



Microsoft Internet Connectivity Data

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Microsoft AI For Good Lab



Microsoft AI For Good Lab: Who We Are

We are **Data Scientists, Economists, and Data Storytellers** across **four continents**

200+ projects and **70+ papers** published over the past five years

Working together with **subject matter experts** to address **urgent challenges**



One of Our Focus Areas: Digital Inclusivity

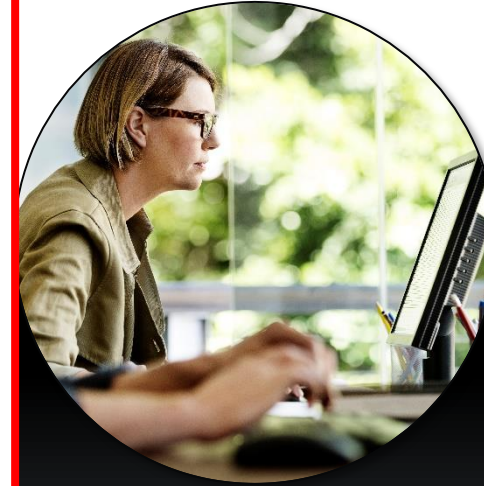
We are committed to **promoting inclusivity through digital skills** and opportunity. We are measuring digital literacy, creating analytics to boost digital skills, and expanding digital inclusivity in the Global South. Our efforts are helping to close the data divide and create a more equitable future.



5:1 data scientists in the Global North versus the Global South a significant gap in the ability to turn data into decision-making insights and action



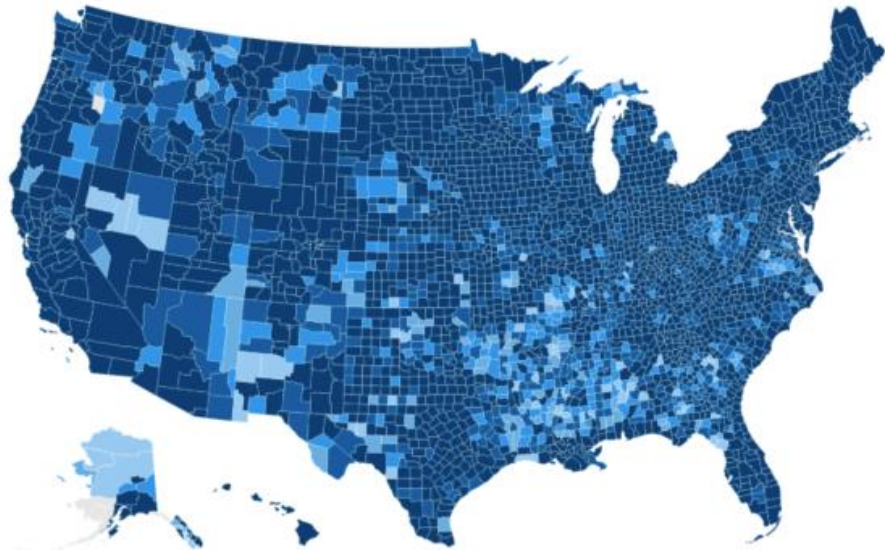
Education, healthcare, jobs, and other critical services increasingly require fast, **affordable broadband internet connection**



Worldwide initiative to help people acquire digital skills, identify in-demand jobs and access to online learning paths

Problem: 95% Broadband Coverage in the US?

FCC indicates broadband is not available to
~14.5M people



Microsoft Airband Initiative has a goal of increasing broadband coverage (>25 Mbps download) across the US (later expanded globally)

FCC relies on surveys of ISPs for what *could* be possible in an area, and suggests very high coverage across the country

Can we compare this against actual usage?



* FCC Broadband has or "could" provide greater than or equal to 25 Mbps / 3 Mbps

Measure Internet Speeds With Microsoft Data

The datasets consist of data derived from anonymized data Microsoft collects as part of our ongoing work to improve the performance and security of our software and services, like...



