# CONVERGENCE Vol. 3 / No. 1 | JANUARY 2009

# HSBB Malaysia's Drive for High Speed Broadband

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roadband, broadband and broadband.

It is no longer an optional living tool, but a necessity in this connected wired world. Broadband will be the future of things to come for this year and beyond.

Under the National Broadband Plan our aim is to achieve a 50 percent penetration rate of broadband services to the nation. We are currently at about 20 percent; hence have yet a long way to go to achieve the 50 percent penetration rate by end 2010. All of SKMM together with the Ministry of Energy, Water and Communications, and industry participants will be mobilised to achieve this, dare I say, amazing feat. This issue of .myConvergence features an extensive update on this current topic.

We will also look back at some of the achievements of 2008, such as implementation of Mobile Number Portability, WiMAX, MyIX as well as continuance of Bridging the Digital Divide efforts through development of Universal Service Provision (USP) technologies.

Taking a peek into the horizon of the communications and multimedia industry takes us into a discourse on how far technological convergence has come to us including how the ubiquitous phone has evolved. From purely a device for voice communication the modern phone today encompasses much more functionalities such as ease of mobility as well as data and image transmission. In the broadcasting sphere, Digital TV will inevitably come into our converged future, and I feel, it is timely that we take a look at the development of the Digital TV Set-Top box and the technologies required for its implementation in the country.

Read these and other topics in this issue. We would welcome any feedback on the topics presented and ideas for improvement of the publication. Do e-mail us at myconvergence@cmc.gov.my

I take this opportunity to wish everyone a Happy New Year 2009 and may the future bring the benefits of communication and multimedia to one and all.

Thank you and God Bless. **Datuk Dr. Halim Shafie** 

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## High Speed Broadband (HSBB) Public - Private Sector Partnership (PPP) Signing Ceremony

High Speed Broadband Signing Ceremony between Malaysian Government and Telekom Malaysia (TM) Berhad at Putrajaya International Convention Center (PICC) on Tuesday, 16 September 2008.







# MALAYSIA'S DRIVE FOR HIGH SPEED BROADBAND

SKMM's Nor Akmar Shah Minan shares details of the High Speed Broadband Project that will provide high speed broadband to crucial areas in the country. igh-speed broadband or HSBB is part of Malaysia's National Broadband Implementation Strategy and the Government aims for the country to achieve 50% broadband penetration by 2010. This involves several strategies in terms of both supply and demand.

According to the Malaysian Communications and Multimedia Commission (SKMM), Malaysia's broadband penetration was 17.5% of households at the end of the third quarter of 2008. That meant that there was still a large market to grow for many service providers.

Also, the increased focus on high tech and knowledge based industries meant that broadband was going to become an essential utility. Not only was broadband a must in areas like high tech parks, it was also necessary in homes. Workers were beginning to work more from their homes.

Just like electricity and water supply are standard features in homes, similar arrangements were going to be needed for broadband services in Malaysia.

High-speed broadband adds to the competitiveness of a nation in the global economy and it is imperative that the nation keeps up with other nations in the rollout of highspeed broadband. The HSBB project is thus a vital necessity that has to be implemented as quickly as practicable as the nation races to achieve the Malaysia Vision of a knowledge based economy in 2020.

A two-pronged strategy is deemed to be necessary to meet the penetration rate target. One comes from the supply side whilst the other from the demand side of the broadband market.



#### The supply side

On the supply side of the broadband market, the Malaysian Government has defined two categories of broadband. The first is HSBB in selected geographic areas with speeds ranging from 10 Mbps up to 100 Mbps for residential customers using fibre to the curb – namely, roadside cabinets - with the final part of the connection provided via a wire pair into the premises and up to 1 Gbps using fibre directly into premises for businesses and high economic impact areas.

The second is Broadband to the General Population (BBGP) with speeds generally from 256 Kbps to 2 Mbps and all the way up to below 10 Mbps.

HSBB is required for advanced and bandwidth services such as digital homes, medical imaging and multi-channel high-definition TV applications and services. In Malaysia it will be implemented mainly in industrial areas, cities, towns and the various development regions including cybercities and cybercentres, technology parks and the Iskandar Development Region in the southern part of Peninsular Malaysia will feature HSBB.

The Government's strategy to achieve this is through collaborative effort in a public-private partnership.

An agreement to that end was signed between the Ministry of Energy, Water and Communications (KTAK) and Telekom Malaysia (TM) in mid-September 2008 to roll out HSBB over a period of 10 years. Under its first phase, HSBB access will be provided to over 1.3 million premises by 2012.

Under this initiative, TM will provide last mile access to homes and businesses through three main technologies namely, fibre-to-the-home (FTTH), Ethernet-to-the-home (ETTH) and Very High Speed Digital Subscriber Line (VDSL2).

The Government will co-invest RM2.4 billion (US\$685 million) towards the project, while TM will provide RM8.9 billion (US\$2.54 billion). The Government's portion is mostly to make up for the lower net presence value (NPV) due to pushing supply into areas such as new housing estates and new industrial zones which are regarded as non-profitable by the other service providers to do so.

While some in the industry and other commentators have criticised this partnership for providing an advantage to one service provider over the others, the Government sees it as the only practical means to enable quick HSBB rollout, especially when Malaysia is far behind in broadband penetration compared to other countries. It needs to catch up fast. Efficient and speedier roll out is required. TM is the only service provider with an extensive network of fixed line infrastructures and ducts in place nationwide, so it's simpler, cheaper and faster for TM to do it.

#### New lifestyle with HSBB

Broadband has the potential to revolutionise the way we live and work, delivering real economic benefits. The demand for multimedia is the prime driver for high-speed broadband. The communications industry has moved to the stage where it focuses on broadband. There is a growing demand for faster Internet access that supports applications such as collaborative networking, video conferencing, telepresence, IPTV, Video on Demand and VoIP. To meet this demand for bandwidth, a growing number of service providers have begun offering high bandwidth to subscribers in key regions worldwide.

The increase in Internet access speeds can be directly linked to the types of services offered over the network. The provision of single play services that were primarily data-only services were responsible for moving dial-up users to ADSL which was mostly provided in Malaysia by TM through its Streamyx service. Most users basically used the Internet for browsing static content (graphics and text) and email with a little bit of music and video streaming.

Dual play came along and added voice with better quality of service (QoS) to existing data connections. This allowed cost effective voice over IP (VoIP) services along with other value-added services. Though these services were initially of poor quality, customers did not mind as they were provided at low prices.

The networked world has now moved on to triple play which combines Internet access, voice communication (telephony) and entertainment services such as video streaming. Quadruple play adds seamless mobile access to the equation. The growing popularity of social networking applications and personalised services are adding even greater bandwidth demand.

To provide an acceptable level of service for current and future Internet services and applications, HSBB becomes absolutely necessary. The speeds envisaged in the HSBB project along with the move to an all-IP network and

Video conferencing and telepresence require high speed broadband



improved bandwidth management will provide very high quality levels of services and promise subscribers with a TV-like (including high definition) or even better experience.

#### **Economic benefits**

HSBB is important economically. According to an Economic Planning Unit study, broadband can deliver significant benefits to Malaysia. Achieving 50% household broadband penetration by 2010 can result in tangible contribution of 1% to country's gross domestic product (GDP) and create 135,000 new high-value jobs in 2010.

