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Connecting Indigenous Communities – Examples and Lessons Learned

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Agenda

- Status of Indigenous Connectivity
- Community Networks Defined
- Example Deployments
- Capacity Building
- Challenges and Opportunities
- Lessons Learned

About the Internet Society

The Internet society is a global non-profit organization dedicated to ensuring the open development, evolution and use of the Internet.

The Internet Society

Founded by Internet pioneers in 1992

A global non-profit organization dedicated to ensuring the open development, evolution and use of the Internet

A network of 63,710 members, 133 Chapters and Special Interest Groups, and 104 Organization Members

Works through its chapters and members, and collaborates with a broad range of groups to promote technologies that the keep the Internet safe and secure.

Serves as the organizational home for the Internet Engineering Task Force (IETF).

The state of connectivity in the North

What does connectivity look like in the North?

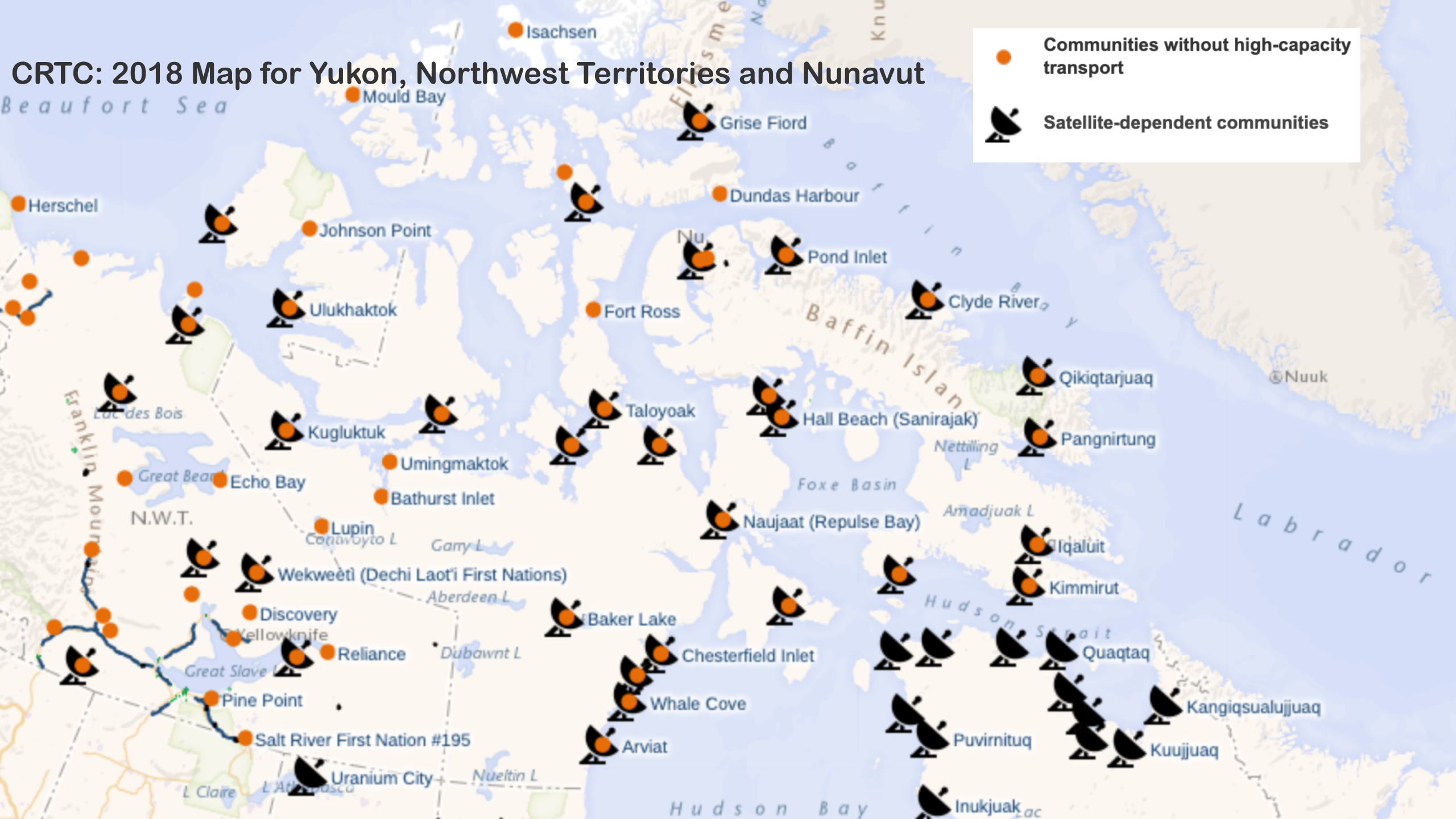
~42 Inuit communities are satellite-dependent; the rest are serviced by microwave or fibre.

