



Case Study

IPSTAR Cellular Backhaul

Japanese Mobile Operator Extends 3G Service Nationwide with IPSTAR Backhaul

Japan is a country renowned to be at the forefront of technology and was an early adopter of 3G mobile service. Currently there are more than 120 million cellular subscribers in Japan, with a service penetration rate of 94.76%. However, being an archipelago of 6,852 islands with 70% of land isolated in mountainous regions and islands, it is an arduous task for any service provider to cover all of Japan. It may come as a surprise to the

outside world that “Digital Divide” is still prevalent in remote and outlying islands of Japan. One of Japan’s largest mobile operators decided to tackle this issue by providing 3G service in these rural areas using IPSTAR satellite service.

IPSTAR is an excellent solution for overcoming geographical distance and barriers to provide mobile phone

service in rural areas. The broadband satellite capacity of IPSTAR can be used to provide backhaul from the 3G base stations at remote sites, called Node-B’s, to their controller equipment in the mobile network, called Radio Network Controller (RNC).

Challenge

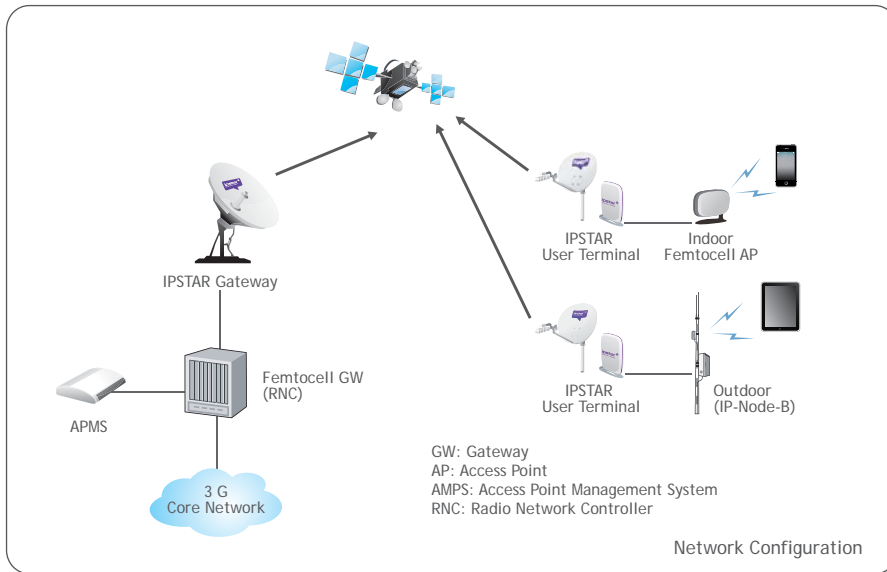
- Provide 3G mobile service coverage in remote areas of Japan, where sparse population is distributed in mountainous areas and isolated islands
- Eliminate/ improve on the “latency” associated with satellite voice communication to provide high service quality
- Provide stable service during typhoons, rain, snow and other extreme conditions experienced in the remote islands

Solution

- Use IPSTAR platform for backhaul link from IP-Node-B in remote site to RNC of 3G service provider.
- Adequately tune equipments to provide voice quality as good as terrestrial networks
- Addition of backup gateway site for standby use to provide 99.9% link availability
- Use Femtocell technology to provide compact and easy to deploy IP-Node-B stations

Benefits

- **Nationwide**
Wide coverage and quick deployment nationwide
- **Cost-effective**
Lower bandwidth and equipment costs in providing cellular backhaul for geographically dispersed subscribers
- **Easy Integration**
Interoperable with IP based Node-B’s
- **Scalable**
Allows seamless increase of capacity on a single platform
- **Fast Time-To-Market**
Quickly acquire new service subscribers and earn immediate revenue



The Situation

The Japanese service provider wanted to expand their 3G service in the remote islands to provide voice communications as well as broadband Internet service to rural communities. The IPSTAR satellite service with nationwide coverage was the ideal choice. However, satellite based voice communications usually have a problem of latency, or delay. To provide a good service, the quality of voice conversation should be as good as that of terrestrial networks. Also, the Japanese islands are subject to various forces of nature such as rain, typhoons, snow, and varying temperatures from very hot to extreme cold. The IPSTAR backhaul solution would have to work flawlessly under all these technical and environmental constraints to provide seamless voice and data communication services.



The Solution

Teams from the mobile service operator and IPSTAR made a joint technical effort for almost one and half years to fine tune the IP-Node-B equipments to perform within acceptable levels of voice quality and deployment cost. The solution that was finalized supports 16 consecutive voice conversations as well as multiple Internet data sessions. Trial operations were conducted at 100 different sites in rural areas to verify long term stability of IPSTAR backhaul for the IP-Node-B systems.

These systems could be deployed within the short period of a few days with highly reduced CAPEX due to the compact size of IP-Node-B equipments. Each such node can provide 3G coverage up to a radius of 2 Km. Femtocell technology from NEC was chosen for IP-Node-B solution. The operator has also purchased most of IPSTAR's bandwidth over Japan to extend this service to its valued customers in remote areas. A backup diversity gateway has been recently constructed in Japan for standby use in order to ensure 99.9% service availability necessary for mobile phone networks.

Proof-of-Concept

This successful commercial deployment in Japan once again demonstrates the effectiveness of IPSTAR in providing an efficient and scalable mobile backhaul service. IPSTAR eliminates the need to setup microwave links and optical fiber networks, thus reducing CAPEX by one-eighth as reported. The Dynamic Link Allocation (DLA) capability of IPSTAR enables efficient use of spectrum by allowing a number of base stations within the same spot beam to share bandwidth, which in turn reduces long term OPEX.

The robust IPSTAR backhaul solution can be deployed in areas with low population density on a point-to-point, multipoint or mesh network configuration. IPSTAR enables network operators to quickly and seamlessly expand cellular service into remote area. Extending service to accommodate higher traffic loads or to cover more geographical areas can be done economically via the satellite since IPSTAR-enabled cell sites only require minimal additional infrastructure.

According to the service provider, IPSTAR has successfully achieved the reduction of delay to negligible levels so that the quality of service for voice communications remains high, concurrently achieving Internet broadband speeds compatible with 3G standards.

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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