Community Telecommunications
Part III: Business Model
6 January 2006

This Paper is the third of a three part series on Community Telecommunications, specifically on the topic of expanding telecommunication services into rural communities in developing countries, with a focus on voice services. Whereas Part I provided a backdrop and overview of a new technical and business model, and Part II focused on the technology, architecture and design components, this third Paper focuses on the Business Model component.

As a starting point, the proposed Community Telecommunications approach incorporates a strange paradox. On the one hand, as reflect in Part II of this series of papers, it incorporates some of the most advanced Internet related technologies as part of the solution set, some of which are just now coming into the marketplace. Yet with regards to the proposed business model, it reaches back to approximately 100 years and borrows extensively off of a successful approach that played out throughout the rural areas across the U.S. at a time that rural teledensity virtually exploded.

This model is rather simple, and is based on the establishment of literally thousands of small rural community-based phone systems. As a rule these systems were locally owned and operated, at times were part of the value-added services provided through rural cooperatives, and on average each network had less than 200 subscribers. For anywhere from ten to over 30 years in some communities, these phone systems were not interconnected, but supported only calls made within each individual community. At the time, technology simply didn't support longer-distance voice traffic.

Today there is a strong parallel dynamic that in many ways is quite similar to the situation as it unfolded back in the early late 1800s and 1900s. At that time, two key components were responsible for the rapid expansion of telecommunications and these were; 1) the telephone technologies that had became available with the end of the telephone patent held by Bell—for the first time the technology could be obtained by anyone, and 2) there was virtually no government interference that prevented anyone from deploying this new technology—it was years before the Federal Communications Commission (FCC) came into existence. The parallels today are obvious; the open nature of the Internet both from a technology perspective as well as a legal and regulatory perspective. While perhaps more open in the U.S. than in many developing countries, as a rule the Internet is typically substantially less regulated and more open in most all countries when compared to common telecommunication carriers.

Fundamental Concepts

The following provides a brief summary of several key concepts that outline the business approach proposed in this series of papers. These are considered fundamental, perhaps even essential foundations to the success of actual deployment.

Voice Focused—For the past decade or more a primary focus of the international development community has been leveraging the Internet for deploying a range of application-specific ICT-related projects and solutions (e.g., education, health, e-commerce, e-government). There has been much focus on the telecommunications policy, legal, and regulatory environment, but not

substantial focus on actual deployment/implementation in the rural areas of developing countries beyond establishing and supporting universal service/access funds. This series of papers focuses on deployment of telephony in rural areas. This is not at the exclusion of, nor in anyway aimed to diminish the value of other ICT-related activities. Rather it is simply a chosen concentrated focus built on several key considerations: 1) telephony is likely the highest demand service by those living in these rural areas, 2) it is a common service that can support virtually all local business as well as personal demand (e.g., it is not a specialized service as most other ICT-applications are, 3) it is most likely the one service that those living in these rural areas are willing to pay for, 4) there are new technologies now available that make it more cost-effective to deploy in economically marginal areas, and 5) by its very nature (e.g., two-way communications) it has the distinct built-in advantage of capturing a revenue stream from outside the community itself (though in-coming calls). In addition, in that the technology base is an IP network, other value-added Internet services can be added at a reduced/marginal cost.

Local Community Centric—With rare exception, the bulk of the approaches and implementations of Universal Service/Access programs continue to adopt an approach whereby rural connectivity is provided through a single phone into a community. This is typically either via a costly satellite system or in some para-urban areas via microwave. The business approach presented here changes the focus to the rural community first, and then the interconnection. This is not so much as a sequence, but as a priority. The orientation is to build a local community phone system, with a significant base of local users, a sufficient enough base of users to make the local system of value to those living in and around the community. This could be dozens or could be hundreds of phones depending on the size of the community. Statistical data reflects that most calls in countries where the phone has become ubiquitous are local; approximately 60%. This component takes an approach of satisfying local needs first and in gaining the local ubiquity of the system. In doing this there's not only intra-community value gained from the system, but with the local community-based system being linked with outside world, this approach has two distinct advantages; 1) it provides for an expanded base for accessing those living outside the local community, and 2) it increases the value of incoming calls as they are made directly to those who have a phone (in lieu of outsiders calling a single community phone).

Locally Operated—Ideally the local phone system should be locally owned and operated. Various business models are feasible and these could be either; 1) a local start up business venture by a resident or a group of local businessmen, 2) a local community cooperative that provides a range of value-added service, the local phone system being just one, 3) a local franchise set up by a national-level business venture, with local community-level franchises established to provide local management, marketing, and operational support, or 4) a national-level company that establishes local branch offices for supporting the local community. Being that this series of papers has a decided international development orientation, those options that incorporate local ownership though an associated micro-small-medium business/entrepreneurial program are recommended.