That will also create opportunities and markets for applications and content developers.

It will also boost local industries and employment generation directly. The national broadband strategy will enhance human capital and allow for movement up the value chain. It will enable the K-economy and serve as a catalyst for overall national competitiveness.

#### **Open Access to HSBB**

To ensure there's no unfair advantage to TM with regards to other service providers, HSBB will be an open network with open access and fair pricing that will allow other service providers fair and non discriminatory access to provide their own services over it for a reasonable fee.

The existing Access Regulatory Framework will be further developed to ensure the network is open and that the pricing is fair. SKMM noted that it is very important to promote an open network without necessarily duplicating the costly last mile and backhaul connectivity to promote economic growth. Service providers would initially be able to seek and provide access from Bitstream services as well as Digital Subscriber Line Resale Service.

The regulatory framework is on an open network access concept. Other industry players will be able to obtain network access on a commercial, non-discriminatory, fair and equitable basis.

For example the HSBB network will be open to other industry players at the applications and network service level. Qualified service and application providers will be able to launch services such as IPTV and other multimedia services on TM's HSBB network. Further, for connection services it will provide access to core and international networks.

#### **Broadband to the General Population**

BBGP is the second category in the supply push and it will be deployed in all areas including areas covered by HSBB. It will be provided by current licensees using fixed ADSL (asynchronous digital subscriber line), wireless HSPA (High-Speed Packet Access) or WiMAX (Wireless interoperability for Microwave Access) and this provides an alternative and competitive means of broadband access to many.

The vision for BBGP in 2010 is to ensure enough coverage by the multiple technologies and operating service providers. For example in high economic impact areas where HSBB



📭 It's an increasingly connected lifestyle

is present, multiple infrastructure are likely to exist. HSBB and BBGP coverage will be available across the entire zones providing alternatives and choice, including backhauling support to wireless service providers.

In sub-urban areas the current coverage will be widened under various wired and wireless technologies as mentioned above.

Provision of BBGP in less profitable and rural areas will be funded through the SKMM's Universal Service Provision (USP) fund. The BBGP programme in these areas includes Basic Telephony (through fixed and mobile network), Community Broadband Library (CBL) and Community Broadband Centre (CBC).

By 2010, 40% of the target of 3.2 million homes will be served by BBGP, while the remainder will be served by HSBB.

The BBGP service providers are not left out as under the 2008 Malaysian budget, the Ministry of Finance approved tax allowances on expenditure on last-mile broadband equipment as an incentive for service providers to roll out their broadband networks.

Among them, last mile network facilities providers will be given an investment allowance of 100% on capital expenditure incurred for broadband up to 31 December 2010.

Import duty and sales tax exemptions will be given on broadband equipment and consumer access devices.

Tax deduction will be given to employers on benefits in kind in the form of new computers and payment of broadband subscription fees for employees. Such benefits in kind received by the employees will also be tax exempt.

This set of incentives will continue to be reviewed for its effectiveness to further push supply and demand.

#### The demand side

There is this famous saying which states that you can take a horse to the water but you can't make it drink, so while there is that entire broadband infrastructure in place, what will make people want to use it.

The Government will adopt a three-pronged strategy in three critical areas to create demand.

The first is to create public awareness of the benefits and availability of broadband.

The Government believes that while service providers will promote their broadband products, they may not promote its benefits; so the Government will have to do that together with the Industry.



Government and private sector initiatives will help create and communicate an icon or brand that encapsulates the benefits of broadband, organise Internet training courses for relevant target groups such as mothers and home-makers, encourage more urban cybercafés to be set up and set up broadband booths at community events.

Overall activities to promote broadband will be planned and coordinated with relevant stakeholders including the industry, while impact studies on the effectiveness of the programme will be conducted to provide feedback on its effectiveness.

#### The water in the pipe

The second strategy is to develop the attractiveness of having broadband in terms of good content and applications, i.e. the water that flows in the pipe. Here, the Government will focus on providing electronic-Government, distanceeducation and on promoting electronic-commerce.

Demand for, and the development of private content will be aided by the high quality broadband infrastructure.

Malaysians already spend on average  $\sim 5\%$  of their monthly household income on digital entertainment and info-communications services. The current high average revenue per user (ARPU) for pay TV also indicates a high willingness to pay for content.

#### e-Government services

The Government is also taking actions to raise its capabilities to develop future offerings, such as building effective internal networks and infrastructure; expanding databases and systems integration and inter-operability among different Government agencies; improving coordination by strengthening the current IT governance and control framework. It is also enlarging the IT manpower pool through inter-agency knowledge sharing systems and human capital enhancement programmes.

HSBB and BBGP infrastructure will advance the Government's efforts to reach citizens and businesses with quality online services and improved accessibility to broadband would create efficiency gains through increased usage of Government online services.

One of the e-Government initiatives is the ongoing eKL project covering the Klang Valley and it is currently offering nearly 600 online services. This number is targeted to grow by 2010 with more online services being developed and delivered through several service delivery channels such as agencies' online counters and web services, mobile phone's Short Message Service (SMS), kiosk and bank autoteller machines.

#### Affordable to all

The third strategy is to make broadband affordable to all. Broadband is currently too expensive for certain social segments which can't afford PCs, broadband subscriptions, modems and other access devices. Coordination will be required with other Government agencies to facilitate PC ownership and broadband take up. According to figures by SKMM and others, about 60% of middle income earners with annual income between RM18,000 and RM60,000 (US\$5,143 and US\$17,143) found current broadband prices in Malaysia to be unaffordable, while none of those earning under RM18,000 per annum found it affordable, while all of those earning above RM60,000 found it affordable.

A 512 Kbps DSL connection typically costs the equivalent of US\$18 (RM63) per month and it needs to be lower.

There also is an almost linear correlation between PC and broadband penetration, which needs to be addressed. Thus there is a need for action plans to find solutions especially for the above middle and lower income groups.

For example, discussions will be necessary with the Ministry of Finance to lower duties on these equipment and to provide individual income tax relief on their purchases. At present, individual tax relief is only provided for purchases of notebook PCs but this has to be extended to include all equipment and SKMM will continue discussing this issue with all relevant authorities so that the affordability factor is enhanced for the target groups.

SKMM will also work with the industry in formulating broadband packages with low cost PCs and Internet devices.

To improve affordability in rural areas, the SKMM will try to widen community access by providing computers, printers and broadband access in community centres to complement current initiatives by the Ministry of Rural and Regional Development (KKLW) and the Ministry of Women, Family and Community Development (KPWKM). This serves to bridge the affordability factor as well as collaborative learning by the community to understand the benefits of broadband and how they can participate in it.

#### **Community broadband**

Telecentres offer a good platform for mass community broadband access and should be strengthened.

To achieve this, a single agency should be designated to coordinate efforts with State ICT agencies to build new telecentres and customise them to be relevant to the local population.

Telecentres should be opened at night and at weekends and IT graduates and students should be hired to operate them at these times. IT graduates should be hired as managers and all should be sent for training in best practice centre management sharing sessions.

