Conventio n To Deploy Internet In Rural And Remote Areas

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Abstract
At present, we seek the service of Internet Service Providers to connect us to the global network. The telephone companies or the telecommunication operators provide this kind of service for us. This is reachable to only one out of three in the world's population. The remaining people are not able to get internet access. It is not an easy task to lay the telecommunication lines all around the world to provide internet connection everywhere. Since the developing countries cannot afford such a huge sum of money to lay fiber cables, this will not be the optimal solution. To provide internet facilities in remote places and rural areas, we need a high-altitude platform. Google came up with an innovative solution to use balloons to provide internet connection in remote regions. Balloons are used for numerous purposes but here it is used to provide internet connection in remote regions. This project is a network of balloons floating in the stratosphere. It acts as a wireless station and provides internet service to rural areas and remote regions in a cost-effective manner. This technology will replace the existing fiber, optic network system. This will be done by using a tethered balloon along with the payload (containing a receiver, a transmitter, and a radio communication device). This payload will be suspended from the ground at an altitude (depending on the area of coverage required). Users under this area will be able to access this system directly for internet connectivity. This system can be used over large areas like universities, companies and societies to provide internet facility to their users through Wi-Fi or over an area where the user is specified (commercial purposes).
Along with this balloon technique, we have another way to transfer the internet to remote places, which is by using a satellite internet system.
Keywords: ISP, Remote Areas, Internet Facilities, Global Network, Balloon Technique;

Introduction
Nowadays, approximately twenty million people are connected to the Internet, but there are more who cannot connect on the web. A large percentage of upcoming web users will come from emerging markets, particularly from countries such as India and Indonesia. India has over 10 billion people; approximately 750 million people live in 637,000 villages in rural India with no internet connectivity. From this, we can say that the next billion web users could come from rural India. Internet connectivity would allow rural Indians the opportunity to achieve economic status.

Rural India’s poor infrastructure results in undependable electricity and very low bandwidth with disturbed Internet connectivity which are the reasons for poor rural Internet penetration. Another block is the lack of affordable computer systems and internet connections due to rural people’s lower income. India’s literacy rate is still below 75 percent as an entire and much lower in rural India. Many attempts have been taken to offer better connectivity over the last decade, including setting up shared telecenters, but none of these efforts has given significant results. Most of rural India remains unconnected.
Data communication via satellite is not much different than someone using a land-based data provider, at least from the standpoint of the Internet user. The key to remember is that once the satellite system is configured by the installer, satellite service acts nearly identically as any other ISPs and may be configured as such.

Satellite Internet Access is internet provided through communication satellites. Modern consumer-grade satellite Internet service is typically provided to individual users through geostationary satellites that can offer relatively high data speeds, with newer satellites using Ku band to achieve downstream data speeds up to 506 Mbit/s. In addition, new satellite internet constellations are being developed in low-earth orbit to enable low-latency internet access from space.

**Problem Addressed**

**Rural Internet Access Challenge 1: Physical Barriers**

In rural areas, physical barriers and the natural world present increased challenges. For example, what if there is a large hill between your office and a customer farm? In that scenario, it is going to be challenging to maintain a stable line of sight. As a result, your customers may complain about an unreliable internet connection.

Hills and mountains are just one example of physical barriers at work. You also need to contend with lakes, rivers, and forests in rural areas. These challenges to robust internet service also change with the seasons. In the autumn, leaves fall, and this may affect power lines and sensitive equipment.

**Rural Internet Access Challenge 2: Increasing Demand for Telework and Telehealth**

The demand for internet access and bandwidth is increasing. It is no longer good enough to have occasional email and web access. Modern internet services require much higher bandwidth. In 2020, the explosion of remote work has changed the situation.

Beyond work requirements, rural areas have limited access to telehealth facilities. Providing health advice online is challenging. Without a high-quality video link, this challenge becomes even worse. As more people put remote work and telehealth demands on rural internet service providers, the existing infrastructure is going to face serious problems keeping up.

**Rural Internet Access Challenge 3: Limited Company Growth and Resources**

In contrast to the other challenges, this challenge may be more difficult to notice. You’re used to running your business, so you might not notice your limitations. For example, your customer might sign up for multiple video streaming services. Successfully servicing that level of demand may put a heavy strain on your bandwidth.