Satellite – expensive, slow, relatively unreliable (eg. In Ulu max of 5 mb/s symmetrical, often 1 mb/s)

Small number of providers.

Low ROI for ISPs to deploy infrastructure in the North: small population, remoteness, difficult terrain.

CRTC: 2018 Map for Yukon, Northwest Territories and Nunavut



Community Networks

The Internet can open up a world of opportunity. With half the world's population unconnected, it's urgent that we shape a tomorrow that benefits everyone.

What is a Community Network?

- A “do it yourself” solution to bring connectivity to communities.
- Telecommunications infrastructure deployed and operated by a local group to meet their own communication needs.
- The result of people working together, combining resources, organizing their efforts, and connecting themselves in a bottom-up manner.
- Complimentary to commercial networks, providing access where commercial networks do not operate.

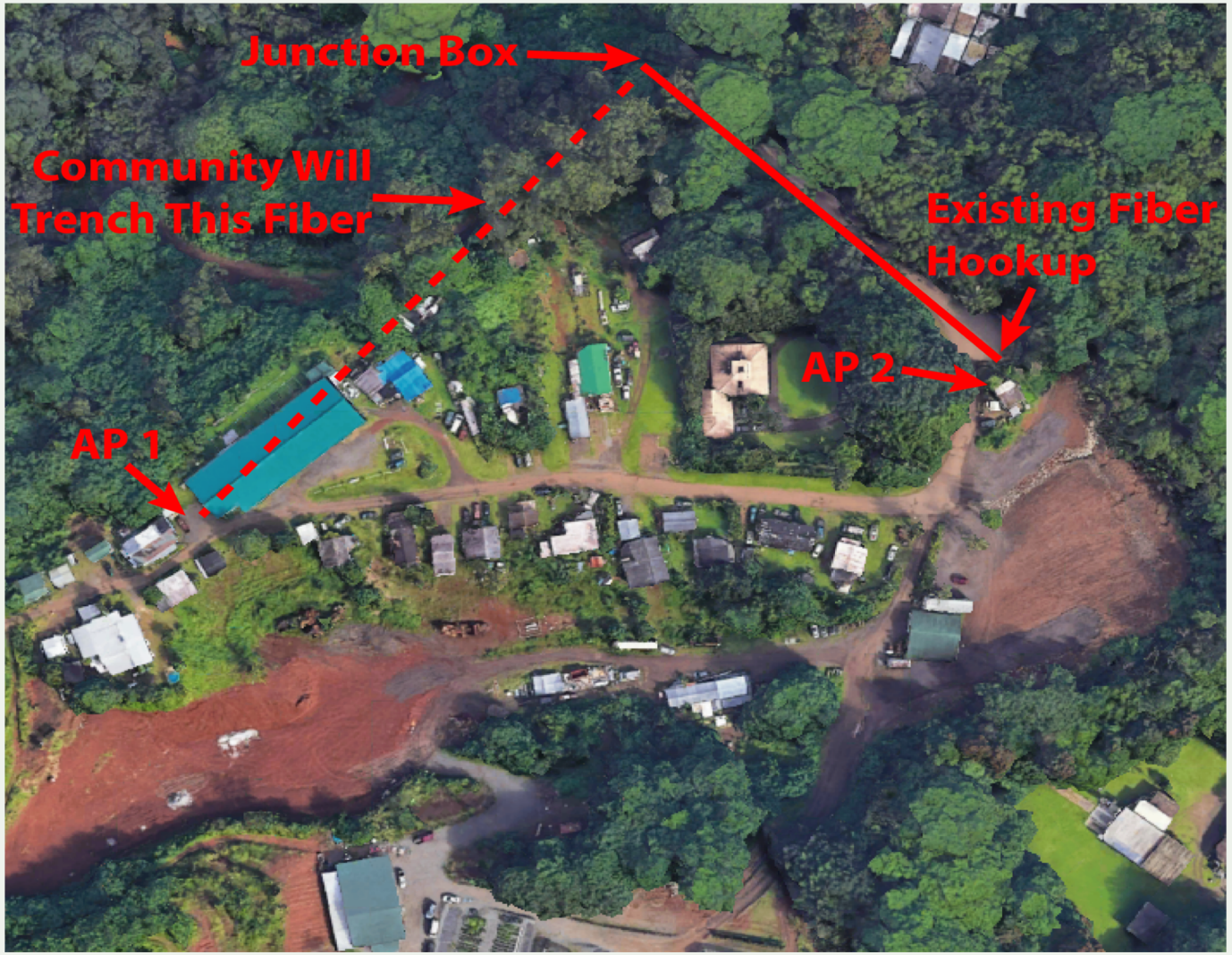

Community networks keep the community’s money in the community by operating your own network, and create training and employment opportunities for residents

Pu‘uhonua o Waimānalo, Hawaii

Solution Overview

- LTE based wireless network

  (5 GHz unlicensed spectrum)
- Two eNodeB and six outdoor CPEs
- Connect to WiFi home routers for wider coverage
- Backhaul is on optical fiber
- Capacity of 2 x 1Gbps circuits
- Fees: ~ USD 400 per month

