



# **BROADBAND CHALLENGES IN MICHIGAN**

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## **Agenda**

Merit Network and the necessity of RENS

Why is connectivity needed?

Leveraging technology to improve communities

Technology solutions

TV Whitespace Spectrum

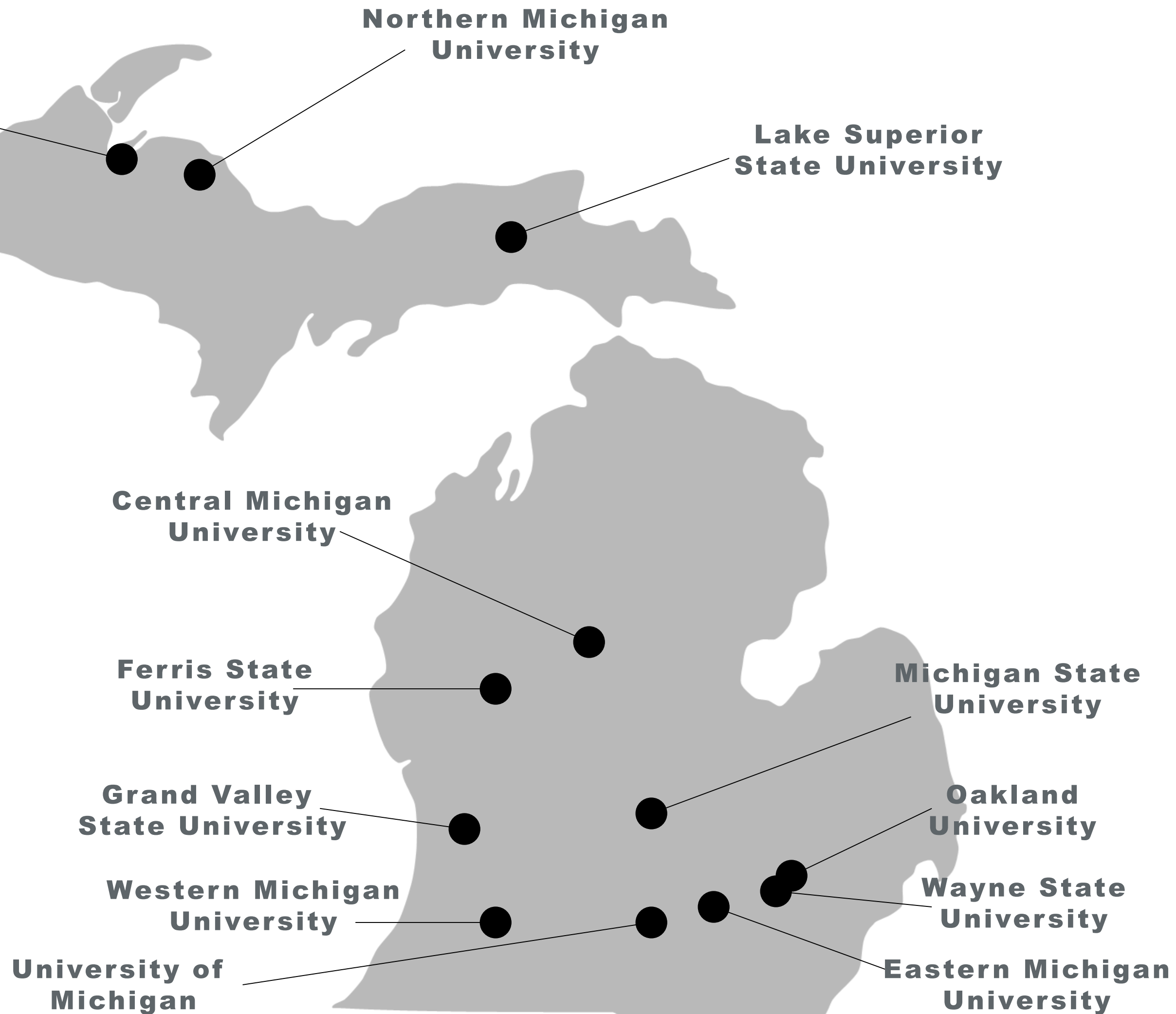
Rural Airband Initiative




# merit

Merit, the longest running R&E network in the U.S., is governed by 12 public universities and supported by 285 affiliate members.

