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Making Internet Accessible and Affordable for Unconnected Populations

If you live where wireless is available and affordable you probably don't think too much about paying $50+ per month for your service. And what about adding another $50+ for broadband Internet access for your home? Those of us who happen to live in developed economies don't think twice about these expenses because they're understood to be necessities, right after shelter and food— though sometimes it seems many urban youth would prioritize staying connected over anything else!

For the estimated 3+ billion unconnected, spending $50 per month on anything other than shelter and food is simply unaffordable, reflecting the wide income disparity that exists globally. According to the UN Broadband Commission, broadband Internet is considered affordable when it costs the subscriber less than 5 percent of total monthly income. Data from the World Bank shows that the billions of people do not have any options that meet this criteria, as they may only be able to spend $10 to $20 per month for service.

To close this digital divide, service providers around the world are facing a two-fold challenge. The first is justifying the investment to expand availability of service to reach these unconnected populations, many of which live in rural and mountainous areas; and secondly, how to make it affordable.

Addressing Accessibility

People in major cities around the world benefit from competitive high-speed terrestrial-based Internet services, whether it be cable, fiber or cellular 4G LTE. However, once you leave those cities and find yourself where the population density is considerably lower, building out last mile network access employing terrestrial infrastructure is cost-prohibitive. Service providers are wrestling with a stark reality: rolling out infrastructure across long distances only to reach a lower number of potential subscribers cannot be justified.

Enter Satellite Internet, which has already brought broadband access to several million unserved or underserved households and businesses in North and South America, and now beginning to expand to other regions. This is largely because the cost of satellite capacity has plummeted in the last few years with the advent of Ka-band, high-throughput satellites (HTS). Employing spot beams that can be dimensioned to serve a given population much like in cellular coverage, means service providers can target home and office customers in targeted areas to create viable business cases, even in rural and hard to reach places. Indeed, today's satellite offerings such as HughesNet with download speeds of 25Mbps are competitive in performance and cost with those delivered by DSL and cable providers; and are both profitable for providers and affordable for those able to pay $50 per month for service. There now needs to be a new and innovative way to make the service affordable in markets where customers can only afford to pay $10 to $20 per month.

Addressing Affordability

One encouraging approach being adopted is sharing a VSAT's broadband connection amongst 10, 20 or even 30 users; which can reduce the cost of service per subscriber to the affordable range of $10 to $20 per month. While this sounds relatively simple, there is still one significant obstacle to overcome – how to distribute the service to users from the shared VSAT - without digging up roads and stringing wires to buildings and homes. To keep costs down, the best method to distribute the service is to use wireless 'last mile' solutions – employing cellular and Wi-Fi technologies.

Using cellular technology with a shared VSAT means partnering satellite service and technology providers with local Mobile Network Operators (MNOs). For Community Wi-Fi, each service provider can deliver their service using widely available Wi-Fi technology. However, in both circumstances, the service distribution hardware will need to be established in a central location that enables the service to reach as many subscriber locations as possible.

The Shared VSAT Model

MNOs focus their investments on distributing services to urban and suburban areas where they achieve the best ROI, knowing the population and per capita income is sufficient. Reaching the next level of subscribers in more remote towns and villages often requires building out terrestrial backhaul lines and erecting new towers over difficult terrain, while also facing unavailable or unreliable supply of electrical power.

Why would any MNO invest significant capital in these markets only to sign on subscribers who would likely take much longer to reach profitability? No MNO has been able justify a business case in this commonly seen scenario.

MNOs can make the most of their expansion investments by using energy efficient (even solar powered), low cost, small cells that require lower level investments. Starting as basic as 2G and over time progressing to 3G and 4G, the MNOs can plan a roadmap to serve and develop dormant markets that are still waiting for connectivity. And of course, the shared VSAT overcomes one of their biggest problems – that of cost-effectively connecting the cell site traffic to their core network by running the backhaul over satellite.

The second approach that leverages the shared VSAT model is Community Wi-Fi. So what is community Wi-Fi? It's exactly what it sounds like, no different than the Wi-Fi access we have in a hotel or conference center or our home, where we are able to connect our phone, tablets and PCs everywhere the signal reaches.

A shared VSAT-based Community Wi-Fi service substitutes a VSAT in place of a typical terrestrial internet connection, providing a sharable bucket of bandwidth to the Wi-Fi users. To ensure a high grade of service, the VSAT's service plan is properly sized and configured for the number and type of Wi-Fi users being served. With Community Wi-Fi, service plans can be designed for occasional use, or for pre-paid use or even on a recurring monthly basis, making for a highly flexible service solution.

Cellular Backhaul in Bolivia

A successful example of a shared VSAT model in conjunction with cellular technology is by Entel, the state-owned telecom operator in Bolivia that was tasked by the government to set up telecom services in rural areas as quickly as possible. The motivation to cover rural towns and villages was found in the Bolivian constitution, which in Article 20, paragraph 1, states, "Every person has the right to universal and equitable access to basic services of potable water, sewer systems, electricity, gas services in their domicile, postal and telecommunications services." This lays out several basic rights, including access to telecommunication services.

To deliver on the constitutional right of Bolivians to internet access, the Bolivian government instituted a program called "Integral Satellite Telecenters." This effort was intended to close the digital divide between urban and rural areas of the country. To execute on this policy, Entel had to overcome the oft challenging Bolivian terrain, which encompasses part of the Andean mountain chain with towns dispersed among the mountains, valleys, flats and elevated plateaus.

Setting up cell towers in such environments is costly, time consuming and requires a near constant state of maintenance. The cell sites chosen typically do not have existing roads, power lines or high-speed backhaul lines. In some instances, the equipment even has to be helicoptered to the site.

Entel concluded that the most cost-effective and quickest-to-market solution was to modularize the cell sites by using smaller footprint, low-cost and low-powered equipment. To solve the backhaul issue, Entel decided to use satellite connectivity, avoiding the laborious and expensive task of laying copper or fiber lines to these remote locations. Internet, 2G and 3G traffic from each site is backhauled using a VSAT, thereby connecting a whole new demographic of people to each other and to the rest of the world. The cellular backhaul over satellite has been a major success thus far and the system continues to grow, with plans to add even more sites throughout 2018.

Community Wi-Fi in Russia

With a bordered landmass encompassing over 6.5 million square miles, Russia has thousands of far flung towns with sparsely populated communities. In fact, there are over 20 million people who reside in towns with less than 250 households. The per capita income in these areas is too low for to afford a dedicated VSAT on an individual household basis, so two operators, KB Iskra and Altegrosky, created and offered an inexpensive Community Wi-Fi service.

Both operators deployed a high-power Wi-Fi access point to create a mile wide cell, to cover each town or village with high-speed internet access. Typically, each VSAT has 20-30 Wi-Fi subscribers, with each subscriber paying $15-$30 per month. That worked out to a total revenue of $300-$900 per VSAT each month. So even though the number of individual VSAT subscribers may not be growing as quickly, the revenue per shared VSAT is growing substantially. To put it another way, the revenue from each Shared VSAT with Community Wi-Fi is equivalent to 10-15 individual VSAT subscribers and with only one terminal to install and maintain.

At present, each operator has more than 600 such shared VSATs providing a highly desired service to almost 40,000 regular Wi-Fi users that would have otherwise remained unconnected.

The shared VSAT solution has helped local operators build networks that make internet accessible to new communities. In turn, they were able to deploy at affordable price points to what was an otherwise ignored market segment that is now turning out to be a highly profitable solution.

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