



Photo courtesy of Intel

Solution Sheet

IPSTAR Wireless Technology Backhaul

Sustainable Community-based Broadband Internet Access for the Telecom Industry

IPSTAR can deliver shared broadband connection through the integration of its on-ground system with other network technologies. The IPSTAR backhaul-enabled WiFi/WiMax broadband access is a reliable solution for telcos to provide instant broadband Internet coverage to any community lacking access to terrestrial line infrastructure. The combination of IPSTAR and WiFi/WiMax supports a sustainable business model that uses Internet Protocol (IP) technology without the need for land-based infrastructure – leapfrogging wired technology to connect a large number of users to high speed broadband Internet.

Wired technology, such as fiber optics, requires a well-established broadband Internet infrastructure that is oftentimes not available in the rural area. In particular, it needs a reliable ground network that is frequently limited to several kilometers away from a telecommunication exchange. Furthermore, with the increasing number of cellular service subscribers and the declining demand for telephone lines, many telecom operators simply no longer deploy fiber optics.

Therefore, installing wireless technologies such as Worldwide Interoperability for Microwave Access (WiMAX) and Wi-Fi to deliver broadband Internet in rural areas is oftentimes the only alternative.

Wireless Technology with IPSTAR Backhaul

Though WiMAX and Wi-Fi are suitable to provide broadband Internet over the 'last mile' – the final leg of delivering connectivity from a communications provider to a customer – a wireless system still requires a reliable backhaul network. In far-flung, remote areas, fiber optics is normally not available. A point-to-point microwave link may provide good connectivity, but it is not always cost-efficient for extending broadband Internet to rural areas.

IPSTAR can be deployed cost-effectively across 14 countries in Asia-Pacific. It is capable of delivering IP bandwidth by using the latest modulation and spot beam technologies. In addition, THAICOM-4 (IPSTAR) can deliver up to 45 Gbps of aggregate bandwidth capacity

and can provide a bandwidth speed of 5 Mbps/4 Mbps* per end user. Therefore, with THAICOM-4 (IPSTAR) used as backhaul for WiMAX or Wi-Fi, a satellite link can be distributed to various locations rather than to a single user – making it a viable solution in providing a community-shared broadband Internet access to remote areas.

Benefits

- Sustainable community-shared broadband Internet access model without the need for wired networks
- Flexible and rapid infrastructure rollout
- Cost-effective solution for any remote community lacking access to telecom infrastructure
- Instant Internet coverage for data and voice applications

* Maximum throughput is not applicable for simultaneous download and upload. Maximum throughput for simultaneous download and upload is 4 Mbps receive and 2 Mbps transmit.

Wireless Network Architecture

With a WiMAX network and a single microcell base station, IPSTAR-enabled broadband Internet can be delivered to multiple user locations through star topology.

Base Station Network

Outdoor equipments:

- IPSTAR satellite dish
- Omni-directional antenna
- Micro base station

Indoor equipments:

- IPSTAR user terminal
- Micro base station
- Network equipment

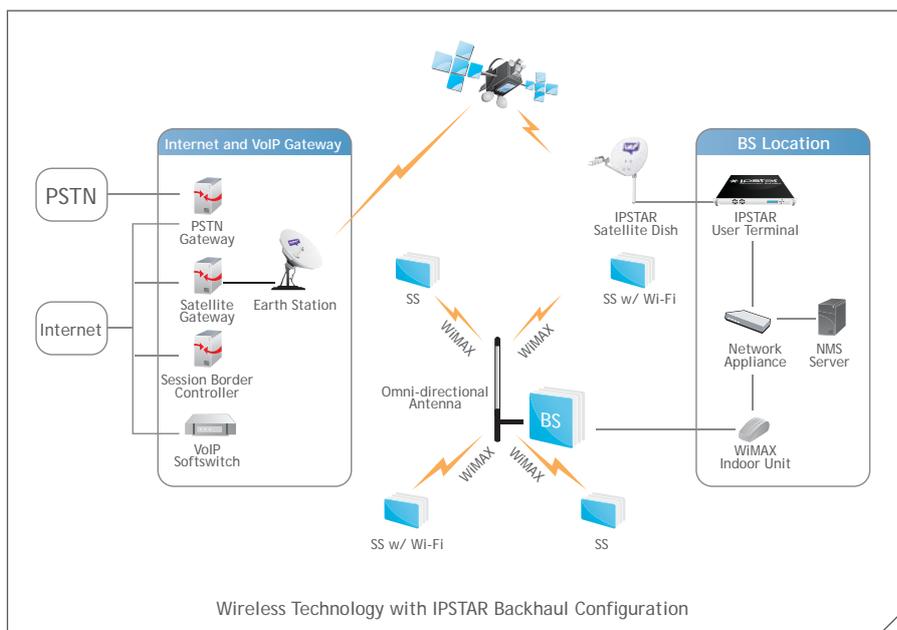
Subscriber Station Network

Two types of Subscriber Stations (SS) equipments – the basic SS and the SS with integrated Wi-Fi – can be deployed on each user location. The basic SS equipment is connected to a switch or a Wi-Fi Access Point (AP) to provide broadband Internet on a single Ethernet line, while the SS equipment with integrated Wi-Fi delivers the same Internet connectivity – but it has an integrated Wi-Fi AP on the same chassis.

IPSTAR vs. Fiber Optics

Although both satellite and wired technologies can be used as backhaul, it is obvious that the cost factor prohibits the use of wired backhaul for a WiMAX network with Wi-Fi.

For instance, the cost of installing a 230-kilometer fiber optic cable in the rural area can reach up to USD 400,000, while connecting the same location to



broadband Internet by using IPSTAR will only cost less than USD 22,000. The significant difference in pricing is mostly due to the continued increase on the cost of deploying fiber optics, requiring telecom operators to search for other backhaul alternatives.

Cost-effectiveness of IPSTAR Satellite Backhaul

The cost components of using IPSTAR as backhaul for a WiMAX network with Wi-Fi can be separated into capital and operational expenditures.

Capital Expenditure

A wireless network designed to support 40 Internet subscribers can be delivered for less than USD 22,000. The base station costs around USD 14,000 – inclusive of the network equipment, satellite system and miscellaneous items.

Operational Expenditure

IP-based High Throughput Satellites (HTS), like THAICOM-4 (IPSTAR), provide broadband connectivity at substantially lesser cost than Fixed Service Satellites (FSS). Broadband satellites can enable sharing of a single Internet link to several user locations.

With a price of USD 1,200 to 2,500 for a 2 Mbps Internet speed, broadband can be delivered for a monthly cost ranging from USD 30 to 50 per household.

Capital Expenditure: IPSTAR vs. Fiber Optics		
	IPSTAR	Fiber Optics
Cost (USD)	22,000	400,000 for 230-kilometer distance
Users	40	29

About IPSTAR

THAICOM-4 (IPSTAR) is the world's largest and most advanced commercial satellite serving up to 10 million users in Asia-Pacific. The breadth of the satellite's geographical reach in the region – covering an area inhabited by 4 billion people or roughly 60 percent of the world's population – positions IPSTAR as the preferred gateway in 14 countries across Asia-Pacific. IPSTAR has achieved a critical milestone in its pursuit to bridge the digital divide in the region. With a combined 100,000 subscribers in Australia and New Zealand alone and still growing, IPSTAR has become the single largest VSAT network operator in both countries. Across the region, IPSTAR has sold nearly a quarter of a million user terminals.

For more information, visit www.ipstar.com.

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