Our Members are community-facing organizations from across the education, library, government, healthcare and non-profit sectors.



A background network diagram consisting of a complex web of interconnected nodes and lines, rendered in a light gray color against a white background. The nodes are represented by small black dots, and the lines are thin, dark gray lines connecting these dots. The overall structure is a dense, interconnected mesh, typical of a network topology.

**Merit provides networking, security and community services to member organizations – while upholding the principles of an open internet. Merit intends to operate its network in an open and transparent manner. We will not block websites, we will not throttle or degrade traffic and we will not discriminate in our treatment of this traffic.**

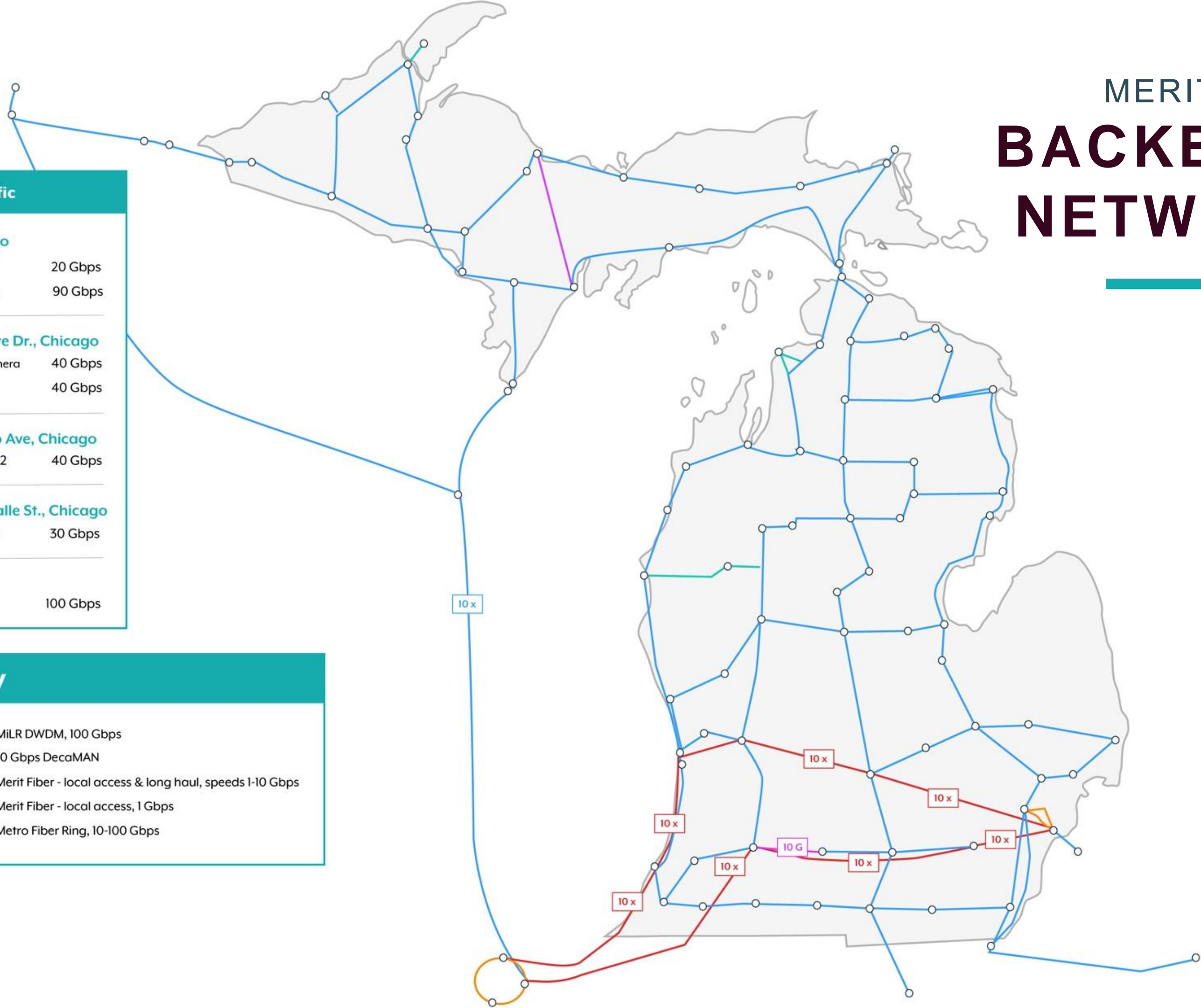
# MERIT'S BACKBONE NETWORK

**Internet Traffic**

<b>Equinix Chicago</b>	
AT&T	20 Gbps
Non-transit peers	90 Gbps
<b>710 N. Lakeshore Dr., Chicago</b>	
OmniPoP/I2/TeliaSonera	40 Gbps
R&E Peers	40 Gbps
<b>600 W Chicago Ave, Chicago</b>	
OmniPoP/Internet2	40 Gbps
<b>427 South La Salle St., Chicago</b>	
Non-transit peers	30 Gbps
<b>Southfield</b>	
Internet2	100 Gbps

**Map Key**

	MiLR DWDM, 100 Gbps
	10 Gbps DecaMAN
	Merit Fiber - local access & long haul, speeds 1-10 Gbps
	Merit Fiber - local access, 1 Gbps
	Metro Fiber Ring, 10-100 Gbps



# Why is connectivity needed?

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**34 million Americans** still lack broadband access  
(10% of total US population, **40% of rural America**)

**5 million** households with school-aged children



# Leveraging Connectivity

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- Access the internet has become **an integral component of everyday life**
  - Reshaped how individuals participate in society
  - These skills are **required to be competitive**
  - Higher broadband penetration is associated with **higher per capita growth**
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- Alleviating the homework gap
