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## Indigenous Internet Networks<sup>1</sup>

*Open Access Teaching Case Developed for the Tech for Humanity Pathways Minor*

*Funded by the Andrew Mellon Foundation*

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### Background

In 2021, as part of the omnibus appropriations bill funding the government, the U.S Congress allocated almost 1 billion dollars to improving Internet connectivity on Native lands.<sup>2</sup> This funding was viewed as part of the government's efforts to alleviate historic "digital inequalities" that disproportionately affected the sovereign territories of Native American communities. A 2018 report from the Government Accountability Office (GAO) found that the Federal Communications Commission (FCC)—the agency nominally in charge of enforcing standards and practices for communication infrastructure across the United States—had failed to sufficiently assist Native communities in accessing licensed spectrum for building wireless high-speed internet connection<sup>3</sup> across their territories. The electromagnetic spectrum, whose management is regulated by national governments, is a crucial part of the communication infrastructure. This is because frequency fractions of the spectrum serve as the medium to transmit radio, TV, mobile and Wi-Fi signals.<sup>4</sup> Who has access to this resource—between

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Case based on the paper Rosa, Fernanda R. (2022). From Community Networks to Shared Networks: the Paths of Latin-Centric Indigenous Networks to a Pluriversal Internet. *Information, Communication & Society*. Available at: <https://doi.org/10.1080/1369118X.2022.2085614>

<sup>2</sup> U.S. Department of Commerce (2021). "FACT SHEET: Biden Administration Offers Nearly \$1 Billion in Grants to Help Connect Tribal Lands", June 3.

<https://www.commerce.gov/news/fact-sheets/2021/06/fact-sheet-biden-administration-offers-nearly-1-billion-grants-help>.

<sup>3</sup> Government Accountability Office (2018). "Tribal Broadband: FCC Should Undertake Efforts to Better Promote Tribal Access to Spectrum", November. <https://www.gao.gov/assets/gao-19-75.pdf>.

<sup>4</sup> Foditsch, Nathalia (2017). *The Power of Airwaves: The Role of Spectrum Management in Media Development*. Washington, DC: Center for International Media Assistance National Endowment for Democracy. [https://www.cima.ned.org/wp-content/uploads/2017/04/CIMA-Spectrum-Management\\_web.pdf](https://www.cima.ned.org/wp-content/uploads/2017/04/CIMA-Spectrum-Management_web.pdf)

telecommunication companies, civil society organizations, Indigenous communities, among others—is a crucial communication policy issue.

The 2018 report followed an earlier GAO report<sup>5</sup> which found that the multiple grant programs for expanding wired internet access on Native territories were not particularly successful—partially because of confusion over eligibility, and partially because of the fact that sovereign lands were located on terrain that was physically difficult to access and build through. This deterred commercial internet service providers (ISPs) from providing the needed equipment and infrastructure to Native nations to expand internet access.

Government analysis has failed to account for how internet connectivity is deeply intertwined with efforts to assert and preserve Indigenous sovereignty. Professor Marisa Elena Duarte, a Yaqui native, has written that Native ideas of territory, locality and land shape the topography of internet infrastructure across sovereign lands. Duarte also notes that “leaders in Native and tribal communities harness information and communication technologies to accomplish information-sharing goals,” in contrast to colonial ideas that see Indigenous culture and technologically-assisted connectivity as somehow opposed.<sup>6</sup>

Given the historic neglect by commercial and governmental entities in promoting internet access across sovereign lands, Indigenous communities have worked to fashion their own infrastructure to achieve better internet connectivity. Nonprofits such as the Internet Society and the Institute for Local Self-Reliance have begun detailing and documenting these efforts to push for larger policy changes.<sup>7</sup> In the following case, we will learn about how Indigenous communities in Mexico have contended with longstanding technological neglect and governmental failures by building their own technological infrastructures that express Indigenous values, sustain community needs and desires, and combat digital inequalities. We will also consider the challenges posed to these Indigenous infrastructures from commercial and governmental policies and practices.