It is hoped that Malaysia's targeted approach will bring about results and that the HSBB network will help transform the nation into a knowledge society. **my** 

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**Personality** 

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# BUDDING LOCAL COMMUNITY ICT CAPTAIN RUZELAVATI OHD KHALIB

## Ruzie is finding fulfilment by working on the frontlines of the initiative to bring ICT services to underserved areas of the nation.

any would define an ideal job as one that would allow the person to earn a decent living, contribute to society, located near loved ones and which allows the person to pursue entrepreneurial dreams. By those criteria Ruzie, as she prefers to be known, has the perfect job.

Since the start of 2008, Ruzie has been running a UCC (USP Communications Centre) in Bandar Baharu, Kedah. The position has brought this young IT graduate face to face with the challenges and thrills of introducing rural Malaysians to the advantages and wonders of a connected world. UCCs are cybercentres set up by SKMM in rural and underserved areas and are aimed at giving those without access to the Internet the opportunity to join the online world. UCCs are currently operating in locations all over Malaysia and form part of the national broadband rollout programme. The UCCs provide Internet access for free and in a safe environment to people living around the area. Since many people in rural areas have not been exposed to the Internet, the UCCs also provide training classes to people wanting to learn how to access and utilise the power of the Internet.

This bubbly young lady has no regrets so far about taking an unconventional career path. If she had not heard about the UCC programme from a friend, she probably would have continued working in an ICT desk job like many of her college mates. Ruzie completed a Diploma in Business Studies at UiTM in Arau, Perlis before earning a B.Sc. (Honours) in Business Computing at UiTM Shah Alam. Ruzie did work in the ICT call centre industry with VADS in Kuala Lumpur and later, Dell in Penang.

Job satisfaction however eluded her and when she heard about the UCC programme, Ruzie jumped at the opportunity to be her own boss - sort of. The UCC programme is run in a unique collaborative model. TM, as the appointed broadband access service provider for the centre, has engaged its training partner Medan Sedunia Digital Sdn Bhd (MSD) to hire Ruzie to operate the UCC. Ruzie was ecstatic upon learning that a UCC was being set up in Bandar Baharu which is not far from her hometown, Taiping. Even though she would not be earning as much as she could if she had stuck to more traditional jobs, she never hesitated for a second to take up the challenge for the sheer satisfaction of providing social service to the rural community.

Equally strong was the desire to aid deprived rural citizens. "Every time I help someone understand what the Internet can do, I feel so much satisfaction." She has seen people become empowered just by obtaining an email address. The interest in the Internet has skyrocketed and even adults in her area have become interested in learning how to use computers.

On what has it been like so far, Ruzie says that she has seen a steady growth of interest in UCC activities from the community. After almost a year, the UCC is firmly placed with patrons utilising its services in reasonable numbers. The most difficult challenge was getting adults interested in ICT. But since it is a rural area, word of mouth travels fast and the impact Internet had on the first few batches of adults ensure that others are coming forward to learn.

"Those who attend our Internet introductory courses usually end up asking us to help them get computers for their homes," said Ruzie.

Ruzie is also not sitting still as far as personal development goes. She plans to further her studies. The facilities at the UCC and flexible work hours will be useful when she starts.

The biggest joy Ruzie gets from running the UCC comes from seeing the effect her UCC is having on Bandar Baharu and the role that UCC plays to complement other community services such as the library. "Students previously used to go to libraries and use books to get the information they want. These days they come to my UCC centre and search the Internet. I am so proud that my UCC has become a real community centre used by both young and older people. I am glad to be part of something that is useful to the people of Bandar Baharu."



The tenth anniversary of the creation of SKMM can also be described as ten years of convergence as it was created to promote and drive Malaysia's progress in the fast evolving communication and multimedia industry. The Experiencing Convergence and MyBroadband 2008 Conference and Exhibition in October 2008 showcased the successes of that decade.

Feature

#### he conference saw the participation of the Government, industry and regulators. The programme featured an exploration of emerging technologies, services and trends.

The Minister of Energy, Water and Communications, Dato' Shaziman Abu Mansor outlined why SKMM was created. He pointed out that from the arrival of telecommunications services to this country and for a very long time after that, the Government both provided and regulated these services. It was necessary to chart the industry's future direction since the country was still in its infancy then. However, as the industry matured, the Government saw the need to encourage greater private sector participation to bring the communications industry to the next level.

Similarly, the word "convergence" was rarely heard in the last century but the worldwide trend is now towards convergence of different communication functions, technologies and services onto a common platform.

Convergence has resulted in applications such as mobile TV which lets people watch television on their mobile phones and broadband connections that enable data, Internet access and voice to be carried over a common pipe. This in turn gave rise to the concept of a converged digitally connected homes and personal communications.

One of the better ways to describe convergence may be to quote from the renowned strategist, Sun Tzu. He said "There are not more than five primary colours; blue, yellow, red, white, and black, yet in combination they produce more hues and colours than one can ever imagine beyond our wildest dream." In that same way, the convergence of services, platforms and technologies results in the creation of a myriad of other services and technologies.

These trends drove regulators and service providers to adapt. Regulators especially had to adapt their organisational structure, purpose and regulatory framework to facilitate and take advantage of the changes convergence brought about.

Malaysia was in fact amongst the earliest to overhaul its regulatory framework , which led to the creation of the Malaysian Communications and Multimedia Commission (SKMM) in 1998 and the Telecommunications Act 1950 and Broadcasting Act 1998 were repealed and replaced by the Communications and Multimedia Act 1998. With the new industry structure established 10 years ago, the Government undertook numerous proactive initiatives to revamp Malaysia's communications and multimedia industry to enable a knowledge driven economy which would enable Malaysia to become a developed nation by the year 2020.

Realising that this target could not be achieved in a single leap, the Government introduced supporting and complementary programmes along the way to help the country move towards its 2020 target.

One of them is the ten year National Broadband Plan, which was implemented in 2004 with the strategic goal to enable a knowledge-based culture in the country through the supply of broadband to facilitate the development of all Internet services in Malaysia, e-Government and ecommerce in particular. Programmes were developed and evolved around this plan to address specific areas. One of these is the MyICMS 886 strategy initiated in 2006 and which will run till 2010. This focuses on eight service areas supported by eight selected infrastructures. It is further complemented by generating growth in six selected areas which will spearhead the economy into the next era.

Out of MyICMS 886 came the High Speed Broadband (HSBB) programme with an investment of RM11 billion, which aimed at achieving MyICMS 886's target of 50% household broadband penetration by 2010. This would be done by providing high speed connectivity at 10 Mbps and above to 1.3 million homes and offices mostly in urban areas through a public-private partnership signed last September between the Ministry of Energy, Water and Communications (KTAK) and Telekom Malaysia.

A parallel initiative to drive the achievement of the 50% penetration target is the Broadband to the General Population (BBGP) project whereby service providers would fill the gaps and provide alternatives of choice by providing up to 2 Mbps Internet access using a combination of wired ADSL and wireless technologies such as wireless connection such as HSPA and WiMAX.

Malaysia's household broadband penetration was 15.5% as of the end of 2007 and in that year the communications and multimedia industry contributed 8% and 7.6% respectively to Malaysia's gross domestic product (GDP) and gross national product (GNP).

In many countries, the level of broadband penetration is expected to have tangible impacts on the country's GDP. For example by 2010, 50% penetration by population in the United States is expected to contribute 4% to total GDP, 15% penetration by population in UK will contribute 0.6% to its GDP, while 50% penetration by population in New Zealand will contribute 0.9% to its GDP.