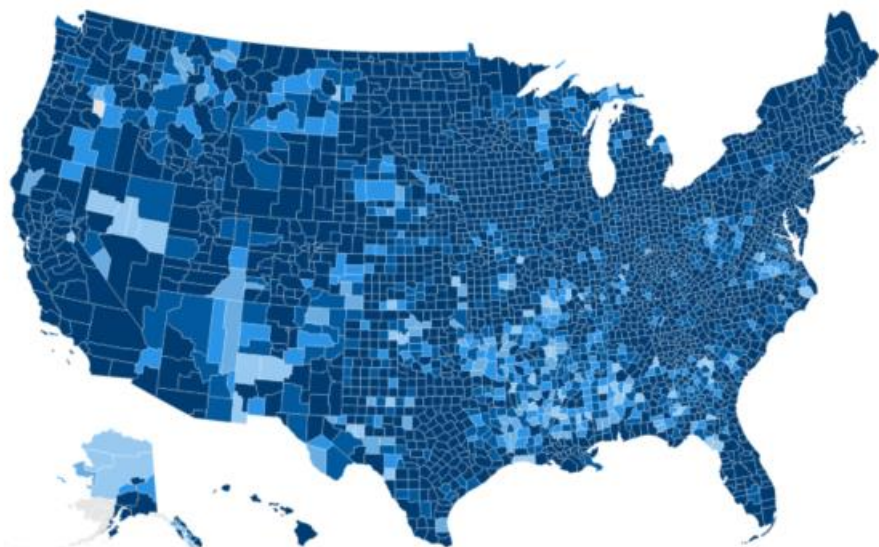
Configuring update for Windows 10

5% complete

Do not turn off your computer

Result: 120M Americans lack broadband access

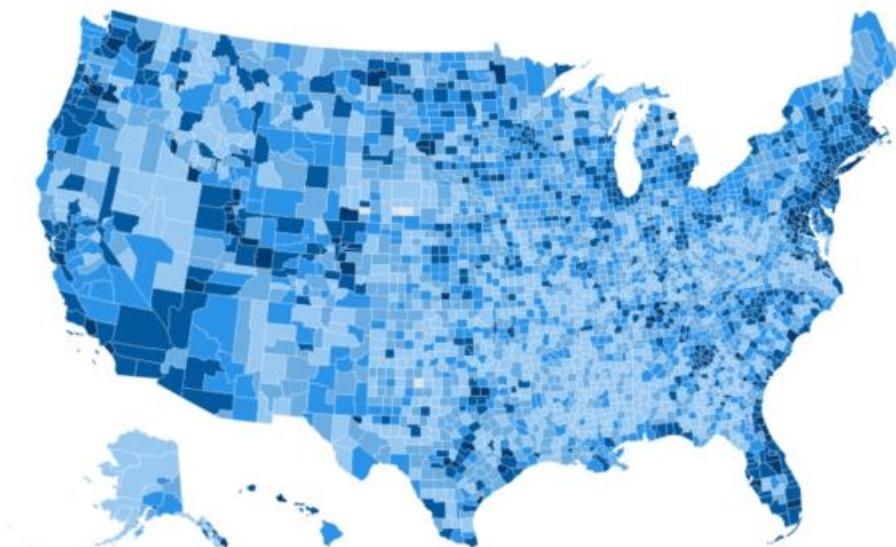
FCC indicates broadband is not available to
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FCC broadband availability*
0% >0 to 20% >20% to 40% >40% to 60% >60% to 80% >80% to 100%

* FCC Broadband has or "could" provide greater than or equal to 25 Mbps / 3 Mbps

Microsoft data indicates ~120.4M people do
not use the internet at broadband speeds

