Using **Reverse IP Geolocation** to Identify Institutional Networks

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### Motivation

**Reverse IP Geolocation**: Why Universal Internet Access Matters

**The Guardian**

Homework In A McDonald’s Parking Lot: Inside One Mother’s Fight To Help Her Kids Get An Education During Coronavirus

Support the Guardian

**News** | **Opinion** | **Sport** | **Culture** | **Lifestyle**

World | Europe | US | America | Asia | Australia | Middle East | Africa | Inequality | Global Development

**Coronavirus**

US's digital divide 'is going to kill people' as Covid-19 exposes inequalities

Exclusive research shows deep connectivity is impacting rural and urban areas with populations already underserved by the medical system or haunted with poverty

### Challenges in Identifying Anchor-Institutional Networks (AINs)

- Anchor institutions are “place-based, mission-driven entities such as hospitals, universities, and government agencies” [anchor.ucsf.edu]

- AINs are smaller than residential providers, and often have tight budgetary constraints, which also limits their operators’ technical sophistication.

- Existing approaches to classify networks at the AS level are too coarse to identify most AINs: they purchase connectivity and lease IP addresses from an ISP.

### Measuring Connection Reliability at AINs

**Identify**

- Where are these networks?

**Measure**

- Are these networks reliable?

**Improve**

- How to upgrade unreliable networks?

**Reverse IP Geolocation**

**Identifying Anchor Institutional Networks: Where To Start?**

- We do not know which networks serve anchor institutions
- We usually know where anchor institutions are physically located

**Reverse IP Geolocation**: Building Blocks

- Several databases can help us identify institutional networks
- They are all prone to inaccuracies (treat as candidates)
- Collect additional data for each candidate to confirm AIN status

**Conventional IP Geolocation**

**IP Address** ➞ **Physical Location**

**Reverse IP Geolocation**

**IP Address** ← **Physical Location**

**Initial Findings: 100 Anchor Institutions In or Near Tribal Areas**

- Government (10)
- Healthcare (11)
- Higher Education (10)
- Schools (10)
- Regional ISP (8)
- Religious Organizations (9)
- Community Services (8)
- Public Utilities and Energy (6)
- Sectoral Association (5)
- Finance and Insurance (4)
- Local Newspaper (4)
- Veterans (3)
- Cultural Organizations (2)
- Tribal Companies (1)

U.S. anchor institutional networks identified with our Reverse IP Geolocation technique

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