Malaysia's Economic Planning Unit expects that achieving 50% household broadband penetration by 2010 can contribute 1% to Malaysia's GDP and create many new jobs.

HSBB is seen as meeting many objectives. It will be a regional leading infrastructure with best-in-class QoS. The content and media eco-system will aid local content devel-

Broadband subscriptions by technology, Q4 2008

![](_page_14_Figure_17.jpeg)

The broadband industry in Malaysia will be highly competitive with infrastructure enabling multiple players

![](_page_15_Picture_1.jpeg)

opment. HSBB will aid economic growth through enhanced national competitiveness. Overall, it will grow broadband penetration to comparable levels of regional leaders. It will lead to employment and development of human capital for high tech and knowledge industries and affordable and fair market prices for consumers and services providers.

It's expected to enhance electronic-Government as well as institutions of higher learning infrastructure, while industry will benefit through a world-class infrastructure for applications and content development, access to Internet Protocol (IP-based) next generation network for high speed Internet and new services delivery.

For the nation, HSBB is expected to have a positive impact on Malaysia's GDP and employment, provide spinoff effect in other sectors. It will encourage the knowledgeeconomy and altogether result in enhanced national competitiveness.

The ten providers of HSBB and BBGP access will provide a channel for the current 14 content aggregators, content developers and TV broadcasters to provide their products and services, including telehealth, multimedia post production, high-definition TV, IP-TV, games, eeducation and others. It will drive growth in local content development, enhance developer productivity as well as the consumer experience.

Following the overall picture of the past, present and future painted by the Minister, other speakers took up specific topics in their addresses.

Sua Chek Hong, Huawei Technologies Malaysia deputycountry manager added that for users to enjoy a ubiquitous massive data experience, it will require full-service ultra broadband, which will enable users to access massively sized items of content anytime, anywhere, whether at home, while outdoors or in the office.

At home, users would enjoy high-definition TV, online games, videophone or high-speed Internet at speeds up to 10 Mbps. On the go they would enjoy TV and music, videophone and high-speed Internet up to 5 Mbps and in the office they can share data at between 100 Mbps to 1 Gbps, access the Internet at between 10 Mbps and 100 Mbps and videoconference at 10 Mbps.

Ericsson Malaysia President and Country Manager, Krishna Kumar Guda shared that the convergence of telecommunications with digital media results in users wanting to communicate with other persons or machines, listen to music, play video games, access content and data and services on different types of networked desktop, handheld and mobile devices.

This will provide new market opportunities for fixed line, mobile and cable TV service providers, as well as content providers, utilities, municipalities and content portals, including user-generated content portals to provide broadband content and services to end users.

Ericsson's 2007 ConsumerLab survey of 5,000 users across five countries on their broadband needs confirmed that broadband availability was leading to changes in lifestyles: 48% agreed that computers without broadband had no value, 40% said they watched TV less now than previously and 50% agreed that having broadband everywhere was important to them.

Ericsson sees the benefits of broadband providing development, resource management and access to networking to businesses, institutions and the people. It believes it

![](_page_16_Figure_0.jpeg)

Broadband enhances user experience - Downloading

will benefit the country overall in terms of productivity reduction, stability, global equality and economic growth.

A study found that broadband benefits entrepreneurs enormously by generating income in existing and new businesses and that the benefits of broadband for business development are related to three main areas.

For existing businesses, broadband provides marketing reach and access to global markets, product and production development. Secondly, it creates new business opportunities to provide and sell access, provide IT education and IT support services and thirdly, broadband also is an integrated tool for the business.

Ericsson cited a real-life example from Indonesia. Dewi, who runs a ceramic business in Malang Indonesia, employed 10 workers and was making 18 million Rupiah profit per month. After she got broadband Internet access and learned how to use e-mail and create a website, her profit jumped 50% to 27 million Rupiah and she increased her staff strength to 18.

Her homepage and email communications not only brought customers from all over Indonesia but from the UK, Australia and France as well, compared to previously, where her customers were located within her surrounding area.

Likewise, broadband can vastly improve the performance of institutions like schools, health-centres and Government offices by giving them access to information and provide them with a channel to reach out to the people with new and updated teaching material, improved healthcare through more knowledge about diagnoses, treatment and care, while cutting red tape.

It empowers the people by enabling them to connect to the broader society, bridges the gap between villages and cities, nations and continents, increases their knowledge and access to Government services.

For both businesses and institutions, broadband enables a more efficient utilisation of resources within them through faster communication and a faster flow of information, as well as through a more efficient administration.

Floyd Wagoner, Director, Motorola Home and Mobility Networks sees video as being the primary driver of broadband, with a typical standard-definition movie file occupying 3.4 GB and its high-definition equivalent occupying 10 GB.

That 10 GB file would take 267 minutes to download over an ADSL2 connection, 67 minutes over VDSL2 and 6.7 minutes over a GPON (Gigabit-capable Passive Optical Network), while corresponding upload speeds for a 50 GB standard-definition video would be 400, 200 and 4 seconds respectively over the three types of networks.

By 2012, 70 billion videos will be viewed online and the capacity of broadband networks will have to be able to cope with that demand to ensure a satisfactory user experience.

Results of Motorola's Millennial Survey in August 2008 of 1,223 persons aged between 16 and 27 years of age – dubbed the Millennial Generation -- across France, Germany, Spain, the United Arab Emirates (UAE), and the United Kingdom (UK) found that 28% streamed video, 24% streamed movies, 26% downloaded movies while 22% downloaded TV several times or more in a week.

Among other online activities, 35% downloaded and saved music, 35% played video games, 15% recorded TV programmes to portable video recorders and 14% created video content for online social networking sites such as You Tube and others.

The key issue which emerged among the Millennial Generation was the time they were willing to wait for a video or movie to download before they could start viewing it and about half said they would become frustrated or aggravated if they had to wait more than five minutes before they could start viewing a 30 minute TV show.

Forty seven percent had the patience to wait at most one minute before they could view a video on a social networking site, while 53% could wait up to 45 minutes to see a two-hour movie.

Most believed that digital technologies have had a profound impact on their lives, with 74% agreeing that their personal lives would be changed dramatically without access to the Internet.

Jakob Neilsen's research on the usability of the Web led to the development of Neilsen's Law, which states that broadband demand increases at a compound annual growth rate of 50% or 57 times over 10 years and that mass

![](_page_16_Figure_20.jpeg)

![](_page_16_Figure_21.jpeg)

![](_page_17_Picture_0.jpeg)

Michael Lai of Packet One

market bandwidth usage lags that of high-end users by two to three years, so investment cycles in broadband infrastructure must be able to meet that growth.

#### Wireless broadband

As for growth in wireless broadband, Yuan Wei, ZTE Corporation's Senior Director for Global Marketing weighed in with an analysis of where WiMAX is currently on its hype cycle. This refers to a often used observation that most new technologies usually go through a cycle where they are first overhyped before ultimately going on to achieve their potential.

He reported that fixed WiMAX is well past what trend analysts call the Peak of Inflated Expectation due to market hype and exuberance and it was at its lowest point in the Trough of Disillusionment as of June 2008, after which it will begin its more sedate but steady climb along the Slope of Enlightenment on its way to the Plateau of Productivity.