Smaller internet service companies in rural areas have historically struggled to build out more infrastructure. They do not have the option to spread out their network costs across millions of customers.

**Proposed Work**

None of these challenges are impossible to solve. Government programs like the federal Lifeline program aimed at low-income consumers have a role to play. However, those programs are not enough to overcome barriers to access. Unfortunately, adoption rates for these programs have been limited. To improve access, these strategies may help.

1) **Focus on The Rural Business Market**

Some people and organizations have a higher demand for rural internet access than others. Research has found that 90% of rural small businesses want internet access vs. 74% of households. Therefore, it makes sense to focus on the small business market first because they have a greater interest in internet access.

After building a customer base with those customers, wireless internet service providers will have an economic base to expand service to households.
2) Promote Rural Internet Access for Growth
Economic growth and employment gains are very unevenly distributed across the United States. Many urban areas have seen a long-standing boom in economic growth. In contrast, rural areas have struggled with growth. Further, there is increasing evidence that many people in rural areas are moving away to other areas to find jobs and business opportunities. If this trend continues, rural areas will be left behind. This economic disparity presents an opportunity for community engagement. Consider seeking out partnerships with governments. At the federal level, the E-BRIDGE Act is one promising example that may lead to increased rural Internet access.

3) Enhance Wireless Internet Service Quality and Coverage
Working with governments to improve funding and make internet access is helpful. It would help if you still had the hardware to provide access and extend your coverage area. To add more coverage to your wireless internet service, consider BLiNQ’s FW-300i Network Solution in a Box.

Buying the FW-300i is just one part of your overall wireless provider equipment. There are other systems, maintenance items, and products you need to buy. To help guide you through the options, take a look at our guide: Wireless Internet Service Provider Equipment: What To Buy Now Vs. Later

Modernization in Internet Services

1) Satellite Internet
Satellite Internet generally relies on three primary components: a satellite, typically in geostationary orbit (sometimes referred to as a geosynchronous Earth orbit, or GEO), several ground stations known as gateways that relay Internet data to and from the satellite via radio waves (microwave), and a small antenna at the subscriber's location, often a VSAT (very-small-aperture terminal) dish antenna with a transceiver.

Other components of a satellite Internet system include a modem at the user end which links the user's network with the transceiver, and a centralized network operations center (NOC) for monitoring the entire system. Working in concert with a broadband gateway, the satellite operates a Star network topology where all network communication passes through the network's hub processor, which is at the center of the star. With this configuration, the number of remote VSATs that can be connected to the hub is virtually limitless.

2) The Loon’s Technology
Here we have designed an airborne tethered balloon system to replace the existing optical fiber technology. As an aerospace engineer, our focus is mainly on maintaining the height and the aerodynamics of the balloon along with the payload a longer duration (at least a month). Along with this have also considered the benefits of the existing technology in our payload which will be suspended from the balloon system.

Our focus is mainly concentrated on the four major uses of this tethered balloon system- point to point data transmission (end to the end-user), open network for multiple users (universities, companies, rural areas), a closed network for commercial purposes, and support of GOOGLE LOON(the places where their balloon is unable to provide the internet facility to the users, our balloon will interact with their balloon to help provide this Wi-Fi facility worldwide by using the Google Loon transmitters and receivers)

Our system is divided into two sections: 1) Airborne Unit: It everything from a balloon and its monitoring system to networking components in the payload. 2) Ground system: It is consisting of the ground control room, servers, and tethered system.
Conclusions

Rural India is a huge market for the latest technology offerings. Rural demand has also played a vital role in the growth of India during the slowdown of the world economy. Bringing the web to rural India could be a driver of immense growth. As we have analyzed the upward trend in the growth of rural internet access rate, creating rural-specific applications will enable greater growth of rural India. Getting the Web to rural India is not just necessary; the Internet could be a driver for immense business growth. The Indian government, as well as IT researchers, should recognize this as potential and they should take an effort to build applications and good infrastructure to rural India.

The technique to bring mobile internet connectivity to billions of people using balloons and satellite may sound crazy but it might work. Google states that "It is highly experimental technology we have a long way to go". This innovative attempt made by Google to provide connectivity to rural areas and remote regions that deserve internet connection is an inspiring effort. The launch of 'Project Loon' made balloons an option to provide Internet access everywhere that too in a cost-effective manner.

References

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