Building and Managing a Cost Effective FBWA Business

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Abstract: Today, most developing countries still do not have sufficient fixed wired infrastructure to provide comprehensive telecommunications coverage for fixed voice or Internet. On the other hand, even in low GDP countries mobile wireless market penetration is quite healthy**.**
The primary reason behind this is because the cellular wireless model is clearly more financially attractive to investors than the fixed wired model. Unfortunately, mobile broadband cellular technology is incapable of providing service at levels comparable to DSL and Cable Broadband at similar throughput and capacity.
Emerging Markets need to adopt Emerging Technologies in innovative ways to create a platform for growth in tomorrow's world. Telecoms and Service Providers are now provided with the information and the opportunity to build and deploy fixed BWA at a lower risk. At the same time, they are given the assurance that the CAPEX is significantly lower and with a faster ROI rate.
Underserved locations that used to be virtually unreachable can now be services. Today, in Emerging Markets, the clear choice for Broadband Services with limited or no wired facilities is Fixed BWA.

Keywords: GDP ; Gross Domestic Product, one of the measures of national income and output for a given country's economy ; CAPEX ; Capital Expenditure ; ROI ; Return On Investment.

Introduction

The last five years saw the tremendous growth of Broadband Internet, which has since become a hallmark in defining technological supremacy and economic wellbeing among nations. As expected, developed nations took the early lead in adapting Broadband into the very fabric of their way of life, profiting from the more advanced state of their telecommunication infrastructure, and in the process, creating a global digital divide. Fortunately, we live in an age where the easy flow of information and the advent of new technologies allow late adopters to vault into positions that can place them at par or even ahead of the game. Such is the case with the spread and transfer of broadband technologies in the developing world. The new broadband technology models now allow developing nations to leapfrog into the league of the digitally connected global economy.
Aided by the magnetic pull of the Internet, there is no question that in the next 2 to 3 years, the demand for broadband is set to explode in Africa. Given the state of the existing telecommunications infrastructure, however, the model that worked for most of the developed world will certainly not all work in emerging market such as Africa. A new

approach is therefore needed in order to offer emerging markets a lifeline towards broadband redemption that will allow them to participate more actively in the global economy, in the process spurring their growth towards economic progress. This white paper
seeks to present Fixed Broadband Wireless Access (FBWA) as cost effective and practical solution that will connect households in Africa and allow ordinary and average African families to enjoy broadband Internet access at the comforts of their home.

When viewed as a lifeline to Africa markets for use as a tool for greater economic participation, building a broadband infrastructure takes on a much more urgent call for action. It is a need unique to the developing world that seeks immediate fulfillment of a practical solution that balances cost and performance which we find only FBWA can best satisfy today. Any new technology can promise a better broadband platform but if it cannot be delivered today to meet this urgency, it does not serve the interest of the African markets.

Fixed Broadband Wireless Access – The Solution

Fixed Broadband Wireless Access (FBWA) is still not yet as firmly rooted as the other key Internet access technologies. Although developed at around the same time as DSL and Cable broadband and deployed several years before experimental mobile wireless Internet solutions, FBWA was left on the wayside as a casualty of the complete dominance of cellular mobile telephony service (CMTS) that came into its own in the late 1990's. However, market acceptance and rapid deployment of cellular technologies has leapfrog the voice communications in emerging markets and today, Africa enjoys the highest growth rate in cellular take up rate Globally.

Although most cellular service providers have launched mobile broadband access technologies such GPRS, EDGE, 3G and HSDPA. These technologies works very well when you are mobile and are using a small gadget such as your Smartphone, iPhone or laptop for occasional downloading of emails and browsing of favorite websites while on the go. However current mobile broadband services today fail to satisfy the needs of a home user where the demand for speed and capacity is a magnitude times more compared to a road warrior working on the go using his/her Smartphone or laptop. In fact today, it is very common for business people to have both mobile broadband connection for work and a fixed DSL broadband connection for high speed broadband access which connects one to two laptops or desktops at home via a Wi-Fi access point (AP) router.

