

# Bridging the Digital Divide

with Mobile ad-hoc  
Networks in the  
Circumpolar North

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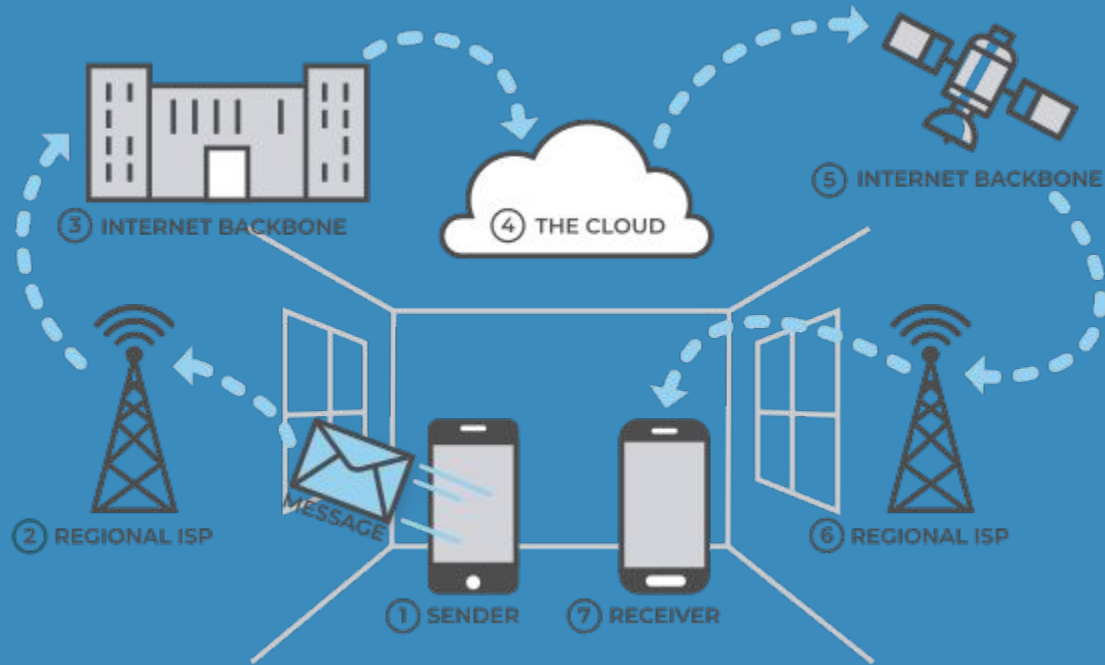
# Territorial Acknowledgement

The University of Guelph resides in the ancestral and treaty lands of the **Attawandaron** people and the **Mississaugas of the Credit**.

This work would not be possible without the contributions and guidance of the **Inuit** of Labrador & Nunatsiavut.



