

Photo courtesy of Inmarsat.

Taking IP to new heights

Internet Protocol or IP has sparked a revolution within the communications industry making multimedia a reality. Satellite technology enables these services to be shared by all no matter where in the world they are. Satellite Evolution evaluates the developments in IP in the Asian region specifically.

Satellites have extended the reach of communications and, in recent years, have revolutionised the way in which we are able to communicate. Internet Protocol or IP, has also created its own communications revolution. Put the two together and you will discover a formidable communications combination.

So, what is IP? Well, IP is the most widely used protocol on the Internet. Developed in the 1970s, it is often used with Transport Control Protocol or TCP. IP facilitates unique addressing for computers on a network. Most networks use IPv4 (IP version 4) featuring addresses that are 4 bytes in length.

The new IPv6 features addresses that are 16 bytes in length. IPv6 provides for all kinds of networks and systems and also supports Quality of Service or QoS for real time audio and video. It is the next generation of IP.

Data on an IP network is organised into packets. Each packet includes a header that specifies the source, destination and other information and the message itself. IP basically enables more sophisticated information to be sent over the Internet.

IPoS – the satellite standard

IPoS or Internet Protocol over Satellite is the standard for the delivery of always on IP services, and is widely used in business and residential markets. Through IPoS, a user or users can access broadband Internet, Wide Area Networking and also multicast services such as audio and video streaming.

The IPoS system offers many benefits, especially to those people who live and work in rural or remote area away from towns and cities with a comprehensive cable or fibre infrastructure. Regardless of where in the world they are located, broadband services can still be made available. IPoS is scalable and flexible and therefore easy to augment.

Broadband via satellite in Asia

The Internet plays a tremendous part in a huge amount of people's lives today. We are all using it whether it is for business purposes, recreation or education, the value of access to the Internet has well and truly been realised. Access to ICTs is something that is at the



top of the majority of government's 'to-do' list. Both the private and public sector have realised that it is important that everyone has access to ICTs no matter where they are whether that may be in a mountainous and remote area of Peru or in London's inner city. Now that we have had a taste of broadband, no-one wants to return to dial-up. The choice of applications is so much wider with broadband. Service providers need the most efficient way of delivering broadband, one that uses bandwidth effectively and that is easy on the user's pocket.

Broadband for all, via satellite

In Asia, broadband satellite providers are endeavouring to rollout broadband to even the most remote villages and towns. Hughes Network Systems, specialists in the provision of broadband satellite networks and solutions, announced in April 2008 that Orion Satellite Systems of Australia has purchased and commissioned a state-of-the-art DVB-S2/IPoS with Adaptive Coding Modulation (ACM) satellite system from Hughes to provide broadband Internet access service to remote areas in Australia. Orion Satellite Systems is one of the registered providers of broadband satellite services under the Australian Broadband Guarantee (ABG) program.

The HN system from Hughes is fully compliant with the DVB-S2/IPoS air interface standard, including the Adaptive Coding Modulation (ACM) feature, which yields higher throughputs and more efficient bandwidth utilisation. The Hughes implementation of DVB-S2/IPoS with the ACM feature means the combination of coding and modulation of the system outbound channel can be configured for each remote terminal, thereby resulting in optimal transmission efficiency. This ability to custom design the outbound channel per terminal enables an operator to realise an additional 50 percent throughput increase over the DVB-S specification.

Andrew Johnson, Managing Director of Orion Satellite Systems, said, "We believe there is a very large untapped market in Australia with an estimated 200,000 potential subscribers who have no access to broadband. We are very confident of the service we will be able to provide with Hughes providing the technology."

"Hughes has one of the largest installed bases of broadband satellite terminals in Australia and we are very pleased that Orion has chosen our technology," said Ramesh Ramaswamy, Assistant Vice President, International Marketing at Hughes. "Our system brings additional capacity where it was not previously available, which gives Orion the ability to maximise the efficiency of bandwidth utilisation and contain costs as they grow their business."

The IPSTAR project – ambitious and successful

THAICOM (formerly Shin Satellite) initiated their IPSTAR satellite broadband project with the launch of THAICOM-4 in 2005. The IPSTAR system consists of two main parts: they are the space segment, THAICOM-4, otherwise known as IPSTAR, and the ground segment comprising the IPSTAR user terminal, gateways and networks. THAICOM-4 was the heaviest commercial satellite ever launched and was also the world's first dedicated broadband satellite with a total capacity of 45 Gbps. This is 20 times more capacity than a conventional satellite. The aim of the satellite's launch was to serve all types of multimedia applications. The satellite can serve up to 10 million subscribers across Asia Pacific including Thailand, China, India, Australia, New Zealand, the Philippines, Taiwan, Japan, Korea, Vietnam, Myanmar, Cambodia, Malaysia and Indonesia, China, Australia, New Zealand and Japan.