Massively Parallel—One of the core components of the hundred year old approach deployed in the U.S. was that it took place on a massive scale. It wasn't done in a one here-one there orientation. Rather it was a cross the country such that at a country-wide level, teledensity moved from 0.43 to 6.67 in 11 years. And much of this increase took place in the rural areas since the urban areas had been the target of the Bell system for the two decades prior this dynamic getting underway. Interestingly there was no central organization facilitating this

massive dynamic, but rather citizens within thousands of communities taking their own initiative to buy the technology and establish their community-centric phone systems to meet their own local needs. While the earlier fundamental concepts focused on the individual community, here the focus is on that aspect that reflects hundreds or even thousands of communities undertaking similar initiatives in parallel, furthering adding value of the approach at a national level.

Enabling Legal and Regulatory Environment—The final fundamental concept is that of an enabling country environment. As mentioned earlier, one of the two critical *missing* ingredients in the U.S. experience that allowed for the success was that there was NO government law, regulation, or entity, to prevent it from happening! Today this is simply not the situation in any country. In those few countries where work is progressing as reflected in this series of papers, the enabling environment that exists is centered around the Internet and the ISP community building services off of the Internet. In these countries ISPs are being licensed to provide VoIP services within their current value-added service mix, and frequencies can be obtained to support the wireless distribution at the local community level. Obviously in other countries the VoIP phenomenon is being fought by the current carriers with support of a Ministry of Telecom or a regulator. This approach simply ensuring the newer technologies are not taken advantage of to better serve the citizens of these countries.

While the VoIP/WiFi-based technologies could very well be used in a more urban center, the focus of this series of papers is rural. And to support these rural areas what is needed is a public policy with an implementing/facilitating set of enlightened laws and regulations that would allow under-served or un-served local communities the ability to gain required licenses to pursue the approach as reflected in this series of papers. This in fact is not complicated but rather simple, though politically perhaps not easy. The essential element is public policy that does two key things; 1) gets the government out of the way, and 2) a combination of creative incentives and universal service/access policies and a supportive local private-sector business environment.

Combined, the above fundamental concepts serve to establish a base upon which individual business enterprises, cooperatives, or franchises, would design and develop their own enterprises to provide expansion of telecommunication services into rural communities throughout developing counties.

Key Business Considerations

With the above fundamental concepts serving as a base, the following provide key considerations for establishing a supporting business enterprise. These should be considered part of the "due diligence" or considerations that need to be taken into account during the preliminary planning process leading up to formal business plan and subsequent implementation of an initiative aimed at establishing a rural community phone system.

Business Form—As indicated above there are several options with respect to the form of business, be it a small stand alone business, a community cooperative, a franchise off of a nation-wide business, or a local branch of a national firm. In many respects the stand alone business and cooperative are likely the approach with the most risk as there's less of a support structure for management, finance, marketing, and technical support. However, if all the requisite resources can be pulled together for a small entrepreneurial start up, then this approach could be the most rewarding and profitable.

Business Environment & Licensing—This consideration is critical to ensure there is a sufficiently enabling environment within which to establish a viable business, and that the required permits and licenses can be obtained to permit full operations. As mentioned earlier, one approach is to take an ISP, VoIP, and frequency licensing approach where the local market is sufficiently open to allow this to take place. Where this is the case it is also essential to ensure that the telecommunications legal and regulatory environment, including regulatory enforcement, is such that issues associated with interconnection with the PSTN and other mobile operators, is supported. This is essential for providing call termination to local operators, both fixed and mobile. Here the issue is not simply that it is doable, but that it is doable in a timely manner and that the call termination rates will allow for a sufficient profit margin on the part of the new start up.

Financing—Clearly the VoIP/WiFi approach requires significantly less capital investment than setting up a more traditional telecommunications carrier service. But it still requires an investment, an investment that not only must cover the initial infrastructure costs but also financing of the operations until a profitable position is reached. This could be obtained through private sector businesses or individuals who become owners, through local financing, or possibly through public funding, even universal service/access funds. The key here is to obtain sufficient financing to build the infrastructure, provide sufficient financing for the initial period of operations, and to ensure the debt load resulting from the initial financing can be served based on the anticipated revenue stream.

Coverage Area & Demand—From a technology perspective it is clearly feasible to connect any local community, village, or hamlet. However, from a business/financial perspective the key consideration is to ensure the business is established such as to ensure the coverage area to be included in the WiMAX/WiFi network is sufficient to capture enough potential demand such that it can provide a sufficient revenue stream to support a viable and sustainable business. Determining the demand will be as much of an art as it is a science, but undertaking some local survey and gaining input from other similar deployments would provide important decision input and lower the risk to a manageable level. The coverage area may also be directly associated with licensing.