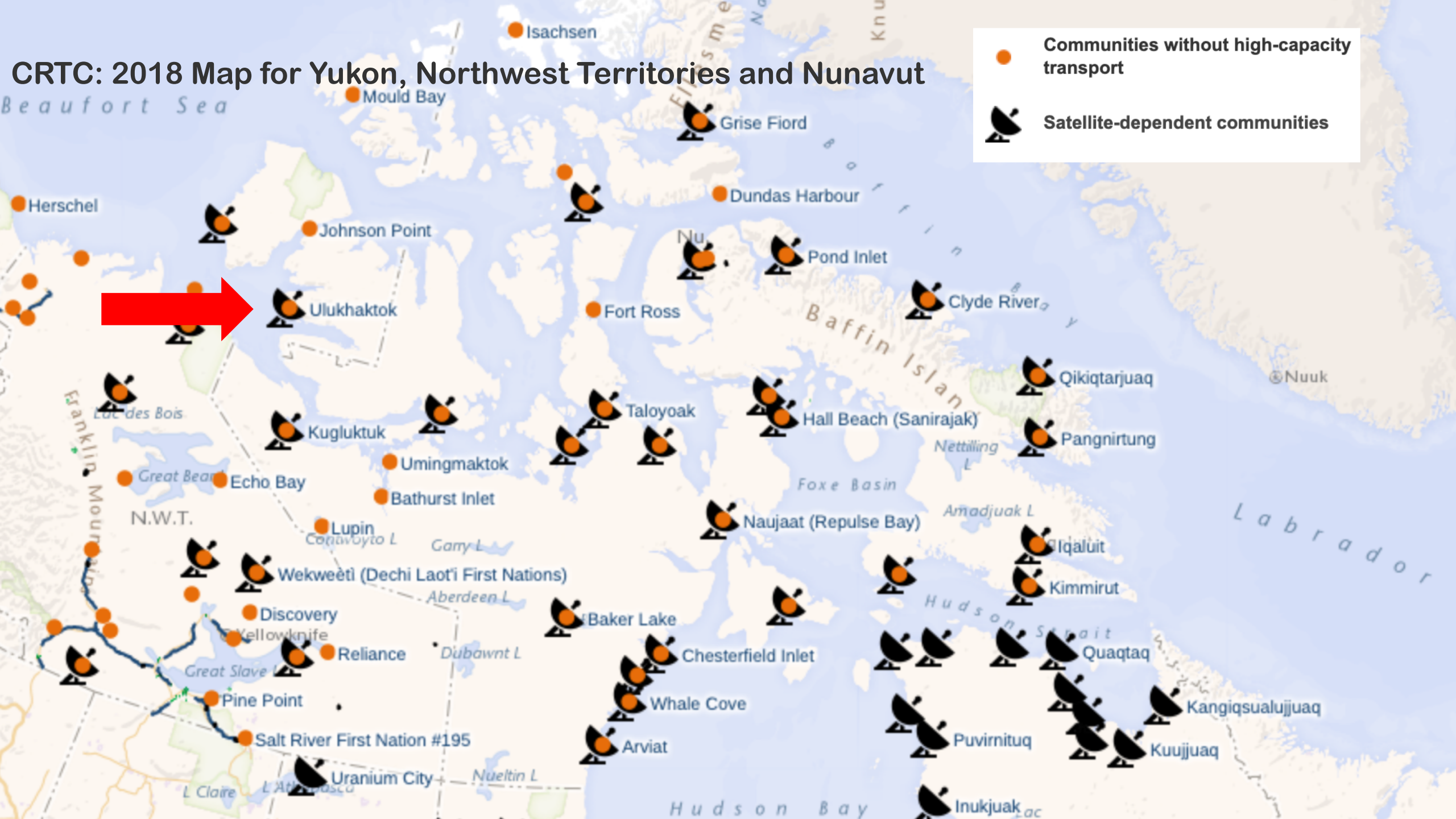


eNodeBs and CPEs

You can’t Internet alone

Ulukhaktok, Northwest Territories, Canada

CRTC: 2018 Map for Yukon, Northwest Territories and Nunavut



Working with Ulukhaktok

Discussions at the Indigenous Connectivity Summit in October 2018 in Inuvik

Ulukhaktuk identified as pilot community

Community visit in June 2019 – support and leaders identified

Training began summer 2019, completed at Indigenous Connectivity Summit in Pu‘uhonua o Waimānalo, Nation of Hawai’i

Ulukhaktok Community Network

- LTE based wireless network
- Backhaul is satellite (transition to Low Earth Orbit satellite in 2021/22)
- Upfront hardware cost: ~ USD 700k
- Fees: ~USD 200k per month

Community Network Training

Central to the success of this initiative will be building the capacity of northerners to develop, build and manage Internet and IT infrastructure.

Why Training is Important to Community Networks

Capacity-building increases the sustainability of infrastructure solutions and provides socioeconomic benefits to communities.

Local community networks should strive to build their talent in-house as part of a sustainable business plan, and in order to scale.