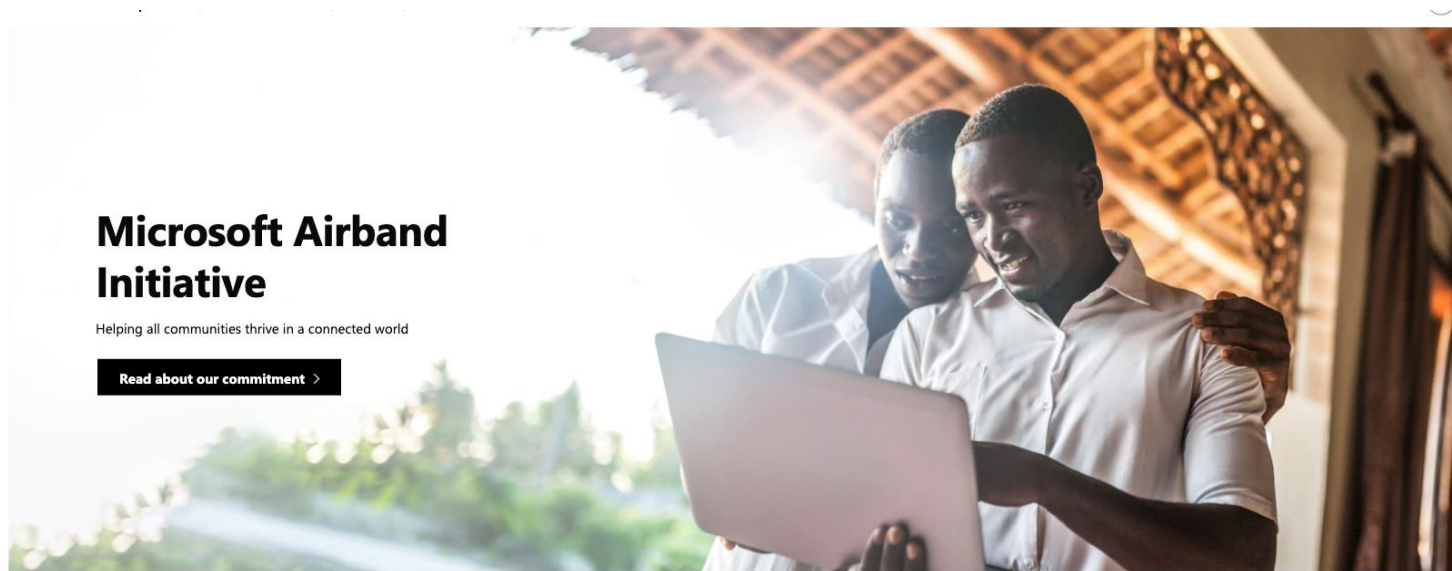


Broadband usage**
0% >0 to 20% >20% to 40% >40% to 60% >60% to 80% >80% to 100%

** Broadband speeds greater than or equal to 25 Mbps

Sources: FCC Fourteenth Broadband report based on form 477 data from December 2019 and Microsoft data from October 2020
To assist with additional broadband mapping analysis data has been made downloadable [here](#). Learn more in this [GitHub repository](#).

Leveraging the Data: Microsoft Airband Initiative



Broadband maps helped the Microsoft Airband Initiative identify areas for investment in multi-technology and multi-frequency solutions

Ferry County (WA)

FCC estimate: >99% broadband access

MSFT estimate: 3% broadband access



Connectivity for a more resilient county

Ferry County, in rural Washington State, has partnered with the Microsoft Airband Initiative to leverage innovative technology to increase broadband access—and shore up emergency response



Leveraging the Data: Digital Equity Dashboard

DIGITAL EQUITY / WASHINGTON

Inputs to determine digital equity

Home **Input** ?

Trend

- 25+ yrs old without graduating high school
- Households without a desktop or laptop
- Without an internet subscr.: broadband of any type
- % people (by county) not using internet at broadband speed
- % of annual median income spent on broadband

Clear selections Reset

County **Ferry County**

Methodology
Each input selected above generates an index value between zero and one for each census tract relative to all census tracts in the state. For multiple inputs, zero to one values are added together equally to calculate the total index value. With five possible inputs, the maximum index value for a tract is five.

Index values change according to the inputs selected above. Census tracts with the highest index values indicate areas with the highest digital inequities.

- Data sources and attributions:**
- US Census Data: 2019 American Community Survey
 - Internet Service Provider data furnished by [BroadbandNow](#)
 - FCC Source Data: FCC Form 477
 - Broadband Usage Data: Microsoft Corporation; AI for Good Lab; available on [GitHub](#)
 - Code.org. (2021). Computer science access [report](#) data

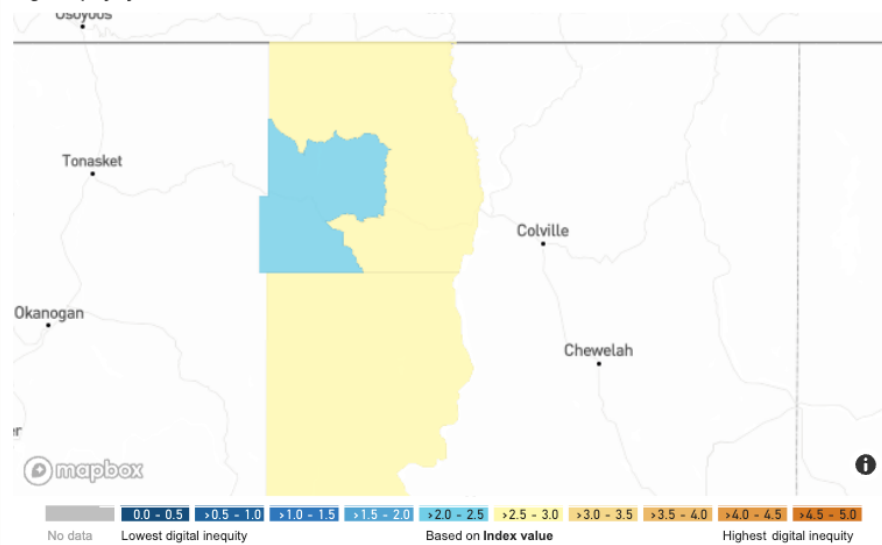
DATA PROVIDED ON AN "AS-IS" BASIS. View Disclaimers of Warranty and Limitation of Liability [Here](#)