Deploying Fixed Broadband Wireless Access (FBWA) technology to connect households provides economic and technical advantages that are win-win to both the service provider and the subscribers. Deploying FBWA solution gives service providers to option to deploy various access technologies such as Wi-Fi, Canopy, OFDM and other proprietary technologies whichever is best suited for the kind of market a service provider wants to serve.

Depending on the regulatory condition and spectrum availability of the country, service providers could opt to enter the market using the cheapest option which is Wi-Fi and grow their access network overtime by overlaying existing access radio with higher capacity and better performing access radios in the future when the need arises.

More than just capacity, there are a lot of other considerations that service providers should

keep in mind when deploying a large- scale broadband network. In the landscape of Africa where the growth of mobile networks has eclipsed that of fixed-line networks, and where broadband penetration is waiting to explode, there is a strong case to build fixed-based broadband services as an overlay on top of existing mobile cellular networks using last-mile fixed broadband wireless access (FBWA) technology.

The following network characteristics and qualities make FBWA a compelling technology in narrowing and even closing the digital divide in Africa.

a.) Affordability
b.) End to end Quality of Service
c.) Bandwidth Management
d.) Effective Provisioning system
e.) Database driven Network Management
f.) Customer Support Management
g.) Scalability

Affordability

One way of bringing down the cost of the equipment is to have economies of scale. Although cost is only one of the vital components that will ensure the economic viability of the FBWA solution, the solution must also satisfy the technical requirements of speed and capacity to guarantee a DSL-like broadband access performance.

Today, the most affordable access solution to connect the African household is through the use of an outdoor Wi-Fi radio technology using directional antenna at the base station, and high gain fixed outdoor directional Wi-Fi CPE on the subscriber side. Wi-Fi technology is a mature technology and is used by millions of devices today, thus making the chipset affordable and very reliable. Adapting Wi-Fi technology and complementing it with systems that makes it operate in a predictable and reliable manner (Telco grade) is the cheapest way to enable Broadband wireless to thousands of African households today.

End to End Quality of Service

End to end quality of service (QoS) is important to ensure that subscribers get the kind of service performance that they paid for and to ensure that the FBWA network operates Under "fair usage" algorithm whereby, no one subscriber could abuse the use of expensive and scare network Internet bandwidth. Once a capacity is sold to a subscriber, you cannot sell the same capacity to other users on the network. Our FBWA solution which revolves around the AXS Pro system ensures that the network has inherent QoS capabilities and it tracks and manages network resources effectively and efficiently enhancing user Internet browsing experience.

Bandwidth Management

In a broadband business, the network capacity is the inventory and it must be managed through effective subscriber access control and resource management Network access (base station, backhaul and the core) bandwidth is a scare resource in a wireless network environment. Internet Bandwidth (Egress point to the Internet) is not only scare but also very expensive in Africa. Per kilobit cost ranges from $ 2.0 to $ 5.00/ Kbps. This cost component is a monthly recurring cost to the service provider. Therefore it is logical to treat network resource like inventory. Like regular inventory in a store, once the non oversubscribed component of capacity is sold it cannot be sold to someone else. Doing so will shortchange every customer in the network. Likewise, if the network capacity is "stolen" or "taken" because of poor inventory management, revenue is lost to the detriment of the service provider and other subscribers who may get short changed. Lost capacity does not only belong to the service provider, a subscriber who paid for a certain capacity may also be the loser if the service provider does not prevent other subscribers or illegal users from using the capacity already rightfully sold to a subscriber.
Our AXS Pro system when deployed in a FBWA network delivers this capability to every base station, allowing service provider to effectively track and effectively manage bandwidth usage across the various points of the network. This information is captured and stored in a centralized database to allow the service provider to maximize the use of the resources and network and subscriber related information that exists in the FBWA network.

Effective Provisioning System

Enabling Wireless Internet to the African household calls for mass market FBWA deployment approach which is very different compared to enabling wireless Internet to the SME and Corporate customers. Africa has over 150 Million (assume 6 people per household) households across the continent. Considering that the broadband penetration rate is below 1 % today, a 10% broadband penetration rate over a period of 3 years, would be mean 15 Million households to connect. The sheer number of households to connect is so huge that an automated and work flow driven provisioning system is a must to effectively cope up with the demand and ensure smooth provisioning and activation of subscribers. Otherwise a manual provisioning system would not scale and would make the provisioning process slow, unreliable and unorganized.