Network Design—The technical approach reflected in Part II of this series relies heavily on the deployment of a low cost WiFi network in the rural community. An option is to rely on WiMAX, or pre-WiMAX for the actual distribution and then at selected locations set up as WiFi Hotspots for access. For the local wireless network the key will be in the selection of technology and placement of antennas (likely a combination of omni-directional and direction high-gain antennas) to provide maximum coverage to those living in the community, including those on the outskirts if possible. One of the more promising approaches is to establish a WiFi Mesh architecture that allows for expanding the network over time to provide even more coverage. Other elements in the network design include where/how VoIP switching will be located as well as Interconnection (see the following two items). A key factor here will be costs, both up front acquisition/set up as well as operating costs.

VoIP Switching—The central brains to the VoIP/WiFi network is the actual VoIP switching. The key business considerations here deal with the approach to be taken (e.g. gaining services off of a central switch or placing a switch in the community), and the actual selection of the specific software/licensing arrangement. The ideal situation is such that a central switch can be relied upon to support any number of community networks, and that this is placed off of the

Internet in an urban environment where there is broadband access. In fact one viable approach is to simply gain access to an existing VoIP switch where at least during the start up phase (perhaps for the long term as well), services are bought online as-needed. This lowers the initial investment and associated risks, links cost closer to realized revenue, plus provides nearly unlimited future expansion. It should be noted that not all VoIP solutions can be located centrally and away from the local community being served. A default position is to actually place a VoIP switch in the rural community itself. However, this can add to costs and in many harsher environments there's the issue of consistent power and availability of technical support.

Backhaul—For any local community network to be enabled to connect outside the community, there is an obvious need for a communications backhaul, preferably an IP-based network. This could be fiber optic (not likely in most rural areas), cable (again not likely), copper (more likely), microwave (common in many countries for more rural areas, or via satellite (for the most rural areas where no other connectivity available). Major considerations here are capacity, stability, and cost. The advantage of the VoIP/WiFi model is that the actual data stream for supporting the initial handshaking required to make the connections is extremely small (a consideration when relying on a central VoIP switch). Further, under some VoIP solutions, no further reliance on this access in required for local calls (again, an issue with regards to lowering costs). And for long-distance calls, the voice data stream is very efficient.

What this translates into from a business perspective is a lowering of costs when the connection is usage-based (common for some satellite services). An essential requirement is that there is the need for the backhaul to have access to the Internet at the terminating end (e.g. at Teleport or Hub). With some more limited deployments this termination could be directly to an in-country PSTN and mobile operator. One of the keys here is to gain a thorough grasp of the costs for calls over this backbone as it will be a key factor in setting the tariff structure for calls coming into and going out of the community.

Interconnection—While the primary focus of the VoIP/WiFi rural community approach is to serve the local community's needs, and a portion of these needs can be met purely local, there is the need to originate calls within the community that are terminate on networks outside the community, as well as terminate calls that have been originated on other networks. This requires interconnection with multiple carriers including typically a dominant land-line provider (at times a government owned and operated monopoly or a dominant privatized carrier), as well as typically 2 or more mobile operators. In addition, there is the need to support international calling. The two key aspects in this interconnection are technical and pricing. Some of the technical elements are addressed in Part II. But there is also a business-related aspect to this interconnection and that relates to how and where this is undertaken. Ideally the best approach is to work with a single carrier, perhaps one of the larger mobile firms, that already has interconnection arrangements (both technical and pricing), to where only a single point of interconnection is required. This simplifies the technical aspect and also goes a long ways towards solving the call termination relating costing in that the mobile operator will have already negotiated these rates. And being larger than the small VoIP/WiFi community operator, they were likely in a stronger position in their negotiations that lead to a cost. This call origination/termination rate is a key factor in determining the tariff structure that will be established for calls in/out of the rural community phone system.

Long Distance Tariffs—In recent years the dominant orientation in pricing of telephone services has been a trend towards forward-looking cost-based pricing. At present there is a

tremendous amount of costing gymnastics being played with regards to distortions in determining actual costs but the truth is this is not a straight forward and simple exercise. As a general rule most regulators provide some guidelines, perhaps even models, and then leave it to the two carriers to negotiate a call termination/origination fee split, unless there is a complaint or egregious violation of the regulations or rules. As mentioned above, ideally this can be resolved by piggy-backing on the earlier negotiations of a larger mobile carrier.

The remainder of the costs associated with establishing long-distance rates will be influenced by the actual costs associated with providing the service. Again, as mentioned above the backhauls costs, along with the interconnection costs, will be major items. Other costs are the costs of operating the local network, costs of switching services, etc. And where there is competition, this too will influence the setting of tariffs, as will any regulatory constraints. Depending on the legal and regulatory environment, this will be more directive in some locations than in others…for example, in a more open environment the VoIP/WiFi-based services may be viewed as a data service and not subject to any significant voice-related regulation.