This can be supported through the development of toolkits and resources for network start-ups, and through work with expert organizations and existing community networks.

Technical Training

Central to the success of this initiative is building the capacity of community members to develop, build and manage Internet and IT infrastructure.

Training opportunities will provide meaningful career options to support a diverse local economy through:

- Online training
- Facilitated access to relevant classes in IT engineering and programming
- Local Hands on Training

Hands-on Training

Soft Skills Development

A successful community network depends not only on the technical skills of it's operators, but also on those operators' soft skills, including:

- Funding a network – business models and proposal writing
- Governance – how to manage the "business" of a network
- Project management
- Types of business models
- Financial management
- Sustainability
- Digital literacy
- Network security – minding your MANRS
- Strategic partnerships

Key Technology Directions

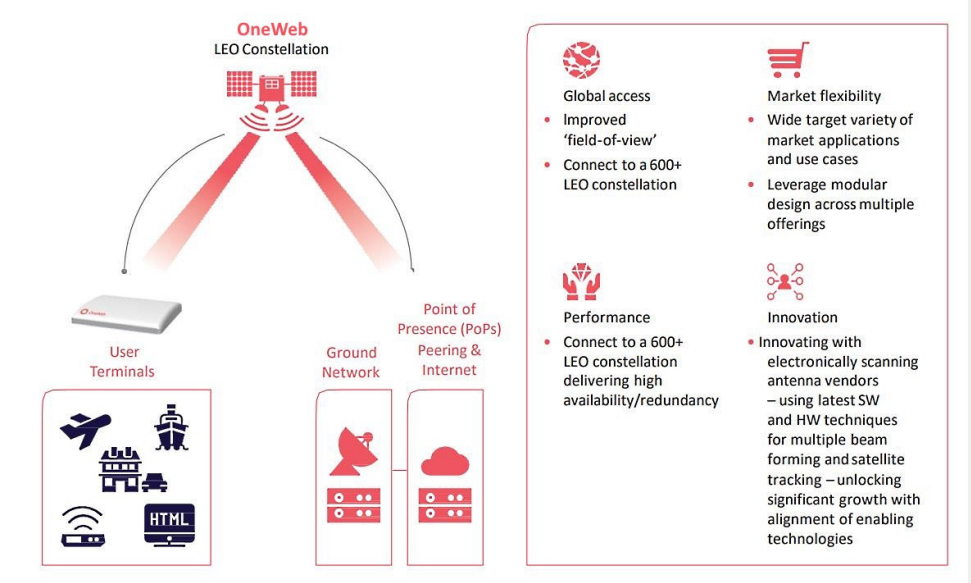
Low Earth Orbit (LEO) Satellite Backhaul