[Download data](#)
[Microsoft AI for Good Lab](#)

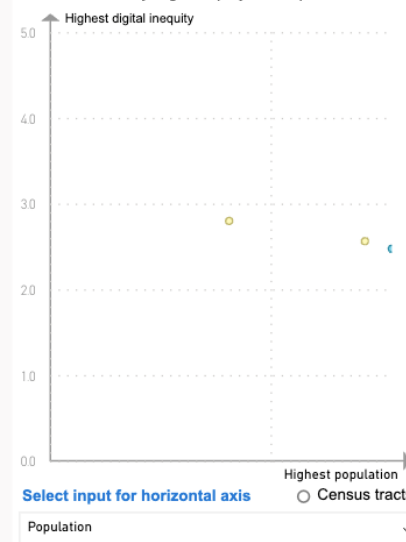
Version 2.1

This tool helps state agencies identify areas with the highest digital inequities using a data-driven approach, to maximize resources and investments in the communities most impacted by the digital divide.

Digital equity by census tract



3 Census Tracts by Digital Equity and Population



Details by census tract

Census tract	Index value	County	Population	W	B / AA	AI & AN	A	NH & OPI	Other	H	25+ yrs old without graduating high school	Households without a desktop or laptop	Without an internet subscr.: broadband of any type	% people (by county) not using internet at broadband speed	% of annual median income spent on broadband
53019940000	2.8	Ferry County	1,624	32%	0%	55%	0%	1%	13%	3%	11.9%	38.4%	45.1%	96.8%	1.6%
53019970100	2.6	Ferry County	2,855	89%	0%	3%	2%	0%	6%	7%	12.0%	34.9%	34.3%	96.8%	1.5%
53019970200	2.5	Ferry County	3,099	88%	0%	1%	0%	0%	11%	3%	14.4%	34.0%	28.7%	96.8%	1.4%
Total			7,578	76%	0%	13%	1%	0%	9%	5%	13.0%	35.2%	34.1%	96.8%	

Race - W: White | B / AA: Black or African American | AI & AN: American Indian and Alaska Native | A: Asian | NH & OPI: Native Hawaiian and Other Pacific Islander | Other (includes two or more races)
Ethnicity - H: Hispanic or Latino

Combine internet connectivity data with other sources to create a *digital equity index*

Allows policy makers to identify the areas in most need of broadband beyond just download/upload speeds

Potential Limitations

Microsoft has good coverage on PCs/laptops, but mobile coverage is limited

Proximity to Microsoft data centers may be a factor for some countries (would expect lower download speeds for countries without nearby data centers)

PC coverage may be limited in some countries, increasing bias in speed estimates

Susceptible to short-term connectivity trends like electrical outages

Future Work

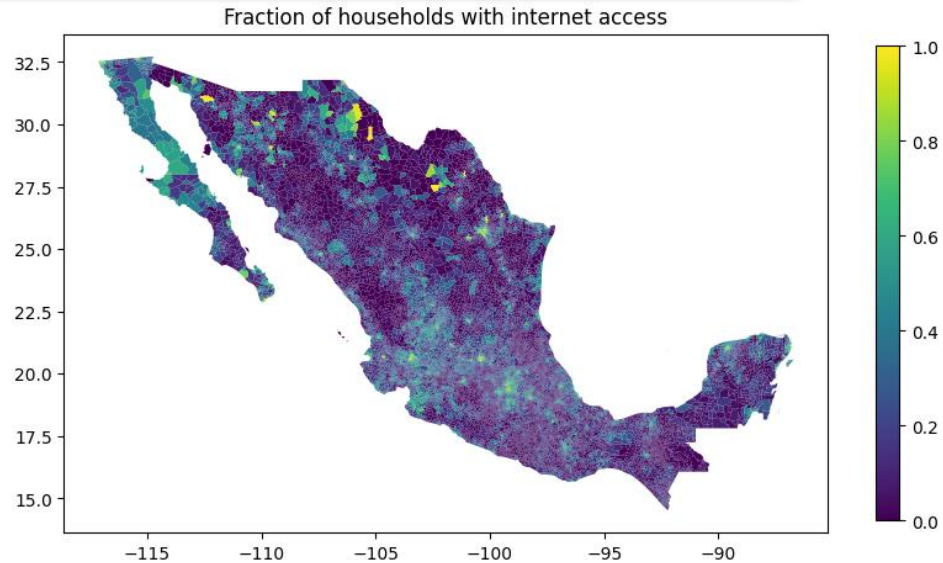
Release a worldwide dataset to the public