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<sup>5</sup> Government Accountability Office (2016). “Telecommunications: Additional Coordination and Performance Measurement Needed for High-Speed Internet Access Programs on Tribal Lands”, January. <https://www.gao.gov/assets/gao-16-222.pdf>.

<sup>6</sup> Duarte, Marisa Elena. (2017). *Network Sovereignty: Building Internet Across Indian Territory*. Seattle: University of Washington Press, p. 53.

<sup>7</sup> Trostle, H. (2021). “Building Indigenous Future Zones: Four Tribal Broadband Case Studies,” Institute for Local Self-Reliance, (January). <https://cdn.ilsr.org/wp-content/uploads/2021/02/IndigenousFutureZones-0221.pdf>.

## Case Study

Access to broadband has been a constitutional right in Mexico since the Telecommunications Reform of 2013. However, in Chiapas and Oaxaca—two states with significant Tzeltal and Zapotec populations, respectively—home internet connectivity rates range between 0 and 20 percent. This is significantly lower than the nationwide connectivity rate of 43% according to numbers from 2017.<sup>8</sup>

Despite the constitutional promise of broadband access, commercial ISPs have consistently failed to deliver satisfactory internet service in both the Tzeltal and the Zapotec homelands. In response to this years-long neglect, the communities have begun localized efforts to build themselves infrastructure that would allow for better internet access.

In Guelatao de Juárez, a Zapotec *pueblo* in Sierra Norte, Oaxaca, local politics is run by assemblies of people from the community. The assembly decided that the *pueblo* should invest in building and deploying a municipally-maintained public wireless network following the failure of repeated efforts to engage with government and commercial ISP and infrastructure providers. For example, Telmex—the leading Mexican telecommunications provider—had refused to build out the infrastructure needed to improve local internet speeds. The company argued that the investment would not be profitable due to the small local population in Guelatao—fewer than 700 inhabitants, according to official numbers from 2005.

Humberto Morales does voluntary work (also known as *tequio*) for the *pueblo*. He coordinated the implementation of this project within the municipality, along with colleagues from the university where he works as a network technician. To build out the public wireless network, the group contracted with a commercial ISP as if they were a residential client, using the home address of an acquaintance in the nearby city of Oaxaca. Then they bought radio and sectorial antennas to convey the internet signal to Guelatao itself and collaborated with parties who had towers, posts, or other “passive infrastructure” needed to pass the signal along from the city to the *pueblo*.

Collaborators included local households that were situated in ideal geographical locations, as well as companies along the route who’d installed towers or antennas for different reasons, like obtaining television. Sometimes money was exchanged, but sometimes it was a trade of

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<sup>8</sup> Instituto Federal de Telecomunicaciones (IFT). (2017). Tercer Informe Trimestral Estadístico 2016, p. 91.

services instead, like when the household hosting the antenna shared in the provided internet access.

After this network was built out, network speeds improved from the leading Mexican telecommunications provider, who promised 1Mbps for download to 60 Mbps. The antennas now work in the 5MHz frequency, which is an unlicensed band of spectrum that does not require payment or authorization from Mexico's telecommunications regulator.

The municipality charges residents 150 pesos (approximately 7.50 USD) per household to connect to the Internet. As of 2020, 30 households in Guelatao have been connected to the network, along with a range of public facilities like the primary school, library and city hall. Through the network, residents converted an individual residential Internet installation into a municipal facility benefitting dozens of people in the *pueblo*.

**Figure 1. Guelatao de Juárez's Primary School with Internet Access<sup>9</sup>**



Another example of Indigenous communities building their own internet infrastructure to express their values comes from Colectivo Ik' Ta K'op's (Word of the Wind Collective's) wireless internet infrastructure in the Tseltal *pueblo* of Abasolo, in Ocosingo, Chiapas state. Prior to the

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<sup>9</sup> Credits: Fernanda R. Rosa

Collective's efforts, the only option for internet access in the area came from a low-speed satellite internet service. The Collective built a mobile wireless network, using a similar technique of repurposing residential connections that the Guelatao municipality did. They brought the signal with their own antennas from a bigger town, using unlicensed spectrum.