Local Pricing Structure—While long distance, out-of-the-community calling tariffs are usage-based, by the vary nature of the local community VoIP/WiFi system, the intra-community calling is not. Once the network is installed, local calling is a virtually a non-usage-sensitive service with this technology set. This, combined with a strategy to encourage local calling and having as many subscribers within the community as possible, makes a strong case for adopting a flat monthly rate for unlimited local calls. The logic here is that the more phones in the community and the more they are used, the more calls will be made outside the community as well as the more incoming calls will be received. In most situations capacity relative to volume of calls will not be a constraining issue. Naturally the established rate structure needs to cover actual costs and also provide a margin of profit. It should be noted that the costs are largely to cover the repayment of the original investment costs as ongoing operational cost are minimal. Pricing should be established to encourage as large a number of subscribers as possible.

Marketing—There is little question that in communities currently without phone service that the demand is greater than the current supply. And while the statistics of developing countries is such that there are huge numbers of people that do not have access, or have even made a phone call, for the most part the telephone is ubiquitous and easily adopted by even the most inexperienced. And fortunately with telephony the technology is pretty much in the background. However, there is still the need for an aggressive marketing campaign to encourage the expansion and adoption of telephony by those living in these rural communities. Whatever approach is used for marketing it needs to fit the local culture and be aimed at appealing to local interests and needs.

Public/Shared Access—The underlying orientation in establishing the rural community-based phone system is to seek as high of individual adoption as possible. Simply network economics are such that the more phones connected to the network the greater the value of the network and the greater value it is to those connected to it. However, it also has to be recognized that there will be those within the community that will not sign on due to cost and/or their own demand is simply not sufficient. In order to serve these individuals it is recommended that public/shared access facilities be put into place within the community, possibly at several locations within the community. One approach is to establish a central public kiosk for those wanting to make a phone call. Another approach is to have designated "phone agents" within the community that provide phone access to those neighbors without phones. Both may be appropriate depending on

the size of the community. In both cases this would be for a fee-for-use basis for even local calls with a tariff rate sufficient to cover costs and produce a margin of profit.

Billing/Pre-Paid—As reflected above, the recommended pricing approach is a set monthly fee for unlimited local community calling, and an established tariff for calling outside the community where the tariff is set to cover costs associated with delivering the services based on a per-minute usage model. With regards to billing and receiving payment it is strongly recommended that a pre-paid approach be established. This is consistent with the roll out of mobile services in most all developed and developing countries. It has the advantage of substantially reduces the operating costs associated with the pay collection of fees. The basic model is caller-pays, which is also a commonly-accepted billing practice used in most all countries, though the U.S. is out of sync on mobile services.

The above Key Business Considerations provide a brief discussion on a range of topics that need to be built into the establishment of a community-centric rural phone system. Clearly there are a range of operational issues needing attention, however addressing these goes beyond the scope of this three part series of Community Telecommunications papers.

Summary

This Part III paper on the Business Model has sought to reorient the very nature of the approach to be taken in bringing those living in the rural areas of developing countries, connectivity that serves their local needs as well as communication needs for linking them to the rest of the world. It seeks to leverage the opportunities now being made available through the newer technologies that can deliver rich services at a substantially reduced cost that has ever existed up until this time.

The orientation has been to present the reader with a shift in fundamental concepts upon which the proposed approach is based. And from there to identify and briefly present a number of key business considerations needing to be taken into account by those seeking to travel down this path. From here the most logical next step is for those that feel their environment is ripe for such an undertaking, to develop a formal Business Plan that is complete and comprehensive. This would need to reflect a thorough understanding of the environment, the local demand, selection of solution sets, marketing plan, financial plan, as well as an approach for establishing their business operations.

For governments the hope is that efforts will be undertaken to provide an enabling legal and regulatory environment and reach beyond this to implement supporting policies and programs to encourage those in the private sector willing to step up to the challenge.

And in concluding this three Part series of Papers the next steps will be two fold; 1) undertake the ongoing work through USAID's Last Mile Initiative (LMI), specifically in Vietnam and Mongolia—both projects containing elements reflected in this series of papers, and 2) capture the experience out of these engagements that will allow for even further elaboration and clarity in future updating and refining of these papers. Ideally the actual implementations undertaken through these projects, and perhaps other LMI projects as well, will be captured in a subsequent evaluation and/or Case Study that will bring forward the realities associated with the actual implementation of projects that are consistent with the orientation reflected in these papers.

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Document: Rural Telecom – Business Model.doc
Date: 6 January 2006