Mobile WiMAX on the other hand was just past the Peak of Inflated Expectations and like many other technologies before it, including railways, oil and others, it will have to go through the Trough of Disillusion before it makes a robust comeback and accomplishes its true worth.

So far there are 305 commercial WiMAX deployments in 118 countries, including 20 service providers in 10 countries across South East Asia and WiMAX deployments of all types in all frequencies are eventually expected to reach four billion persons worldwide.

However the real challenge service providers face in being commercially viable is to be able to provide adequate coverage. Yuan also revealed that according to NTT DoCoMo, coverage of an area must be over 90% to be effective and surveys have found that 69.7% of wireless data traffic is from indoor users. However, signal strength loss from outdoor macrocells is high after penetration through walls.

So instead of focussing on providing outdoor coverage, service providers should find ways to provide coverage indoors.

However, since WiMAX is based on TDD (Time Division Duplex) technology, it must be able to receive timing signals from the Global Positioning System (GPS) which cannot penetrate into multi-storey buildings, so alternative ways must be found to provide that timing signal.

One high bandwidth indoor solution is to use an out door base-band unit (BBS) with GPS connected by fibre to remote radio units (RRUs) such as picocells mounted outdoors on the side of the building and in turn connected by fibre to indoor antennas.

A medium capacity solution for up to 30 Mbps would have a similar configuration, except that it could use an outdoor controller with GPS, connected via fixed Ethernet cabling to picocells on the side of the building and connected via Ethernet to indoor antennas.

Alternatively, broadband over powerlines can also be used for medium capacity requirements, with one or more controllers with GPS mounted outdoors and in turn connected to picocells indoors through the indoor electrical wiring.

Dr Bill Wong, Chief Technology Officer and Vice-President of Engineering with Altai Technologies in Hong Kong took a different approach and made a case for WiFi technology instead. He proposed extending WiMAX and 3G LTE (Long Term Evolution) coverage indoors using WiFi, with its abundance of highly affordable end-user and access equipment and maturity of the technology. This approach is

![](_page_17_Picture_16.jpeg)

🔽 Zainal Amanshah, REDtone Group Chief Executive Officer

![](_page_18_Picture_0.jpeg)

Danawa Resources WiFi projects in rural locations, Sarawak.

used in the Wireless@KL metropolitan wireless broadband project by Kuala Lumpur City Hall and the SKMM in collaboration with Packet One Networks.

On mobile WiMAX, Wong shared that there were 11.04 million mobile WiMAX subscribers worldwide in 2008, which are expected to grow to 133.66 million in 2012. However, he believed that 3G deployment was delayed by three to five years due to shortage of terminals and that WiMAX was facing the same issue of limited number of WiMAX terminals. Based on the 3G experience, it would take about three years before WiMAX becomes popular.

On the other hand, there are billions of WiFi terminals today and it is being embedded in many devices, including printers, cameras, mobile phones, PDAs and notebook PCs.

Wong expects that WiFi will continue evolving and that it will not be superseded by WiMAX as the latter's devices become cheaper and more plentiful. WiFi based on the IEEE 802.11n standard with up to 300 Mbps data rates is already available and it is expected to become a matured technology by 2010.

He suggested that WiFi offers opportunities for WiMAX service providers to earn roaming charges in terms of data from 3G/HSPA/LTE subscribers roaming in their country by letting visitors with WiFi-enabled devices to roam on their WiMAX/WiFi hybrid networks.

Locally, WiFi can easily integrate with existing fixed line and mobile service providers, Internet service providers and applications & services providers. It also allows WiMAX and 3G LTE service providers to economise on their limited licensed bandwidth allocation by offloading traffic onto WiFi.

As an example, he quoted a project carried out by Danawa Resources in Sarawak. The company installed WiFi access points at the Mukah and Miri rural areas in Sarawak, as well as in the major cities there, covering 250,000 users. Each user gets 384 Kbps Internet access free for two years. In 2006, Sarawak only had 1.3% household broadband penetration and this intervention was significant in increasing broadband penetration.

Michael Lai, Chief Executive Officer of Packet One Networks shared his view that growth in Malaysia's broadband uptake will follow the same trend as cellular communications did over the past 10 years. Malaysia's cellular penetration went from 9.7% to 90% in 10 years and the company expects broadband, which was 7% in 2008, to do the same in the next 10 years.

Notebook PCs with embedded or integrated mobile HSPA/WiMAX chips are expected to make their debut in 2009, followed by consumer electronic devices a year later and all this is expected to drive up demand for broadband.

#### WiMAX in a remote village

Nazli Awang Had, Business Development Manager, Intel Malaysia offered an example of WiMAX helping to bridge the digital divide in a village in Vietnam. Intel in partnership with the United States Aid Agency (USAID) and the Vietnam Data Communications company implemented a pilot project to provide Internet access in the remote village of Ta Van, eight hours by train from Hanoi, using a combination of WiMAX in the locality with a backhaul via Thailand's IPSTAR broadband satellite.

He said that Ta Van was chosen because of local political support, eligibility for Vietnam Telecom Funding, which is equivalent to Malaysia's Universal Service Programme (USP) funding, its tourist potential as a source for a sustainable business model and its low tele-density of two phone lines per village, limited mobile coverage and no Internet access.

WiMAX coverage was provided by Airspan MicroMax, while IPSTAR provided 2 Mbps downlink and 512 Kbps uplink in the backhaul to the communications backbone.

The service provided the community with access to news, chat and online music; tourists with access to blogs, photo-sites and tourist guides; the school with access to information on geography, mathematics and other subjects; farmers with crop and disease information; medical staff with health and pharmaceutical information; and the villagers with voice-over-IP communication.

#### Hybrid approach

REDtone International, one of Malaysia's four 2.3GHz WiMAX licensees with spectrum for use in Sabah and Sarawak, firmly believes in the hybrid use of fixed, satellite and wireless broadband technologies to provide converged WiMAX, voice and IPTV services.

According to its Chief Executive Officer, Zainal Amanshah bin Zainal Arshad, the use of WiMAX for hotspots alone will be very costly, REDtone adopted the

![](_page_19_Picture_0.jpeg)

Cone Laptop Per Child (OLPC)

hybrid WiMAX-WiFi or "Wi-Wi" approach, with WiFi used in the last sub mile and WiMAX in the backhaul.

He added that WiFi also faces tremendous congestion problems in unlicensed bands, especially within the Klang Valley – Malaysia's largest urban conurbation including the capital Kuala Lumpur all the way to Port Klang on the Straits of Malacca. REDtone believes its hybrid approach will overcome such problems.

He also noted that WiMAX penetration is also difficult in buildings. Cost was another issue. While everyone wants services to be cheap and good, unfortunately WiMAX equipment is still between 5 and 10 times more expensive than WiFi, so REDtone doubts that WiMAX will be cheaper.

REDtone Telecommunications in partnership with Hotgate Technology is involved in implementing the Penang Free WiFi project in collaboration with the Penang state Government. For revenue, it is working on an advertisement-supported business model whereby users would have to view a short advertisement before they can surf the Internet.

While mobility with WiMAX will eventually come, he said that it is not here yet and there are not enough economies of scale at present.

#### At one go

All these concerns about rolling out terrestrial broadband coverage fast enough can be solved with a stratospheric communications platform called a High-Altitude Platform Station or HAPS according to Billy Harkin, Group Chief Executive Officer of QucomHaps Ltd in Ireland.

