00 Coffee break [B/VOC hall]

11:15 Morning panels [O&B]

12:30 Lunch

13:30 Keynote 2 [O/D0.09]
  Environment *Svitlana Matviyenko*

14:30 Coffee break [B/VOC hall]

14:45 Report presentations [B/F0.01]

15:45 Keynote 3 [B/F0.01]
  Geopolitics *Yu Hong*

16:45 Coffee break [B/VOC hall]

17:00 Afternoon panels [B]

18:30 Closing [B]

20:30 Drinks

Infrastructural futures

Sustainable computing infrastructures
Michelle Thorne [UB/D]

Identifying infrastructure
gaps to shift power in the data economy *Lisa Gutermuth* [UB/C0.05]

Imagining the future: what should the next European Commission do? *Alek Tarkowski, Zuzanna Warso, Paul Keller* [UB/V]

Maps and models

Data centre walk: the materiality of connectivity, centralization, data centres and data *Yan Cong* [UB/DH]

Mapping the network; critical mapping and new perspectives on internet infrastructure and standards *Silke Steets, Nadine Schabét, René Tuma, Dinah van der Geest* [UB/D]

Semente – co-designing community-based digital policy *Felipe Schmidt Fonseca, Bernardo Schepop* [UB/P]

Free software user unions? *decentral1se* [UB/P]

Permacomputing: are you working in the dark? Introduction to permacomputing through a guided visualization and interactive game *Ola Bonati, Lucas Engelhardt* [UB/V]

Exclusionary cultures of internet governance
Corinne Cath

Open-source software as digital infrastructure
Thomas Streinz

Geopolitics: shifts, conflicts, and infrastructures [B/F0.01]

Migration information infrastructures: power, control and responsibility at a new frontier of migration research *Fran Meissner, Linnet Taylor*

"DongShuXiSuan" (east-to-west computing resource transfer project) in China: an evolutionary reform on data infrastructure construction *Chengbao Jin*

The EU and internet standards: beyond the spin, a strategic turn? *Clément Perarnaud*

Standards: norms and methods [O/C0.17]

Data walking in the unheard city: sampling infrastructured devices with mobile apps *Iain Emsley*

The good infrastructures lab: user agency within, through and against infrastructures *Thomas Berker*

Standardization as ethico-political project: dealing with the tension between the value of equal quality of standards and pluriversality *Paula Helm*

Environment: maintenance and resistance [B/F01.01B]

Permitting/resisting the cloud: a comparative legal analysis of community resistance to fossil fuel infrastructure and data centers *Jenna Ruddock*

Reuse commons: a toolkit to weave generous cities *Felipe Schmidt Fonseca*

Washout! environmental synchronization and infrastructural maintenance in the northern Rocky Mountains *Sam P. Kellogg*

DIY electronics jewelry workshop
jewelryhacker.org

Day 0: 09:00 - 13:30 + 16:30 - 18:00 [UB/DH]
Day 1: 11:00-17:00 [B/F0.00]

Geopolitics: European infrastructure politics [B/F0.01]

EU digital diplomacy: digital technologies, standards, and regulation in times of geopolitical upheaval *Julian Ringhof*

Reaching European stars with American clouds: rooting European digital sovereignty in Gaia-X *Andreas Baur*

The Russian conflict and its impact on the Web PKI *Alexandra Dirksen*

Standards: network paradigms [B/F1.14]

Rearticulating the digital public good: aesthetics and technics of the fifth internet *Mila Samdub*

Digital technologies and sustainable development: the missing link *Raúl Zambrano*

An overview of internet censorship in EU *Vasilis Ververis*

Infrastructural futures [B/F01.01B]

On-line federation as a sociotechnical architecture *Roel Roscam Abbing*

Towards a historical, multi-dimensional, relational model of digital infrastructure *Lai Yi Ohlsen*

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