Case Study
Intel World Ahead Program

Wireless Internet Links Highland Community to the World

Intel, USAID and VDC use WiMAX to bring broadband Internet access to the mountains

Nestled in the Hoang Lien Son mountain range in northern Vietnam is the small, picturesque village of Ta Van. Set in a tranquil landscape of rice terraces and roaming water buffalo, Ta Van is an unlikely highland location for a small technological marvel that holds potential for replication in other remote villages around the world.

With help from Intel, Vietnam Data Communication Company (VDC), a subsidiary of Vietnam Post and Telecommunication Group (VNPT), and the United States Agency for International Development (USAID), Ta Van has managed to establish Internet links with the surrounding region and indeed, the rest of the world—no mean feat for a remote village that previously struggled with weak mobile phone signals and has only two fixed-line phones.

Though still in the early stage, the success of the Ta Van project thus far has its partners optimistic that the solution can be replicated in other remote communities in Vietnam, as well as other underserved regions throughout the world.

"The Ta Van Village People Committee highly appreciates the new Internet access and telephone facilities that has enabled our villagers to gain access to national as well as international information. As a result, this has improved the working efficiency of our local authorities while attracting more tourist traffic."

Trieu Xuan Pha
Chairman
Ta Van Village People Committee

Challenge	▪ **Link Ta Van to the wider community and economic opportunities via broadband Internet access.** Heavily dependent on the nearby town of Sapa as a market for its farming goods, as well as a source of tourist dollars, Internet access promises to widen the linkage to Sapa and beyond. ▪ **Create a working model that can be deployed in other communities**. A successful deployment in remote Ta Van proves broadband access may be readily available to other under-served communities around the world.
Solution	▪ **Deploy wireless infrastructure.** Establish a broadband Internet linkage via satellite, and distributing the connection via WiMAX technology. ▪ **Create sustainable Internet services including Voice over IP (VoIP).** Link PCs and VoIP phones to the broadband Internet connection, eliminating the need to build a fixed-line network.

Assessing the Situation

Situated nine kilometers from the town of Sapa—a major tourist destination for travelers in north-west Vietnam—Ta Van village welcomes tourists who trek to the village and spend the night at one of the numerous guest houses.

These travelers bring an important source of income to the villagers, whose monthly per capita income from farming is about USD 13**. Besides rearing farm animals and growing rice and maize, some of the 142 households in Ta Van also earn about USD 50 per month from the 40 or so guests who stay overnight at the guest houses**.

Ta Van is thus deeply dependent on the outside world, both as a market for their produce and as a source of tourist dollars. Establishing communication links to Sapa and beyond is therefore increasingly important to the villagers. Though picturesque, the area's mountainous terrain makes construction of a fixed-line or fiber-optic network economically unviable.

To date, none of the households in the village have access to a fixed-line phone, other than a phone in the Ta Van People's Committee office and another at the communal post office. Mobile phone coverage is also sparse, while broadband Internet access is non-existent.

To overcome these limitations for Ta Van, the answer lies in delivering broadband Internet and voice services over a single wireless network to remote locations via WiMAX.

Leveraging the local political support for the project as well as Ta Van's tourism potential, Intel, USAID and VDC decided to further the recent success of their WiMAX project in nearby Lào Cai city and establish the second phase of the project in Ta Van.

The deployment in Lào Cai was the first WiMAX deployment in Vietnam, utilizing the fiber-optic backbone available in the city to deliver wireless broadband to the community.

Spotlight: Ta Van village, Vietnam

- Ta Van village is located in a scenic valley nine kilometers from Sapa town. Sapa, Ta Van and numerous other highland villages lie within Lào Cai province, bordering China's Yunnan province and over 300 kilometers north-west of Hanoi.
- Ta Van's residents consist of about 150 households of 700 people from the Hmong and Day minority ethnic groups.
- Per capita income at Ta Van is low—each resident lives on approximately USD 13 per month from farming, with about USD 50 earned from each guest house in the village.

WiMAX is particularly important to developing countries such as Vietnam, where 85 million people are geographically disparate and lag behind their Asian neighbors in terms of Internet usage (13.1 million as at June 2006[1]), and broadband access.

WiMAX technology also promises to rapidly deliver affordable broadband access, particularly since the cost of building a wired copper-based infrastructure has increased while the cost of establishing a wireless infrastructure has gone down.

For far-flung communities, the combination of satellite Internet access and WiMAX technology helps roll out a sustainable business model that leverages shared community access and IP technology without the need for wired infrastructure—"leap-frogging" wired technologies so that a large number of users can be connected quickly and affordably.

And remote Ta Van provided this rich opportunity for a visible demonstration that not only can be used across Vietnam, but also by other countries facing similar challenges. Conditions were thus ripe for the Ta Van project to kick-off in early 2007.

Delivering the Solution

The deployment took about six months to complete—from conception of the project to daily usage on the ground in Ta Van. Logistics provided one of the challenges due to the remote location of the village. The actual on-the-ground deployment was completed within a week, with about a month to stabilize the solution.