HAPS systems use a platform such as an aeroplane, airship or balloon fitted with transmitters, receivers and antenna and high up in the stratosphere at a more or less unchanging location and which relay signals between ground stations and users within their coverage area, much like a communications satellite.

While in theory, balloons and airships are ideal platforms with their ability to remain aloft for long periods, in practice they still face challenges to remain in the desired location, so aeroplanes are the only practical solution for now.

The QucomHaps system employs planes, flying at a height of 20 km above the ground and it works like a 20 km high communications tower.

Its Malaysian subsidiary, QucomHaps Malaysia, proposes using five planes, two covering Peninsular Malaysia and three covering Sabah and Sarawak at any one time, and they are capable of relaying various types of wireless broadband signals, including WiMAX, 3G and digital broadcast TV directly between ground stations and users below and it does not require any additional equipment within its coverage area.

Each of the planes covers 125,000 sq km on the ground below and the five would cover the whole country. Each plane has a capacity of 35 Gbps or a combined total of 175 Gbps for five planes.

However, QucomHaps Malaysia won't provide services directly to end users. Instead, it provides its stratospheric infrastructure provider for various service providers to use to deliver their services to users under its footprint. The company is waiting to sign up its first service provider customer before it proceeds to launch its facility.

#### Broadband for all

Lastly, Sarawak company, Danawa Resources shared its experience in bringing communications and information services to underserved areas there. Danawa Resources is a

![](_page_19_Picture_17.jpeg)

Maxis Mobile Car

![](_page_20_Picture_0.jpeg)

🗖 D'Impian teenager's room

D'Impian living room

licensed communications infrastructure, service and applications service provider and it is involved in the Sarawak Rural Internet Access Intiative.

The state of Sarawak comprises 40% of Malaysia's land mass and the entire state is a designated Universal Service area; much of it being rural and underserved.

Danawa is rolling out statewide broadband access using a combination of fibre, wireless and satellite for very remote areas. It will carry video, voice and data services and can be scaled up to include IPTV in the future. Its deConnexion WiFi service has a range between 3 and 5 km in line of sight and between 500 and 800 metres in non-line of sight.

Danawa is also involved in the One Laptop Per Child (OLPC) project for rural schools in Sarawak. OLPC is a worldwide non-profit organisation which provides each child with a rugged, low-cost, low-power, WiFi enabled PC developed by Media Lab and loaded with content and software which lets them undergo self-empowered learning.

In August 2008, two schools were selected for OLPC pilot projects. Their students can access electronic books and information in the national and state libraries and it has icon-based learning material for them to learn mathematics, to play music through its in-built speakers, do recordings through its in-built microphone and take pictures with its integrated camera. It also has a drawing programme and a journal which lets teachers keep track of each child's progress.

The children are allowed to take the laptop home, which increases the awareness of ICT to their parents.

#### D'Impian Smart Home

Over at the Experiencing Convergence and MyBroadband 2008 Exhibition, the D'Impian Smart Home was the show centrepiece.

The D'Impian Smart Home is a smart digitally connected home concept by Telekom Malaysia, SKMM and the Ministry of Energy, Water and Communications to showcase what Malaysians can expect in a digitally connected home facilities enabled by fibre-to-the-home of up to 10 Mbps as with HSBB. It was set up to give a taste of the future to Malaysians.

Various state of the art technologies were deployed all over the concept home. These include RFID readers which monitor the location of visitors wearing RFID tags or that keep track of food items in the fridge or cupboard, so that the home owner will know how many items are left over the Internet and when to replenish them.

The D'Impian Living Room includes a high-definition TV and a smart home automation console to control the lights, air conditioning, open and close curtains. These can also be done via remote control from outside over the Internet.

The D'Impian Teenager's Room 32-inch TV and a flat screen computer lets occupants play against their friends elsewhere in the world. For example, it lets them play games like football where their on-screen avatar moves in accordance with their physical movements in the room.

The home also includes a WiFi digital photo frame, a PC which displays a virtual newspaper in 3D and home surveillance cameras which let owners monitor their home via mobile broadband from their digitally connected car.

For those wanting to work from home, there is the D'Impian SOHO Room with access to e-Biz, e-Government and e-Surveillance systems, as well as the U & Me Multimedia Conferencing system which enables video conferencing with business associates and customers worldwide.

It also showcased TM's myBIZpoints small business application that includes an e-commerce platform for doing business, a content management system, trade materials and a payment gateway, and if required, it can hook up to a logistics provider. Telekom is currently offering myBIZpoints as a package for under RM400 a month, including a 10 Mbps fibre connection. MyBIZpoints was launched towards the end of 2008.

The digitally connected car provided by Maxis was parked at the D'Impian Porch. It lets users monitor surveillance cameras in the home on their 3G videophone using 3G and users can also remotely tilt and zoom the camera and speak with anyone within its vicinity. The Maxis Surveillance Services also let users monitor surveillance cameras anywhere in the world in a way similar to conventional CCTV over an Internet connection.

The Experiencing Convergence and MyBroadband 2008 exhibition was open to the public and saw a large turnout of visitors. Other than the centrepiece exhibit, the D'Impian Smart Digitally Connected Home, major telecommunications companies and service providers exhibited their latest offerings. MAJLIS PELANCARAN PERLAKSANAAN MNP KE SELURUH NEGARA

# Mobile Number Portability (MNP) THEJOURNEY

Adrian Abdul Ghani oversaw the implementation of MNP in this country with his team members, Zakiah Ali and Badaruzzaman Mat Nor. He shares the Malaysian experience.

n 15 October 2008, Mobile Number Portability (MNP) arrived officially in Malaysia placing our nation in the company of countries that have implemented advanced mobile services and competition enhancing regulatory initiatives. The Minister of Energy, Water and Communications, Dato' Shaziman Abu Mansor launched this service at a colourful and much anticipated ceremony in Putra World Trade Centre, Kuala Lumpur.

Feature

The launch ceremony saw a large turnout and those in the crowd included top officers from KTAK, SKMM and all the CEOs of the telcos. They were also joined by their leading officers, MNP working group members and many of the unsung heroes from the telcos who worked at the backend in making MNP happen, all there to witness the takeoff of MNP in Malaysia.

The launch of MNP that day was cheered on by the industry and the public alike. But behind the gaiety of the launch was months and months of hard work carried out by the national MNP implementation team, consisting of representatives from the telecommunications industry and headed by SKMM.

#### What is MNP?

In a nutshell, Mobile Number Portability (MNP) is a service that allows customers to retain their existing telephone number when switching from one mobile service provider to another. With the implementation of MNP, the prefixes of Malaysian mobile number are no longer associated with any particular service provider and one will not be able to identify which telco a user is on by looking at his or her mobile number. A mobile user is said to have ported his number when he switches to a new mobile service provider.

MNP is expected to promote healthy competition in the mobile services sector. It aims at facilitating better consumer choice, improved service quality, lower prices and the introduction of innovative service offerings in the market. Increased competition compels all service providers, both incumbents and new entrants alike, to improve the overall value currently offered to customers by lowering prices to retain their existing customers, improving the quality of service and offering new, innovative products and services as service providers seek to differentiate themselves in the marketplace. New entrants into the market will also benefit from MNP by getting the chance to increase their potential market share if they provide good service to the consumers. Contrary to popular belief, incumbent service providers need not be on the losing end upon the implementation of MNP if they too provide services which are up to the expectations of customers and the general public.