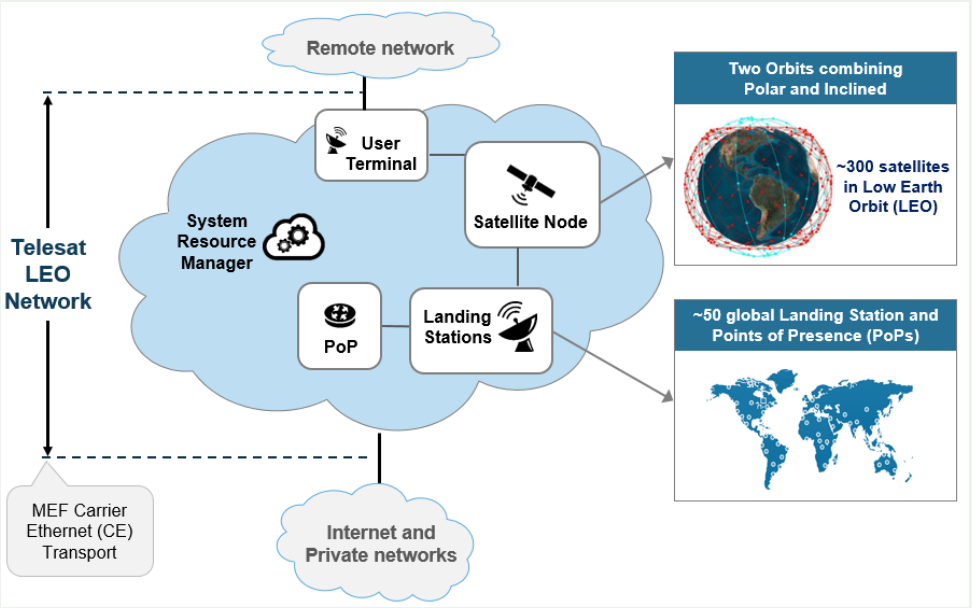
LEO satellite solutions has greatly improved the communications latency.

Several initiatives will use large numbers of satellites (300 to 500) at significantly lower orbits (500-1200 km instead of 36,000 km)

Utilize polar and inclined orbits that ensure global coverage

Timelines: 2020 onward (OneWeb late 2020, Telesat 2021)

