

Sustainable Internet Measurement Infrastructures

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What is the policy goal or fear you're addressing?

Fear: Struggle to maintain network measurements efforts both for wired and wireless domains

Fear: Internet going dark to 3rd party measurements

Fear: Google/Akamai/ISP/NSF only measurements

*“We posit that successful architectures will have to **take responsibility for the economic systems that arise from their engineering design.** This implies not just getting the technical details right, but also **deliberately designing the engineered system so that it has desirable economic properties.**”*

Hoped for, not designed for....
(funding, adoption, use, longevity)

Currently rely upon cooperation, corporations, or confiscation (i.e. tax supported)

- RIPE Atlas [4]
- CAIDA Ark [14]
- Dasu [26]
- Scriptroute [29]
- BISmark [30]
- OONI [25]
- Netalyzr [19]
- PEERING [27]
- FCC's MBA [2]
- ICLab [1]
- MITATE [17]
- CAIDA Periscope [16]

There exists a **community designing next generation decentralized network systems** that does consider and critique (in sophisticated ways):

- incentives, roles, and economic responses of different participants
- governance and evolution of the decentralized systems
- adoption incentives (early adopters, late adopters)
- creative funding models

Resulting in hundreds of millions of dollars of investment and impressive adoption

BLOCKCHAIN PROJECT ECOSYSTEM

CURRENCIES

BASE LAYER PROTOCOLS



PAYMENTS



DEVELOPER TOOLS

SMART CONTRACTS



SCALING



ORACLES



SECURITY



LEGAL



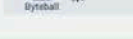
INTEROPERABILITY



PRIVACY



DAGs



SOVEREIGNTY

USER-CONTROLLED



GOVERNANCE



VPN



COMMUNICATION



IDENTITY



SECURITY



STABLECOINS



FINTECH

TRADING/DEX



INSURANCE



LENDING



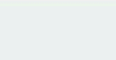
FUNDS/INVESTMENT MANAGEMENT



MARKETPLACES



SOCIAL



VALUE EXCHANGE

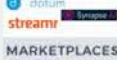
CONTENT MONETIZATION



DATA



MARKETPLACES



ENERGY



VIDEO



FUNGIBLE

NON-FUNGIBLE

FILE STORAGE



COMPUTATION



MESH NETWORKING



SHARED DATA

INTERNET OF THINGS



SUPPLY CHAIN/LOGISTICS



ATTRIBUTION



REPUTATION



CONTENT CURATION



AUTHENTICITY

DATA



TICKETING



OTHER

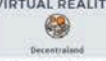


OTHER

PREDICTION MARKETS



VIRTUAL REALITY



GAMBLING



GAMING/ ESPORTS



MARKET



compound

@JOSH_NUSSBAUM

MIT
Technology
Review

Blockchain

The future
is here



Proof-of-*

- **Work**
- **Stake**
- Storage
- Computation
- Science
- etc

Proof-of-measurement?

Apply tools from the crypto bookshelf at three levels:



1. **Measurement validity**

- Proof of measurement correctness (full or probabilistic proofs)
- Cryptographic proof of vantage point
- Trusted execution environments

2. **Crypto financial incentives to adopt and run measurements for the long term**

3. **Smart contracts that involve network measurements (network SLAs or long term measurement studies)**

Technically concrete ideas for pieces of this story

- Decentralized version of some of the FCC MBA tests
- Distributed network telescope
- Adoption incentives
- More...

Recommendations

- Ignore hype, but don't dismiss cryptonetworks
- Invite folks from this community to a future WIE
- **Design for, don't hope for...** funding, adoption, use, and longevity of measurement infrastructures