Database Driven Network Management System (NMS)

To keep the network running smoothly you need to have management systems that collects data periodically from various network elements and performs regular network elements health check. Latitude has created a network management system that is tightly integrated into the AXS Pro system and is database driven. It can store the data collected from the various network points perpetually for future analysis and network planning purposes. The database driven NMS also performs link capacity utilization and conduct regular traffic/latency measurements of the various upstream and downstream network links. This tool aide the NOC personnel in troubleshooting the entire access network and they can

set threshold levels so that the NMS sends out automatically alerts once certain threshold levels are violated or once an incident occurs in the network.

Customer Support Management

Once a service provider has acquired thousands of subscribers, keeping the subscribers happy and on their network becomes a very challenging work especially when there is competition in the market. Again having been a service provider once, we have built a cost effective and very straightforward customer support application from ground up leveraging on our experience and on the experience and expertise of the open source community. Latitude's customer support application is part of Latitude's Business and Operational Support System (B/OSS). It leverages the presence of AXS Pro controller in every base station and captures data from other B/OSS applications (ProvSys and NetSys) to achieve data consistency and integrity.
This is where customers records are kept pertaining to their network configuration, Internet service packages, complaints, history of repairs, HW replacements etc..It is a very useful application that can be linked to a call center operation via IP to create an excellent customer support organization.

Scalability

A Wi-Fi based access network is good for 200 to 225 subscribers per base station. It deliverssuperb browsing experience to the end- user but has limited VOIP support and does nothave enough capacity to support evolving IP based applications such as video and IPTV. As the subscriber demand at the base station increases and as more value-added applications are introduced by the service provider, the access network must be designed to support overlaying of new technologies and spectrum bands to accommodate the increasing no. of subscribers and new value-added applications such VOIP and video across the network. Latitude's FBWA architecture allows service provider to overlay their existing network with newer, faster, better and cheaper access radio technologies when the need arises. Latitude's FBWA architecture supports overlaying of both frequency and technology by keeping the same backend system and workflow business processes (Latitude's B/OSS). This is a very strong indication of Latitude's FBWA design scalability features, allowing service providers to grow their network when their subscriber base and application increases ("Pay as you grow" approach as supposed to "build it and they will come" approach).
The situation above is further manifested by the nature of broadband service where subscriber usage and capacity tends to grow very quickly. It is not unusual to see 200% to 400% annual subscriber bandwidth usage growth in new FBWA deployments. This can lead very quickly to networks with insufficient capacity to provide the promised broadband service performance.

Conclusion

FBWA is not only a viable means of delivering broadband Internet service, it also has natural advantages versus wired broadband networks when deployed in areas that are currently underserved by effective copper wire infrastructure.

FBWA is not only an alternative for the small scale wireless ISP but can be deployed successfully in the large scale as evidenced by the half million (500,000) subscriber network of Smart Bro in the Philippines and by Isocel Telecom which is one of the first wireless broadband operators in Africa who has adopted the BWA solution of Latitude Broadband. Today, less than 12 months after the official launch of its Fixed Broadband Wireless Internet service in Benin, Isocel Telecom became the largest ISP in the country with 2500 household and business subscribers and growing at the rate of 250 to 300 connections per month.

FBWA however is still an immature market segment and therefore the choice of technologies and partners can mean the difference between a successful business and a white elephant.

The FBWA business success hinges on being able to deliver reliable broadband service to all subscribers in a targeted coverage area. To do this, the service provider must have a well designed and well run radio access network and IP backhaul and backbone network along with the necessary expertise to ensure these networks function properly.

In addition, the service provider must have in place the resource people and the information systems that can provide the visibility to manage efficiently the various FBWA network elements, bandwidth inventory resources of the entire network and the end-to-end operations of the FBWA business.