



Rural Connectivity

Old connectivity problems require new satellite solutions.

Table of contents

Rural Connectivity	3
Rural connectivity challenges affect developed and developing countries	3
The importance of ground network infrastructure	4
Bringing the same level of experience to all users	4
What about 5G?	5
Our capacity	5

Rural Connectivity

It is undeniable, what those of us in urban and developed areas have experienced in the last decade, faster and faster internet. The unwritten expectation for our network providers to carry more and more data, to the point that a large portion of our day is filled with data consumption from smartphone call and video, to general internet browsing and content streaming, is an urban utility available at the flick of a switch. All of this data consumption is enabled by rapid and reliable internet access - available only to the city dwelling minority.

The total number of mobile devices connected to the internet has grown by more than 1.2bn in the last 4 years alone.¹ These devices are intertwined into our lives, from banking to video streaming however these devices are the only form of simple communication in underprivileged or underserved areas where bandwidth is extremely inaccessible and overly expensive.

The UK government released a report in 2019, shedding light on the reality that “government policy has barely kept pace with the technological change and has failed to reduce the digital divide between urban and rural areas”². Along with the confusion of how a full fibre rollout by 2025 would even be achieved², the most pressing issue highlighted was the not-spots in mobile coverage across the UK and the need for a rural roaming solution to be met between the government and the Mobile Network Operators (MNOs). The risk of below adequate rural broadband is causing harm to localised rural economies that rely on quality broadband to maintain business in an increasingly technological society. It is therefore essential that those not-spot areas and hard to reach areas are given priority. Furthermore, with financial services, education and healthcare increasingly becoming digitised, it is thus vital that populations in rural and remote regions are not left behind.



750 million

people around the world live in areas that lack mobile broadband (3G or 4G) coverage; 96% of this group live in low- or middle-income countries, mostly in rural areas that are more expensive to connect.

In West Africa

280m

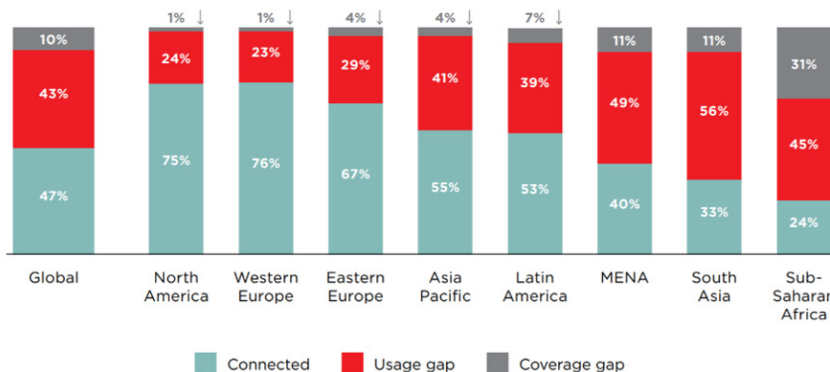
people digitally excluded



Rural connectivity challenges affect developed and developing countries

In West Africa alone, more than 280 million people remain digitally excluded. In Niger alone, 82% of the population are not covered by any mobile broadband network³. Fundamentally this is a digital exclusion that restricts large swathes of the population from having a role in the domestic economy¹. Whilst the economics of a network rollout by carriers is challenging because of lower disposable incomes in those excluded regions, there can be opportunities for governments and mobile network operators to come together and utilise modern innovations in network backhaul that significantly reduce the operating costs and give flexibility in extending connectivity where required. In addition, barriers to investment such as legal and regulatory frameworks should be shifted into opportunities that attract and encourage investment. Whilst microwave backhaul is an option in some locations, in many instances line of sight or distance involved require expensive and fragile multiple hop links.

Sub-Saharan Africa has the widest coverage gap in the world



GSMA: Closing the Coverage Gap 2019

The importance of ground network infrastructure

In recent years, the cost and complexity associated with using satellite to backhaul networks has been greatly reduced. In addition, the Satellite ground segment is also able to support the bandwidth requirements for mobile backhaul as these sit in highly connected hubs. Access to fast deployment in temporary solutions, combined with reliability in permanent solutions make satellite an attractive use-case for Mobile Network Operators looking to meet the growing demands for data.

The Avanti ground network is unique in that it is fully owned and managed by Avanti, bringing an extra level of resilience and security. Its diverse owned gateways ensure ultra-reliability. The multiple backhaul circuits from each ground station provide additional resilience and redundancy. As a result, mobile network operators are able to provide their customers extensive coverage, high levels of availability and high speed connectivity.