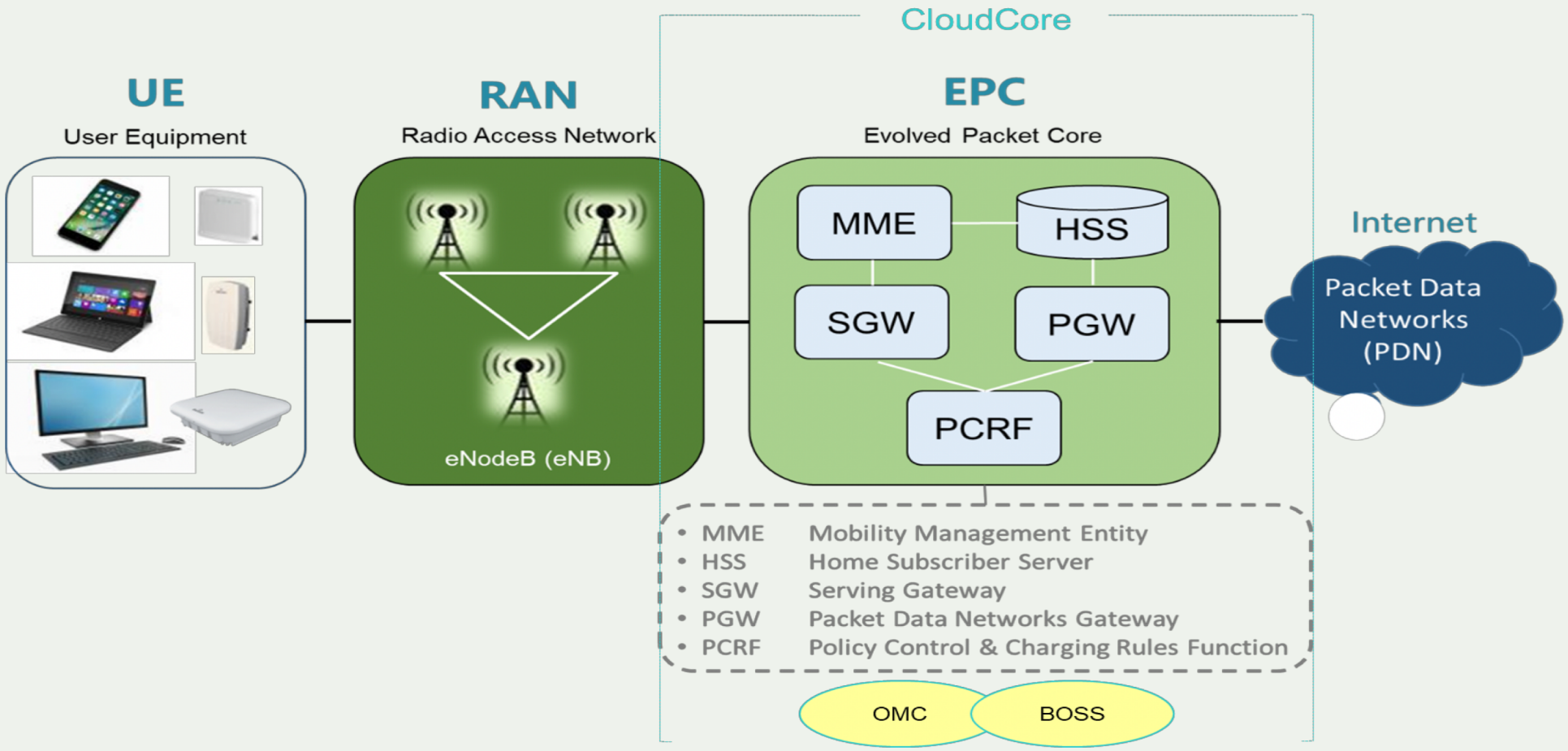




Fact Sheets on “Solutions for Traffic Backhaul in Community Networks”

https://www.internetsociety.org/resources/doc/2019/solutions-for-traffic-backhaul-in-community-networks/

LTE Network Architecture



Baicells

Education Band Spectrum (EBS) for Tribal Lands

- EBS spectrum is in the 2.5 GHz band, ideal for rural communities (116.5 MHz available)
- Restrictions on use in Educational Institutions have been lifted.
- Can be used for fixed wireless services or Internet services
- Specific FCC rollout requirements:
  - Within two years, coverage of 50% of population
  - Within 5 years, coverage of 80% of population

- **FCC**: The 2.5 GHz Rural Tribal Priority Window for spectrum licenses opened on **Monday, February 3, 2020**, and will close on **Monday, August 3, 2020**.
- **https://www.fcc.gov/general/native-nations**

Challenges, Barriers and Opportunities

Challenges:

- Geography
- Cost
- Licensing and permits
- Access to funding
- Access to spectrum

Barriers:

- Community support is crucial for long-term success
- Funding criteria

Opportunities:

- Community support
- Funding is available (GoC and other)
- Technology is not complicated
- New technologies on the horizon
- It’s been done before – there is a world-wide network of support

Lessons Learned

Key Lessons Learned

- Community by-in is absolutely necessary (local champion)

- Preparation and skill development before deployment

- Technical hands-on training and deployment with community members

- Verifying details of connectivity and infrastructure before CN deployment

- Do not rush it!

Thank you.

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Get involved.

There are many ways to support the Internet. Find out today how you can make an impact.

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