#### **Choosing The Right Moment**

Based on the studies undertaken by SKMM, it was felt that the market conditions was just right for the introduction of MNP. It is SKMM's view that MNP is best introduced at a stage when the market has entered a relatively mature phase because at that point such an initiative would provide a further boost in enhancing competition within the market.

With 4 dynamic mobile service providers, Mobile Virtual Network Operators (MVNOs) on the horizon and the steady growth in mobile subscriber numbers, it was felt that the time was ripe for SKMM to provide a competition-enhancing regulatory impetus to further boost the competition levels and benefit the consumers at the same time.

MNP is best implemented in a mature mobile landscape where there are strong service providers and high penetration rates. For example, it might not be timely for countries where mobile penetration is too low around 20% to 30%. Malaysia has reached a stage where the introduction of MNP would be a timely boost for competition as the mobile sector is progressing steadily with the three leading mobile service providers having a strong market share. The arrival of MNP has the potential to stir up the market and bring further efficiencies and as a result this would benefit the consumers. At the same time if aptly prepared, the new fourth mobile service provider will also have a better chance to compete in such an environment.

#### The Road to MNP

As Goethe succinctly puts it, "...mountains cannot be surmounted except by winding paths..." and from the inception, all parties involved understood that the road to MNP was never going to be a walk in the park. The regulator must first have the will and resilience to see the idea to its implementation and that should manifest itself in the clear directions provided to the industry, the strong support provided to the MNP project team and the ability to obtain buy-in from all stakeholders, especially the industry, since the implementation of MNP would involve a considerable amount of resources being expended.

SKMM showed the necessary will and push towards getting this idea off the ground by establishing a special unit dedicated for MNP called the Number Portability Management Unit (NPMU) in May 2007. This project team was tasked to implement MNP in Malaysia and to work on all matters relating to MNP. This included the review of existing regulatory framework, the drafting of new laws/regulations/instruments, the promulgation of industry codes of practice & technical specifications, leading various working groups and sub-committee meetings with the industry. The team need also to monitor the progress made by all parties during the build phase including the inspection and verification of the same, coordinate the test activities during the Test Phase and closely monitor the progress made by all parties towards MNP launch readiness.

#### Laying the foundation

It is the national policy objective of the Malaysian Communications and Multimedia Commission (SKMM), as enshrined under Section 3(2)(d) and (e) of the Communications and Multimedia Act 1998, to regulate for the long term benefit of the consumer and to promote consumer confidence in service delivery from the industry.

To get the ball rolling, a Ministerial Direction on Number Portability was issued by the Minister for Energy, Water and Communications instructing SKMM to undertake the effective implementation of mobile number portability. SKMM then undertook a study on the viability of and method for the implementation of MNP in Malaysia, taking into consideration the implications and impact to the industry as a whole, the mobile service providers and also the consumers.

In parallel with the study, SKMM also carried out a public inquiry (PI) on the implementation of MNP and subsequently, the comments which were received pursuant to this PI were used by SKMM in determining the most effective way of implementing mobile number portability in Malaysia.

The PI exercise enabled SKMM to identify the following preferred technical solution and method of operation for the clearinghouse:

- (a) a centralised clearinghouse will function as a reference database and order processing engine;
- (b) All-Call-Query (ACQ) routing will be used whereby each Service Provider will set up its own mirrordatabase to determine the latest porting status of the party being called; and
- (c) an independent third party will be appointed to build, operate and manage the MNP clearinghouse.

It was also essential that a review be conducted by the SKMM on the existing regulatory framework so as to :

- (a) introduce legally-binding provisions in relation to the implementation of MNP and the requirement for all relevant parties to support the same;
- (b) ensure that the implementation of MNP will complement and will not contradict existing laws for example in relation to numbering assignment and allocation, transfer of assigned numbers, access etc.; and
- (c) recommend amendments to the existing laws in the event that any contradictions as stated above are identified.

Towards that end, the SKMM created an internal Regulatory Review Task Force which looks into the introduction of relevant regulatory instruments/documents including but not limited to the drafting of a chapter on MNP in Numbering & Electronic Addressing Plan, Numbering Regulations, various guidelines and other relevant instruments which are essential for the implementation of MNP. NPMU worked closely with the industry task force on regulatory review and when necessary compare notes in ensuring that all relevant issues are addressed in proposing the regulatory framework for MNP.

#### **MNP Implementation**

While the MNP is simple in its concept, the efforts towards its implementation are complex. While the technical aspects of the implementation already provide the implementor with a formidable challenge, the biggest challenge faced by the regulator actually lies in having the heart, will and resilience to manage the process of obtaining buy-in and in most cases working out consensus amongst service providers who are also fierce business competitors. Ensuring adherence to the strict timelines with so many parties involved, each with different internal processes, network systems, solutions and various platforms would rank a close second.

An apt sports analogy to describe MNP implementation, at least for the members of the NPMU, would be to say that it is akin to sprinting in a marathon while playing a game of chess along the way.

Because there are many possible methods of implementation, different countries have taken different routes towards MNP implementation depending on the circumstances in each particular jurisdiction. Malaysia appointed an independent third party to run the MNP Clearing House meaning that it is not owned and run by the service providers themselves. It was felt that at this particular stage of MNP implementation in the interest of efficacy and timeliness of launching, the initial setting up and operations of the MNP Clearinghouse would best be handled by an independent third party. Based on the experience in other jurisdictions, this could offset some foreseeable delay and squabbles if service providers were to establish a consortium to run the clearinghouse. Among the major issues that usually crop up would be the control and shareholding in the said service provider-run clearinghouse and the division of costs amongst them. An independent third party-run clearinghouse would also help alleviate the worries amongst service providers about the handling of sensitive information.

Talian Gerak Alih (TGA) was the company selected by SKMM to build and operate the clearinghouse in Malaysia and its technology partners include Telcordia Technologies who is the biggest Operations & Systems Support (OSS) player in the world and also Unified Communications Sdn Bhd as systems integrator. Telcordia has clearing house operational experience in the US dating back twenty years. Today it is a leading global provider of telecommunications network software and services for the communications industry. Internationally, Telcordia has the most experience in MNP implementation. It has the software to run MNP and its extensive experience makes it the domain expert in this area.

#### Close engagement with the Industry

Realising the importance of constructive engagement with the industry, SKMM initiated the establishment of the Mobile Number Portability Steering Committee (MNPSC) which is chaired by the Chairman of SKMM with members consisting of the CEOs of the industry. It is within the MNPSC that high level decisions in relation to the implementation of MNP are discussed and made. It is to be noted that if the initiative was purely regulator-driven and devoid from industry buy-in, a longer time frame would have been a strong possibility and in most such cases, the costs for implementation would also be higher.

Under the MNPSC, the Industry Working Group on MNP (IWG) was formalised and it consists of senior officers of the industry together with SKMM. It is under this IWG that efforts in relation to the operationalisation of MNP is conducted through the Technical Sub-Committee, Commercial Sub-Committee and Consumer Awareness Sub-Committee. A few niche industry task forces were also created under the Sub-Committees to deal with specific issues such as the review of the regulatory framework, the drafting of the MNP code of practice, the study on the costing proposal for the MNP clearinghouse establishment and cost allocation to industry etc.