The internet infrastructure in Abasolo is embedded within the values of sharing. As Mariano Gómez, one of the Collective founders, puts it, "There are things we already knew about the internet, but we did not know the name. The spectrum, we call air" [author's own translation]. Air, in this case, is not a commodity—it is part of nature and of their territory. It is sharable, and an inherent part of life.

Using the unlicensed spectrum of 5MHz, each device installed in the network becomes a hotspot. Therefore, the more people who have internet access in their homes, the more people are able to access the internet in public spaces or the street. The building of the internet infrastructure in Abasolo was also a shared effort—interested people would install towers on their property, and the Collective would provide the radio antennas needed to broadcast the internet signal.

As in Guelatao, the Collective charges users affordable rates to access the internet. Users who can contribute to maintaining network devices and support the Collective's other projects are charged 80-100 pesos (approx. 4-5 USD) a month. Users who simply want to access the internet are charged 200 pesos (approx. 10 USD) a month. Still, families who cannot afford to pay these rates may have access for free.

The community's values are also embedded in a local intranet, named IntraBACH, set up by and for the community members. Originally designed by a teacher for his students, the shared nature of the network in Abasolo made these resources available to all accessing the network. The intranet contains materials like a library of books from Latin America, Tseltal language materials, Khan Academy courses in Spanish, and an offline version of Wikipedia, which are stored in the community's server.

These Indigenous infrastructures, in Guelatao and Abasolo both, are still deeply affected by the commercial policies of the internet service providers (ISPs), the technical rules shaping the architecture of the internet, and governmental decisions affecting access to spectrum and

broadband internet. Both networks in Guelatao and Abasolo are shared networks, relying on repurposing individual residential internet connections to provide services to their communities based on signal sharing. This is not in compliance with the ISP's terms of service, so there is always a risk that the internet service providers will take some action.

**Figure 2. Placing an Antenna in Abasolo, Ocosingo, Chiapas<sup>10</sup>**



The commercial ISPs to which the Tseltal and Zapoteco networks connect their shared networks also subject the communities' connections to network management that is driven by commercial interest and not necessarily aligned with the values of these communities. This management can include user-unfriendly techniques such as blocking file downloads and content sharing, "deep packet inspection", or throttling available internet speeds.

Indigenous territories are sovereign, meaning that autonomy and self-sustainability are at the core of their existence. The Tseltal and Zapoteco people's very way of being is embodied in the

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<sup>10</sup> Credits: Fernanda R. Rosa

internet infrastructures themselves, through principles of coexistence and community values to exercise their constitutional right to communicate and have access to broadband internet.

*Sovereignty* and *coexistence* are keywords here, because they require us to understand that when building their infrastructures to have access to the internet, Indigenous people are ultimately exercising their right to exist on their own terms. However, their infrastructures are still threatened by the policies and the interests of other actors, including the commercial ISPs and government regulations over the airwaves themselves.

It is clear from the sustained efforts to build and maintain these shared networks within Indigenous communities that these infrastructures are vital, relevant and important to our understanding of the internet. The technologies that underpin network connectivity are visibly and invisibly embedded with values and uneven relationships of power, whether at the local and communal level, or at the commercial and global level. It is important that we unpack these values and expose their broader consequences on Indigenous sovereignty, autonomy and everyday life.

### **Focus Questions**

- 1) Which reasons led the municipality of Guelatao to start their own internet infrastructure?
- 2) How have Tseltal and Zapoteco people brought the internet to their communities? Where does the signal come from and where does it go?
- 3) What values, would you say, are embedded within Indigenous internet infrastructure?
- 4) Conversely, what values are embedded in mainstream ISP infrastructure? How do these values prevent companies from improving internet connectivity in Indigenous territories?
- 5) Access to broadband internet is a right in the Mexican constitution. Despite this, many people in the country still do not have access. How do Indigenous shared networks contribute to understanding this right?
- 6) How would you define Indigenous sovereignty in your own words?