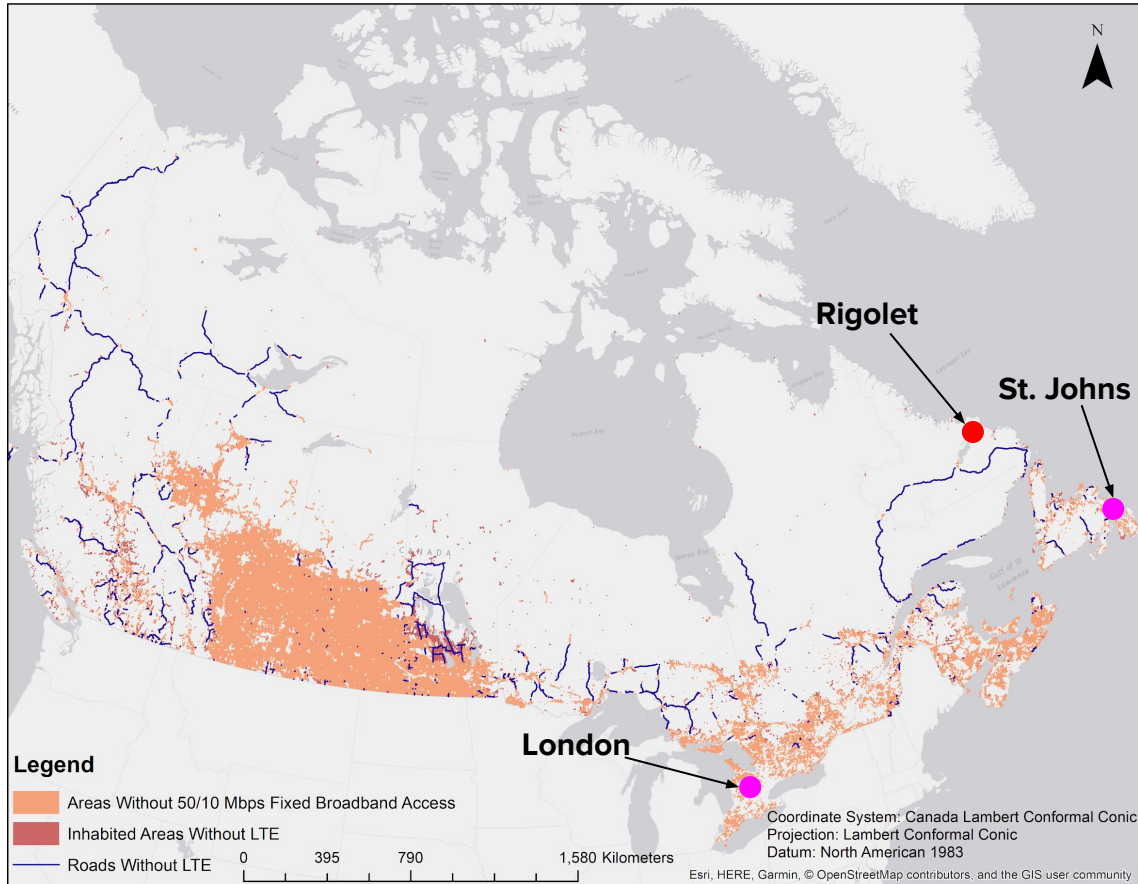
# Traditional Connectivity Infrastructure



# Alternative Connectivity Mesh



# Canadian Regions to Improve Broadband Access



# Download Speeds

19.7 Mbps  
Newfoundland & Labrador

29.5 Mbps  
St. John's, Newfoundland

0.7 Mbps  
Rigolet, Nunatsiavut





# 14%

Of Canada does not  
have broadband  
internet at home

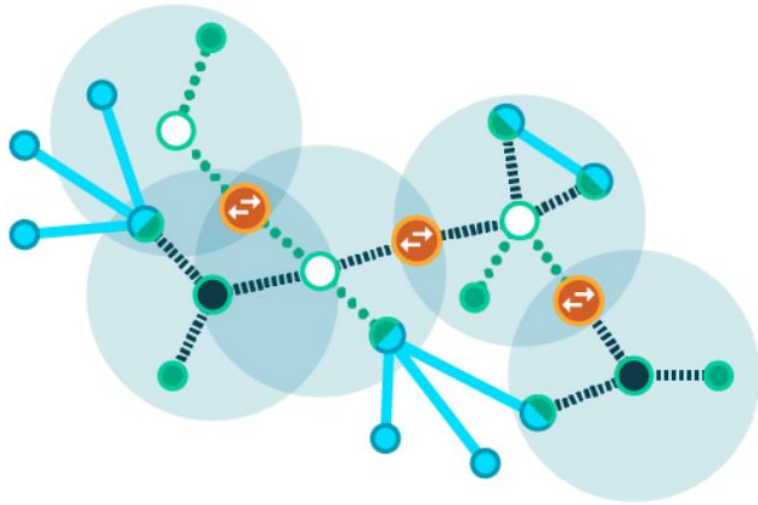
# 49%

Of the world does not  
use the internet

# Mobile Ad-hoc Mesh Networks





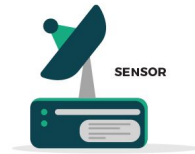
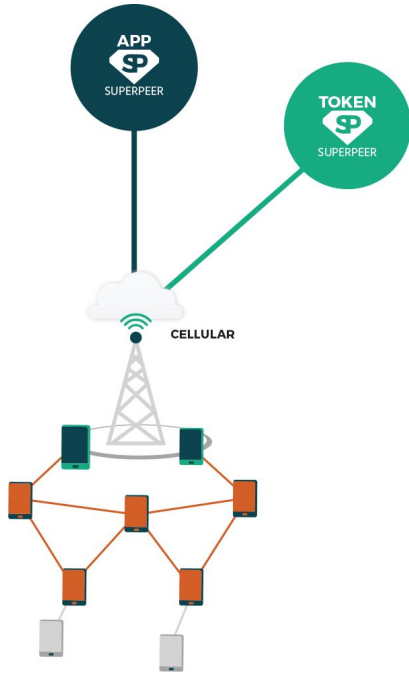


