



## The Challenges of “Last Mile” Internet Connectivity

Last mile Internet in rural areas is especially challenging because of low population densities that are often separated by geographical barriers such as mountains. These areas are less profitable for large providers to invest in the infrastructure for the number of users that can be reached. That often results in the need for specialized solutions for users, particularly those who are off-grid in remote rural areas.

There is no single best rural internet solution for all users, which is why a variety of options and solutions exists, each with its own costs and benefits based upon the specific application needs.

Last mile Internet in hard-to-reach rural areas often involves a patchwork of networks to extend coverage to areas not served by existing methods. Or not being served as reliably, cost effectively or with up-to-date technology in the fast-changing world of telecommunications for the best rural internet last mile solution that fits your situation.

For example, while last mile connectivity is crucial in any location, when emergency disasters strike in rural areas disabling existing communication networks, having a fast-deploying emergency response capability to deliver broadband Internet to first responders saves lives and property. In this situation, compactness and speed of deployment may be the most crucial success factors that overshadows other considerations.

What is last mile internet? The “last mile” is used metaphorically. It can be more or less than a mile. Or it can be the last kilometer.

### **The 3 tiers of Internet delivery**

The worldwide web is a complex network of fiber cables spanning continents and oceans. However, the last mile network that reaches your home or business connects



with a variety of different methods. There are 3 tiers of Internet delivery known as “Internet exchange points”, where these 3 tiers interface and connect.

Tier 1 providers are the major players spanning continents and oceans with fiber cables and giant Internet exchange points. These are the superhighways of the Internet.

Tier 2 providers distribute the signals to local Internet service providers or ISPs.

Tier 3 connects the ISP addresses with individual subscribers. Tier 3 is where the last miles exist and is who you are usually paying your monthly bill to as a subscriber.

### **What are the last mile problems?**

The last mile is usually the bottleneck that slows Internet speeds. This is due in part to the last mile network’s relatively limited bandwidth which restricts how much data can be transmitted compared to the fiber cables laid in cities or suburbs.

The Internet exchange point between Tier 2 and Tier 3 is where connections change and signals get handed over from Tier 2 service providers to a wide variety of competing service providers like AT&T or Verizon. A number of things can and do go wrong at this Internet exchange point, which is why it is so often a speed bottleneck and can be difficult to fully assess before actually implementing the network.

The last mile is also usually the most expensive part of any network. This is particularly true in rural areas with lower population density because the costs are spread over fewer subscribers.

In as rapidly a changing world as telecommunications, solutions that were state-of-the-art 10 years ago may be barely keeping up with today’s increased Internet speeds and volume. To date, there have been no clear last mile rural Internet option that best fits all circumstances.



## **What are the most common rural Internet last mile options?**

Wireless rural broadband Internet systems have the obvious advantage of not having to install wires or fiber optic cables. However, because wireless transmissions are not shielded like cables it can also make it susceptible to unwanted noise and signal degradation over multiple repeaters.

Reliability is a major factor getting high speed internet into rural areas. Weather conditions or peak usage at different times of day are two of the considerations that hamper reliability.

### **Mobile Internet**

5G is now the most widespread broadband Internet in the United States, but still has spotty coverage in many rural areas. Whenever available, it is usually the easiest solution.

### **Satellite**

Satellite can be a good solution for many situations, but that simply isn't always available due to terrain or vegetation. There are limits on the ability to share satellite signals to many users.

Satellite reception can require higher energy requirements that are an important consideration in off-grid remote areas. Satellites can also be affected by bad weather which can be crucial in times of natural disasters.

### **Wireless Local Area Network (WLAN)**

Getting Internet access into remote areas often involves transmitting a signal from an available 5G network or another Internet access point with ethernet or satellite and transmitting it to inaccessible locations via a WLAN.

WLANs utilize high-frequency radio waves to extend a signal over a coverage area that includes Wi-Fi Internet access points or nodes. While some people use WLAN and Wi-Fi interchangeably, it's important to understand the distinction that Wi-Fi



refers to the wireless connection your device uses. WLAN is the network itself, which often uses radio waves as the backbone and delivers the signal to devices in multiple antenna “mesh networks.”

A mesh network is where overlapping connection points in the network cooperate with one another to efficiently route data to and from users. Mesh networks create multiple overlapping paths for information to connect, which strengthens the resilience of the network in case there are local failures.

WLANs are often the best high-speed internet for rural areas. As wireless technology has rapidly advanced over the last few years towards fulfilling the promise of Internet anywhere, WLAN networks have never been easier to set up and maintain.

### **Why is a compact, fast deploying broadband wireless network the best solution for many rural and emergency disaster applications?**

Today’s wireless broadband technology band to rural area in a cost-efficient manner.

It can be installed in a fraction of the time because there is no fiber optic cable to install and no related regulatory approvals necessary, which often delay those projects for years.

A wireless system is much less expensive to install than burying fiber optic cable in areas with low population density.

The normal end user experiences no degradation in the quality of the signal when compared to other systems when using today’s proven technology.

Tekniam's new Remote Universal Communication System (RUCS) bridges the gap between an established Internet contact point - such as wireless broadband, satellite or an ethernet connection - by relaying the signal across a Wireless Local Area Network (WLAN) to users beyond the reach of available access.



What makes RUCS breakthrough technology is its compactness and ease of operation.

Starting at 5 lbs/2.27 kgs it can deliver a signal from an access point within a 1000 ft radius for up to 250 users. The signal can be relayed between units 3 miles apart to cover a total distance of up to 35 miles.

It has never been easier to deliver broadband Internet to rural areas with this new breakthrough technology that is compact, quickly deployable and best of all, affordable!