## Discussion

### Indigenous Sovereignty/Autonomy

Yaqui scholar Marisa Elena Duarte has written that “... Native and Indigenous peoples have endured centuries of colonization in part because of daily ordinary habits of sharing information and ways of knowing with one another, workmates, allies, and friends. Uses of social media and the undergirding systems of devices are becoming, in Native and Indigenous contexts, common modes of sharing information and knowledge critical to Indigenous self-determination.”<sup>11</sup> Duarte also notes that the colonial experiences of contemporary Native peoples across North America are not identical—though they are similar—and that each nation or people has its own particular history of colonization to grapple with in the present moment. Considering the broader contexts of Indigenous peoples in the U.S. and Mexico in North America, explore the following questions.

### Questions

- 1) Open the Institute for Local Self-Reliance report cited at the beginning of this case study and find an example of an internet connectivity project being built by Native nations in the United States. How are these efforts similar to, or different from, the Tseltal and Zapoteco examples from the case study? For example, who have they collaborated with to build out the internet infrastructure? How is it funded and supported? Who owns the infrastructure?
- 2) What do these differences and similarities between Indigenous communities’ efforts to connect to the Internet tell us about communities’ notions of autonomy, individuality, and sovereignty?

### Values in Design

One of the values that animates the Zapoteco efforts to build infrastructure to ensure internet access and connectivity is the principle of *comunalidad*, or communality. *Comunalidad* is a form of social organization that defines Indigenous life in the *pueblos*, their “way of living and thinking”<sup>12</sup> as defined by the Zapoteco scholar Jaime Martínez Luna. It encompasses four major elements: 1) Territory (including collective history, language and human and nonhuman inhabitants); 2) Collective decision-making through assemblies; 3. *Tequio*—voluntary service to

<sup>11</sup> Duarte, Marisa Elena (2017). *Network Sovereignty: Building the Internet Across Indian Country*, p.6.

<sup>12</sup> Martínez Luna, J. (2015). *Comunalizar la vida toda*. Ixs desechables editorxs. p. 44.

and collective work within the community; and 4) *Fiestas* (celebrations) and rituals.<sup>13</sup> *Comunalidad* are principles that animate life and work in the present moment, and link that work to possible horizons and futures.

### Questions

- 1) Which elements of *comunalidad* are in evidence in the construction of Indigenous shared networks?
- 2) What stands out for you in the Tzeltal and Zapoteco communities that have built their own internet infrastructure? How do you think that the value of *comunalidad* plays a role in what you have noticed?

### Digital Inequalities

Efforts to create more equitable and widespread internet infrastructure have not been limited to Indigenous communities. For example, the Equitable Internet Initiative in Detroit, Michigan<sup>14</sup> uses a point-to-point mesh wireless network to provide free internet access to the neighborhoods in which it operates. The Initiative operates under a set of Working Principles<sup>15</sup> that include “collaborative community ownership and governance,” a “culture of consent,” “collaborative problem solving,” and “long-term, authentic relationships.” There are a range of community and municipal efforts to address long-standing digital inequalities in many different places across the world. All of them are an attempt to imagine and provide alternatives to the dominant commercial models of internet service providers in the country today.

### Questions

- 1) How would you define “digital inequalities” in your own words? Have you encountered any examples of digital inequality in your community? What did it look like? What impacts did it have on you, or your friends and neighbors?

<sup>13</sup> As explained by Mixe scholar Díaz Gómez, F. (2004). *Comunidad y comunalidad*. *Culturas Populares y Indígenas*, 365–373. <http://rusredire.lautre.net/wp-content/uploads/Comunidad.-y-0comunalidad.pdf>.

<sup>14</sup> Echelman, Adam and Inside Southwest Detroit, “The Wires that Bind,” Available at: <https://www.insidesouthwest.com/the-wires-that-bind>.

<sup>15</sup> Detroit Community Technology Project (2020). “Equitable Internet Initiative Working Principles”. <https://detroitcommunitytech.org/sites/default/files/EII-Working-Principles-2020.pdf>

2) How have Tzeltal and Zapoteco people faced digital inequalities? How have they responded to that?