The impact that the satellite has had on the broadband satellite industry has been significant. THAICOM sold the 100,000th IPSTAR user terminal in January 2008. The IPSTAR terminal can be used for a number of applications in both public and private sectors. Especially useful for Universal Service Obligations (USO), IPSTAR serves even the most remote sites, enabling villages and communities to have access to voice, data and even video services. IPSTAR is now providing voice and high-speed Internet access serv-

ices in many remote areas throughout Thailand. IPSTAR is a more cost-effective method of providing such services to remote areas, as compared to other networks. More than 7,000 small communities in Thailand are now enjoying the benefits of IPSTAR and it has been able to effectively close the communications gap between societies, or so called "Digital Divide", and allows equal access to information.

In terms of education, the distance education program named, MOENet (or SchoolNet), initiated by a government agency, has also enjoyed significant benefits from the IPSTAR technology. Approximately 10,000 remote schools out of 40,000 under the project are using IPSTAR for broadband Internet access and voice services. In addition, this has enabled a reduction of cost in distribution of content and course materials, as this can now be done electronically. Teachers and students alike in these schools can now download course materials and content easily from the centralised server.

VoIP via satellite

Using your Internet connection as a phone is something that many of us are now used to doing everyday. Just look at the success of VoIP providers such as Skype and VoIPbuster. It's cheaper, it's easy and it's firmly establishing itself as the next big thing. In fact it is now becoming accepted as a communications platform in its own right.

Voice over Internet Protocol is essentially the routing of voice conversations over the Internet or via any IP-based network. Its ability to facilitate tasks that are a great deal more difficult to achieve over a traditional network makes it very attractive. VoIP converts your voice into a digital signal which then travels over the Internet to the person you are contacting. Calls can be made over your computer, a VoIP phone or even a traditional phone. Mobile phone providers are too now getting in on the act. For example, the '3' network offers Skype VoIP calls in certain of their packages. Wireless hotspots can also allow VoIP calls. The equipment required to make a VoIP call can vary. In some cases, the service may require a special phone or may only work over a computer. Some service providers offer free calls to other service subscribers but in other cases, you will have to pay.

The advantages of VoIP are numerous:

- Ability to transmit more than one telephone call down the same broadband connection. Very easy to add another line at home or in the office;
- Incoming calls may be routed to a VoIP phone regardless of your location;
- Free phone numbers;
- VoIP is location independent; and
- VoIP phones may be integrated with other services available over the internet such as file exchange and teleconferencing.

The disadvantages are as follows:

- Risk of network failure due to power outages;
- No access to emergency calls; and
- No business or residential listings.

For homes and businesses alike the most attractive part of VoIP has to be the fact that it is low-cost. VoIP has a different cost base in comparison with other 'traditional' systems. Its foundation is network efficiency. With circuit-switched calls, the ports in both the originating and receiving switches are tied up for the duration of the entire call but VoIP utilises virtual switches and therefore make more efficient use of the bandwidth available by filling it up with voice and data channels resulting in bandwidth consolidation.

VoIP also takes advantage of the same infrastructure that drives the Internet. The hardware and protocols required to operate the systems are available off-the-shelf and are interchangeable.

VoIP is also very scalable. It is easy to expand a VoIP network and the costs involved in doing so are also significantly lower. More conventional networks are restricted by their circuit switches but VoIP



uses what are known as 'soft' switches which may be used at a regional level thus allowing multiple markets to access the network with only limited equipment.

In business, VoIP is widely used by companies wishing to eliminate their call charges between regional offices by using their data network to carry inter-office calls. This is something that has been increasingly evident in the Asian region. VoIP can also be used to reduce the costs of calls outside their company by carrying the to the nearest point before handing them over to the PSTN (Public Switched Telephone Network) thus giving them an alternative.

The fact that VoIP is based on software rather than hardware also falls in its favour. One network is far easier to manage than two. It is easier to alter, to configure, to manage and to maintain. This results in a reduction of staffing and administration that would normally be vital in maintaining a conventional network.

What about VoIP via satellite?

The emergence of VoIP has opened the door for co-operation between VoIP providers and satellite ISPs. Although reasonably new, satellite Internet is becoming hugely popular due to the fact that it can be accessed anywhere with no terrestrial infrastructure. However, there are still some hurdles that must be cleared before the service is up to the standard that we are used to on terrestrial networks.