Partnering with ITU on measuring household internet connectivity

Use Microsoft data to go from internet access to meaningful connectivity by including download speeds and tie this into the Early Warnings For All initiative

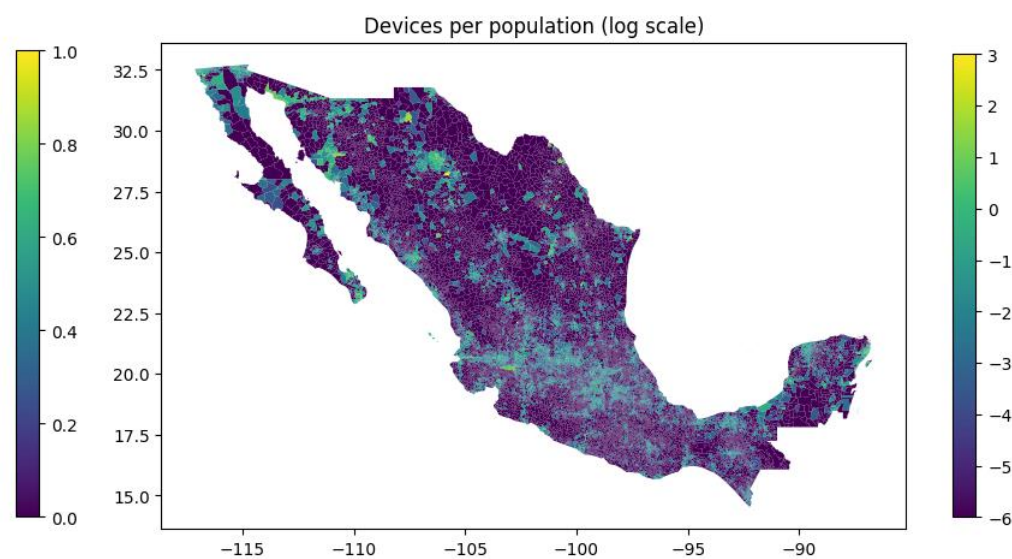
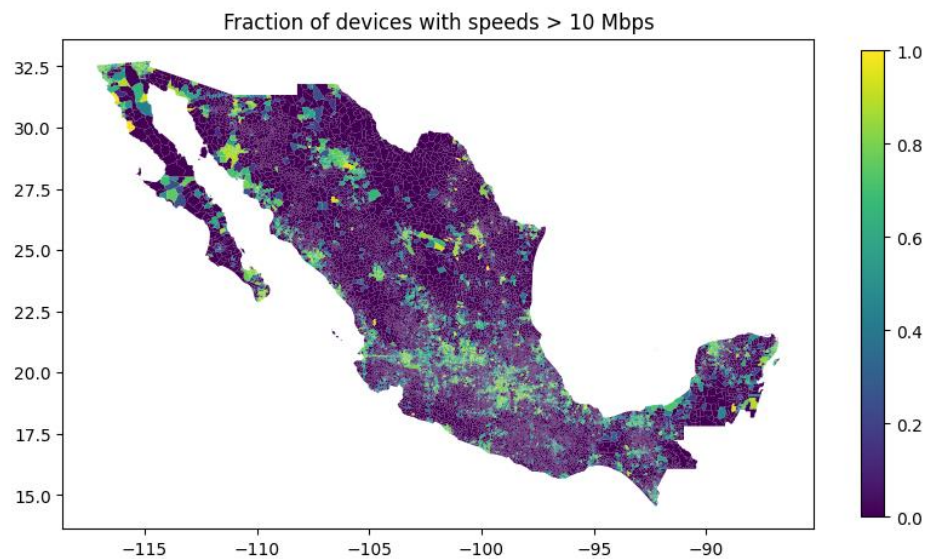
Explore other Microsoft datasets to improve coverage