Bringing the same level of experience to all users

In meeting the ever growing growth in data demand, Mobile Network Operators that offer the best Quality Of Service (QOS) will be competitively ahead. Mobile networks will be required to improve current cell site capability and densify their networks, and with the emergence of small cells in the mobile connectivity space, networks are able to carry increased demand with superior service. In order to deliver this quality service to rural and remote areas, mobile network backhaul solutions should be reliable, flexible and scalable at commercially viable rates. With large untapped markets still transitioning to 4G, NSR research sees satellite as the most effective solution for helping Mobile Network Operators expand into underserved markets. NSR predict the installation of small cells will surpass 80,000 by 2029. ⁴

Previously, capex requirements for macrocell base stations had been a major barrier for connecting ultra-rural areas. However, new generations of base stations optimized for serving smaller populations has decreased the initial investment size by almost 90% ⁵. Fixed line backhaul options such as copper and fibre will prove to be too costly, impractical and without any of the flexibility required for use in conjunction with small cells outside highly developed areas. The attraction of small cells is that they can generate returns attracting as low as 300 subscribers and have a distance range of up to a few kilometres, which makes them an attractive solution for rural deployment as it is now possible to close the business case even when there is a small number of subscribers to be captured.

It is often rural areas with isolated and sparse populations, with low levels of traffic that are ignored because of the heavy investment involved in deploying terrestrial infrastructure. As an industry leader in Ka-band backhaul, Avanti has illustrated its capability in providing end-to-end network integration for 2G, 3G, 4G and is working towards enabling 5G. By working with mobile network operators across Europe, Middle East and Africa in deploying cost effective solutions, underserved populations have been enabled to receive reliable access to the internet.

What about 5G?

Ensuring wide area 5G coverage with terrestrial infrastructure requires a huge investment and it is not yet known when that will happen and how extensive it will be. If only in urban areas, risks of creating a larger divide may arise and affect the viability of key use cases. Satellite can support key use cases and extend the reach of 5G to a maximum of users and uses. Avanti firmly believe that delivering on the future telecoms ecosystem requires a collaborative effort across technologies, across sectors and across regions. Avanti is working on numerous EU projects to develop 5G and is leading the EU Horizons2020 SaT5G project, working with 15 other terrestrial and satellite players to research and develop the standards for seamless integration of satellite into 5G.

Our capability

A great example of carrier grade satellite backhaul and backhaul backup is the solution Avanti provided for a major Mobile Network Operator, EE. By deploying approximately 750 fixed and mobile base stations, Avanti showed the mobile network operator first hand; how temporary and semi-permanent portable assets can be rapidly deployed to recover dead cells, network outages and incidents, allowing the Mobile Network Operator to continue providing connectivity to customers wherever they are. The UK Government uses EE for the Emergency Services network provided by Avanti on KA band – which also provides commercial use.

Another example of using satellite to grow mobile internet penetration rate, is the work Avanti have done alongside the Tanzania Telecommunications Corporation (TTCL). In extending network connectivity to rural areas of Tanzania that were previously digitally excluded, TTCL were able to grow their user base and widen the economic access of individuals previously excluded. TTCL concluded that satellite was the most cost efficient and quickest means of connecting the rural areas and so they partnered with Avanti. Together both parties were able to install VSAT services to over 10 remote locations within 1 month.

Avanti are extremely proud to also be partnering with some of Africa's largest MNO's in providing robust and scalable LTE backhaul into some of the continent's most remote areas. We have undergone stringent testing within their labs, to ensure we meet the highest standards available, prior to rollout. With our HYLAS 4 and HYLAS 2 Satellites, we have vast coverage of these developing countries who are desperate for alternatives to delivering connectivity to their people.

As a proud Global Goals Business Avenger for the United Nations, Avanti is focused on enabling a world where everyone can access high speed internet. Avanti have been a leader in pioneering Education projects in Africa such as iMlango, that rigourously track the progression of students and enables them to an online digital education. These schools are often in remote and rural areas and so thanks to the power of satellite, over 180,000 students have seen improved educational outcomes in maths, literacy and life skills.

Sources:

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⁴ NSR: Emergence of Small Cells 2019

<https://www.nsr.com/nsr-report-smallcells-a-new-key-to-unlocking-39-billion-in-satellite-backhaul-revenue/>

⁵ NSR: Smallcells and Satellite, It's a match 2020

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