The main problem that VoIP tends to suffer from is latency that disrupts the VoIP signal. Latency can be described as the time it takes for the packet to reach the destination computer. This is usually a matter of milliseconds. The packet has a long way to travel to the satellite before being beamed back down to earth and that's not the end of the journey, as there are still several 'hops' to perform. This latency causes a delay on the line. It can make calls quite confusing as the user must be careful not to interrupt the person they are calling. However, the QoS problems that VoIP over satellite can

encounter are being overcome. Satellite companies have come up with a solution whereby VoIP data packets are prioritised and they have set bandwidth aside purely for VoIP calls. Advanced compression techniques are also helping to reduce or even eliminate call degradation.

There is no doubt that VoIP over satellite will be key in helping developing nations gain access to voice services. It takes away the need to build a standard telephone network and is simple and cost-effective to implement.

VoIP in the Asian context

The VoIP market in Asia is very strong and continues to grow. By 2009, total revenue is expected to leap from US\$4.2 billion in 2005 to 12.9 billion (Source: www.infonetics.com). Businesses are migrating to IP for the flexibility and cost-reduction that it brings. Japan, South Korea, Hong Kong and Singapore are IP hot spots. The Asian market is growing at a rapid pace and due to the fact that there is no legacy infrastructure in place, the take-up of IP has been very quick in comparison to other continents. Perhaps unsurprisingly, it is expected to adopt IP quicker than any other region.

Video conferencing over IP

Video conferencing over IP is allowing businesses to carry out their work, whether that may be a meeting, a negotiation, transaction or even an interview with staff and potential customers anywhere in the world. This reliable and cost-effective means of communication is saving companies huge amounts of money on communications and travel expenses as they can now be there virtually, without actually being there physically – the same goes for smaller and home-run businesses. Video conferencing over IP has also made it easier for business people to work at home yet never to miss that important meeting – less commuting, happy staff, higher productivity. Staff training can also take place via video conference enabling interactive, real-



Photo courtesy of THAICOM.

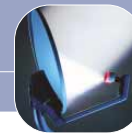


Photo courtesy of Philips.

time discussion even when a trainer is in Washington and a student in Calcutta.

Using IP for broadcasting

Another use that is being found for IP over satellite is in the field of broadcasting. IP Access International is a California-based global satellite service provider that has recently broadened its satellite service offerings to include live streaming video services connecting professional videographers to an online viewing community. TodoCast, a streaming video service provides videographers a turn-key solution for pay-per-view live video content from any remote location throughout the US, Canada and Mexico. Leveraging IPA's TodoCast Kit containing a highly automated, user friendly satellite antenna, electronics and encoding equipment, professional videographers will have the capability to film, promote and upload live video to the web, where it will then be available for live viewing to registered users.

The TodoCast Kit costs \$25,000 for purchase or videographers can leverage leasing plans starting as low as \$600 per month. Designed for portability and mobility, the powerful satellite antenna can be easily mounted to any SUV, providing access to live video events in the most remote locations. Todocast.tv takes the capabilities of video over satellite and packages the technology into a simplified service, providing videographers a platform and dynamic web audience. The high-end satellite video service allows registered users to uplink and stream live broadcasts to anyone that can access the Internet and do so by purchasing as little as a days worth of satellite time starting at only \$500 per 24hr period.

"TodoCast is a complete webcast video over satellite service that has been in the works for sometime. The beauty of it is that you can offer the webcast as a pay-per-view or a free sponsored event, like a wedding or corporate event. We've packaged the technology into a

user friendly and revenue generating kit for videographers," stated Bryan Hill, President of IPA. "We're excited to be able to offer videographers the ability to produce live events with guaranteed quality bandwidth. Our videographer partners can pick the day, the event and the price and we will do everything else. They film the events, we collect the money and distribute the video." Hill concluded.

Further enhancing live video services, IPA will be providing an online interface between viewers and videographers. IPLive.tv, will be a one-stop online entertainment portal where live or archived video can be viewed in high resolution. Categories will be dynamically managed through a robust Content Distribution Network, where viewers can browse categories by videographer or genre such as sports, travel and breaking news. There is no cost for viewers to join the IPLive.tv viewing community, and the choice for free or pay-per-view video is at the viewer's discretion.

Enabling IP to be enjoyed by all

Satellite has a crucial role to play in the delivery of IP-based communications across the world. Without it, the enormous benefits of voice, data and video services will not be enjoyed by people based in areas where terrestrial infrastructure does not reach. Satellite, as always, goes the last mile to connect in a timely and cost-effective manner. The IPoS standard will be the key to the introduction of IP to these regions of the world. Delivery of IP over satellite also benefits the global business community in a plethora of different ways and the residential customer too who can gain access to ever more sophisticated applications. In fact, the beneficiaries of this form of delivery are endless, everyone from disaster recovery agencies to homeworkers. The introduction of IPv6, which is slowly being introduced alongside its predecessor, IPv4 will take communications even further. For Asia, IP over satellite will be particularly important due to its size and dispersed population. ■