- ✓ Multiple radio access technology
- ✓ Autonomous network formation
- ✓ Peer-to-peer communication
- ✓ No infrastructure required

# Some research questions

- How many devices are required for connectivity?
  - Sufficient density
- How are devices optimally assigned network roles?
  - E.g. router, client, switching node
- How do we optimize data transfer speeds?





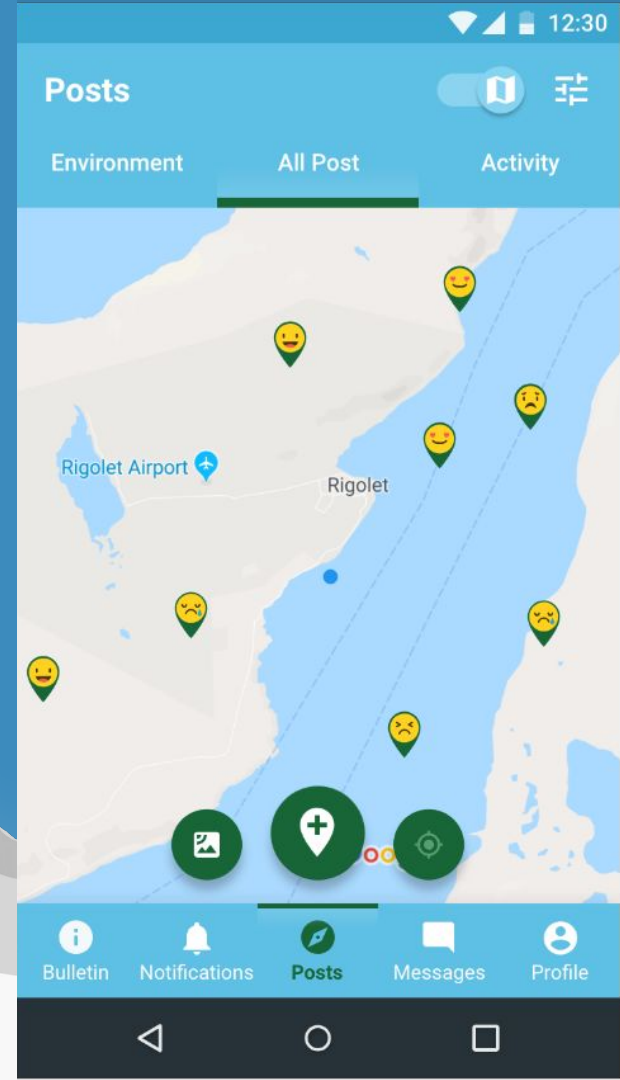
The use of mobile devices allows for **automatic data collection** from:

- ✓ Environmental sensors
- ✓ Built-in sensors
- ✓ Human observations

And **easy distribution** of data within the network.



# Community-based Health & Environmental Monitoring



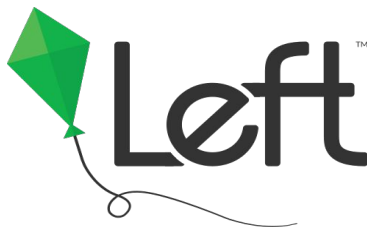
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Shiwak, Michele Wood, Jason Ernst & The  
Rigolet Inuit Community Government





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Nakkumek!

Questions?



- [https://cira.ca/sites/default/files/public/cip\\_report\\_2018\\_en.pdf](https://cira.ca/sites/default/files/public/cip_report_2018_en.pdf)
- <https://openmedia.org/en/canadian-internet-traffic-travelling-through-us-making-canadians-even-more-vulnerable-nsa>
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- <https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx>
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