The Ta Van solution works by distributing one satellite signal to multiple end users via a WiMAX micro base station. WiMAX subscriber stations located around the village then route Internet connectivity to PCs and VoIP phones in numerous locations, including the Ta Van medical clinic, school, guest houses as well as residencies. IPSTAR was selected as the satellite provider because of its availability across the Asia-Pacific region and its cost advantage.

The scalability and adaptability of the solution was critical, as it would mean that it could be adopted in other regions of Vietnam as well as in neighboring countries.

"The solution provides broadband Internet and voice services across Ta Van village, providing a strong link to the country and beyond."

Darrell Owen
Project Manager
USAID

Due to the remote locale of Ta Van Village and the adoption of the IPSTAR satellite network by VNPT through Vietnam Telecommunications International (VTI), the project looked for solutions that had potential for adoption throughout Vietnam in support of the country's universal service program. In doing this, the project also sought to find a solution set that could be of value outside Vietnam and in neighboring countries within the region.

With the completion of the deployment, Ta Van villagers now enjoy advanced telecommunication services from VoIP telephony to broadband Internet services such as e-mail, instant messaging and e-Government services.

POSITIVE IMPACT ON TA VAN

Though it is too early for a comprehensive impact assessment study of the WiMAX solution at Ta Van, early indicators are positive.

Ta Van villagers are already accessing the Internet regularly as there is always somebody in their family who knows how to use computers.

Additionally, VoIP service is gaining in popularity, with phone traffic indicating that villagers are regularly making outbound calls to friends and relatives in the town of Sapa. Though currently only VoIP calls to within Lào Cai province are allowed, the sheer volume of calls alone point to increased communications ease for Ta Van.

The availability of broadband Internet connectivity also means that Ta Van villagers are now better informed, being able to make use of the Internet as a regular source of news as newspapers are not available readily. Additionally, many villagers also use the Internet connectivity to stay in touch with their children who are at universities in Hanoi or Ho Chi Minh City.

Indeed, it is obvious that the solution also provides a solid baseline for improving existing services such as health and agriculture in the rural community while introducing new value-added services associated with the tourism businesses that hold potential for improved economic growth.

At the health center, staff use the Internet extensively to search for medical and pharmaceutical information. The center even documented a recent incident where a baby developed adverse reactions to a routine vaccination and information sourced from the Internet diffused the situation. Elsewhere, in the fields, farmers also make use of the Internet to research agricultural information.

At the guest houses, tourists make use of the broadband Internet connection to send e-mail, update travel blogs and upload photos of their trip. Even tourist guides who come often from Sapa use the Internet to communicate with their company. All these contribute to the development of Ta Van as a rising tourist destination.

Key Technologies

IPSTAR Satellite

- 2 Mbps down, 512 kbps up
- Shared class of service

WiMAX

- Airspan WiMAX 802.16-2004 technology
  - One MicroMAX* Base Transceiver Station (BTS) with omni-directional antenna
  - 12 outdoor subscriber stations

PCs

- 10 end-user workstations distributed to the Ta Van school, medical clinic, guest houses and several residencies

VoIP

- LignUp Softswitch
- Edgewater Networks Network Appliance
- VoIP phones used for phone calls to Sapa

Integral Answers

- Intel provides technical leadership and facilitates the project as well as the design of the wireless network. Intel is also responsible for WiMAX training and documenting the project so that it can be applied at similar locations.
- USAID coordinates the project and funds the VoIP infrastructure. The organization is also in charge of assessing the project and coordinating best practice initiatives.
- VDC is in charge of the operation of the network, providing the network services and the VoIP access. VDC has also trained Ta Van residents to use the VoIP phones as well as PCs for Internet usage.

Those involved in the project hope that the success of the Ta Van deployment will demonstrate a viable model of value by Vietnam Public-Utility Telecommunication Service Fund (VTF) for future rural telecommunication projects.

Parallel to the Ta Van deployment, USAID is also supporting the VTF such that it can start releasing existing and future universal service funds for undertaking hundreds, if not thousands of similar projects within Vietnam.

Combined with WiMAX technology support from Intel, this gives rise to a sustainable Internet connectivity business model that holds potential for replication in other remote villages in Vietnam and around the world.

Benefits

- WiMAX availability means residents and visitors to Ta Van can now get online and stay in touch with the latest news or information, as well as with anyone globally. This gives Ta Van residents access to a world of knowledge, and tourists, better service.
- Enabling low-cost VoIP telephony service via the WiMAX network means Ta Van residents can communicate with the nearby town of Sapa, and anywhere else in the Lào Cai province. They can now, for example, use the VoIP phone service to make outbound calls to friends and relatives in the nearby town of Sapa.

Solution provided by:

Airspan

ipstar Broadband Satellite

[1]Source: https://www.cia.gov/library/publications/the-world-factbook/geos/vm.html

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