Early Results for Mexico



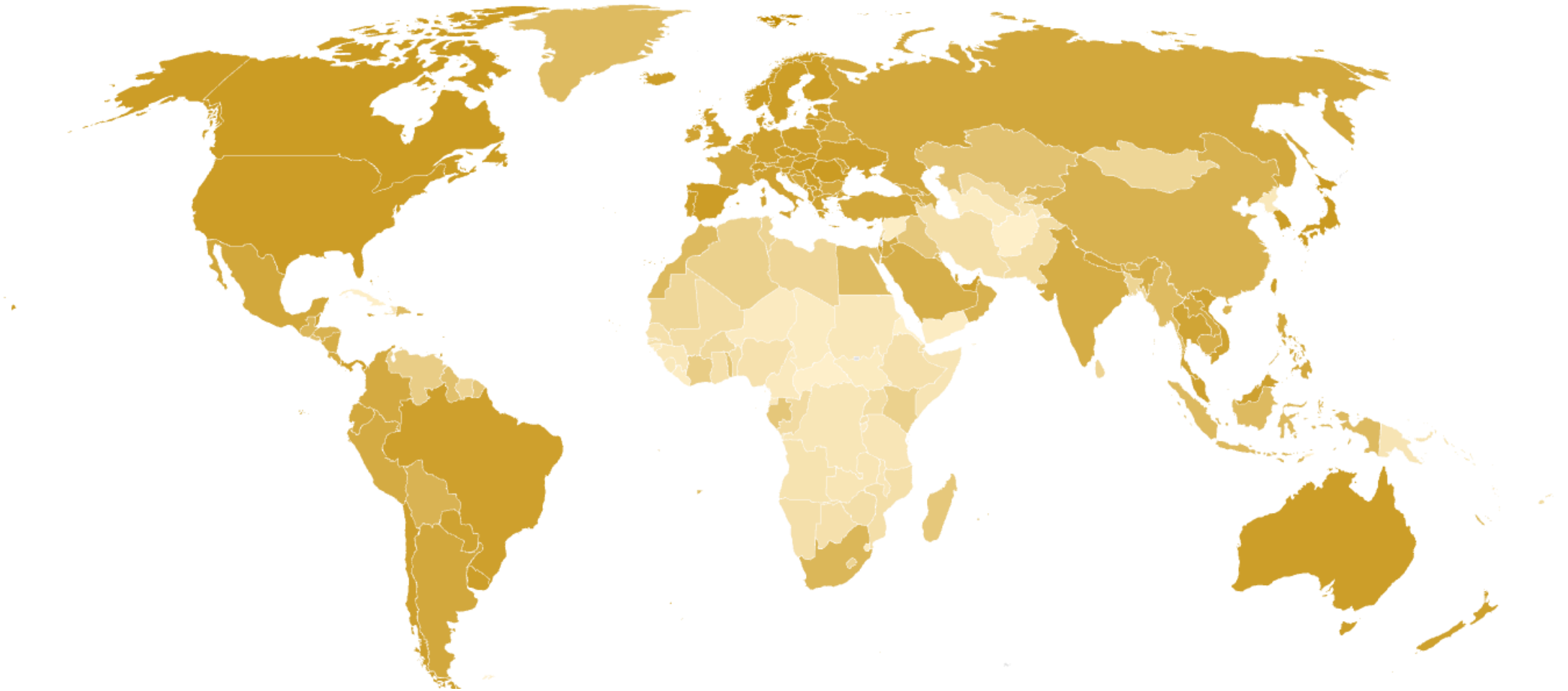
We can measure both speed and estimate number of devices per capita

Both are correlated with households with internet access, and initial exploration suggests these could be used in a predictive model



Coming Soon: Worldwide Data

Fraction of Devices with >10 Mbps download speed





Thank you

Contact and Links

Contact Info:

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<https://www.linkedin.com/in/amitkmisra/>

Links:

US broadband dataset:

<https://github.com/microsoft/USBroadbandUsagePercentages>

Digital Equity Dashboard (dashboard link blog post)

<https://blogs.microsoft.com/on-the-issues/2022/07/14/digital-inequity-dashboard-broadband-access/>