  - Telemedicine/ remote hospice care
  - Wildlife research and trailhead monitoring
  - First responders hotspots





# Technology Solutions

## **Challenges:**

Poor economies of scale, terrain and network issues

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## **EBS (Educational Broadband Spectrum):**

FCC envisioned for instructional materials

Difficult to obtain licenses (scarce)

End-user devices support LTE technology, like mobile wireless providers

## **Wi-Fi Mesh Networks (through a community):**

Used as extension of wireline-based coverage that connects devices through homes, businesses

Relies on unlicensed spectrum subject to FCC rules to unlicensed devices (no exclusive use of their networks)





# TV WHITESPACE

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Blocks of broadcast spectrum between frequencies assigned to TV stations

Used to create wireless broadband connections over long distances

**Base stations** mounted on towers, connected to a network (like Merit)

**Client stations** serve as Wi-Fi hotspots

Expected to provide the best approach to reach **80% of the underserved** rural population in MI

“Super Wi-Fi”

## TV Whitespace (Continued)

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- Unused by licensed services in the broadcast tv bands
- Low frequency can **penetrate physical barriers** and **travel long distances** – ideal for remote populations and difficult terrain
- Bands not configured yet to communicate with end-user devices (Like “transport” for Wi-Fi/Consumed from a hot spot)
- Subject for FCC rules for unlicensed devices
- Due to size of spectrum compared to larger frequency, **vast amounts of bandwidth aren’t available**





merit



ALPENA +  
MONTMORENCY, MI

# TV White Space APPLICATIONS

- Alleviate the “homework gap”
- Telemedicine for homebound patients
- Public safety initiatives like hotspots for first responders
- DNR and environmental research





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