Extensive backend work and consultation between SKMM and all stakeholders were necessary before MNP could take off. The Industry Working Group and its subcommittees met often, sometimes up to 4 days a week, throughout the implementation period. The aim was to ensure that by the time MNP was implemented, the systems would work without hitches and that Malaysia would have an efficient yet robust system.

Another interesting point that not many people are aware of is that the fixed line service providers also played an integral role in making MNP happen. Their existing legacy networks meant that upgrading work had to be carried out. The effort to ensure that all their points of interconnect, which are interspersed throughout the country, was MNPready was in itself no mean feat.

#### Phases of Implementation

In general, the implementation of MNP in Malaysia was based on the following phases :

#### **Plan Phase**

This phase comprises tasks related to regulatory activities, clearinghouse operator selection, initiation of discussions on contracts & agreements, finalisation of industry codes of practice and technical requirements and all other planning activities required to support MNP implementation.

#### **Build Phase**

This phase encompasses tasks in connection with network upgrades, updates to information systems, establishment of primary and secondary data centre facilities and clearinghouse platform installation and deployment.

#### **Test Phase**

This phase can be generally sub-divided into user acceptance testing, defining test standards, inter-operability testing, including end-to-end operations readiness testing.

# **MOBILE NUMBER PORTABILITY**

![](_page_24_Figure_1.jpeg)

![](_page_25_Picture_0.jpeg)

#### **Launch Phase**

The launch phase was divided into 2 sub-phases, namely the limited live trial (LLT) from 29 August 2008 and the full nationwide launch which commenced on 15 October 2008.

Upon completion of the Plan, Build and Test Phases, SKMM decided to commence the launch phase with a limited live trial from August 29, 2008 to October 14, 2008 before going nationwide. SKMM wanted to take a measured approach in launching MNP to ensure that implementation will be smooth and all potential glitches can be addressed and managed.

SKMM also took a leaf from the experience of some other jurisdictions which showed that jumping headlong into launching MNP on a wide scale may result in undesirable consequences such as calls not being able to be made. During this period, SKMM limited the porting activities to only 5 centres in the Klang Valley for each mobile service provider and each of them were only allowed to accept 100 port requests per day.

MNP was launched nationwide on 15 October 2008 and SKMM will continuously monitor the implementation of MNP on the ground with a view to further improve service delivery to the consumers. On the horizon would be a review initiative to shorten the time frame for porting; the introduction of measures which will allow for tariff transparency and also the review of current processes so that it can be further improved.

#### End note

The journey towards the launch of MNP was indeed tough and arduous but it was also a very rewarding one. It showed that the regulator and the industry could indeed work together to bring something good for the consumers at large. The journey to MNP showed that the regulator and the industry could come together to cooperate and implement projects while keeping an open mind on the benefit of constructive debate, tolerance of differing viewpoints and the diversity of thought.

It is credit to the industry that everyone sat down together, put their noses to the grindstone and worked towards making MNP happen. Along the way resources and knowledge were shared and at the same time life-long friendships were made.

The cooperation showed towards implementing MNP in Malaysia was a snapshot of our telecommunications industry at its best – mature, progressive, dynamic yet also consumer-centric. If this is the sign of things to come, we are in for a fantastic ride indeed.

It is to be noted that together with the policy impetus provided by the Government, the active participation and cooperation by the industry has been key in ensuring the success of the implementation of MNP in Malaysia. In that respect, the Malaysian experience may add valuable information to the body of knowledge on MNP already available.

> Adrian Abdul Ghani has since left SKMM. Zakiah Ali is a Deputy Director at SKMM. She can be reached at zakiah@cmc.gov.my Badaruzzaman Mat Nor is an Assistant Director at SKMM. He can be reached at badaruzzaman@cmc.gov.my

![](_page_26_Picture_0.jpeg)

## Launch of MOBILE NUMBER PORTABILITY 15 October 2008 Putra World Trade Centre

# VOUR VOUR NUMBER. VOUR YOUR HOICE.

Mobile phone users can now enjoy the freedom of switching network service providers without having to forego their original phone number (including the prefix).

Mobile phone users can refer to the frequentlyasked-questions on MNP at the Malaysian Communications and Multimedia Commission website at www.skmm.gov.my and the websites of all mobile service providers to find out more about the service.

![](_page_26_Picture_5.jpeg)

![](_page_26_Picture_6.jpeg)

![](_page_27_Picture_1.jpeg)

# WiMAX@2.3GHz and its DNA for wireless broadband

Michael Lai explains where the WiMAX technology fits into the wireless landscape

he Internet landscape in Malaysia has certainly come a long way from the very beginnings, when dial-up Internet access was first made available in the mid-1990s. Dial-up Internet access rides on existing telephone systems, and gave speeds of up to a then zippy 56 kilobits per second – though for we used to subsist on slightly under or over half of that (28.8 Kbps and 33.6 Kbps was common).

(Yes, I bet you still remember that chirpy dialing tone that your dial-up modem makes when you've successfully connected to the Internet.)

For the uninitiated and the young (or those who simply have trouble recalling), the shape and form of the Internet back then was – yes, you guessed it right - primarily text and low-resolution graphics. I remember using the Internet primarily for email, surfing text-based websites, with a smattering of pictures, chatting via IRC and ICQ as well as going on discussion bulletin board systems (popularly referred to as BBS) to exchange thoughts and opinions on various topics of interest.

As the 1990s flashed by, the Internet began to grow by leaps and bounds. Text and graphic gave way to more interactive forms of displaying content. Flash-driven websites started popping up, and everyone was touting video-conferencing as the way forward in enhancing business efficiency and competitiveness. E-commerce literally exploded – Amazon and eBay became the poster boys (or rather, men?) of the Internet.

And all of a sudden, dial-up speeds just could not cut it, especially when you have so much shopping, selling, networking and learning to do.

![](_page_28_Picture_0.jpeg)

Samsung WiMAX Devices

When broadband services were first announced in the early 2000s here, Malaysian Internet users heralded a new era in becoming digital natives. Never mind the restriction it had – you had to be in specific areas to enjoy 256 Kbps to 1.0 MBps download speeds – everyone was clamouring to be on the information superhighway, on what was then the fastest ride around.

#### The wireless revolution begins

By the mid-2000s, Malaysians had begun to experience "untethered" Internet access in the form of WiFi. WiFi is a short range radio frequency system that uses unlicensed spectrum to provide access to a network. It typically covers only the network operator's own property. WiFi is used by an end user to access to Internet or a peer-to-peer network.

Since the beginning of WiFi, users are required to sit at a restaurant and start surfing after they paid for their food. Short coverage distance, insecure online and slow surfing experiences can sometimes be frustrating and annoying. The introduction of WiMAX, the next generation technology, appeared to address these issues and offered a better alternative to the users.

WiMAX, short for Worldwide Interoperability for Microwave Access, is a standards-based technology for providing last mile wireless broadband access as an alternative to wired broadband such as cable and DSL.

There are three variants that WiMAX 802.16e can offer: fixed, nomadic and mobile. Fixed WiMAX serves users at one location or stationary users at different places, nomadic WiMAX allow users to get connected in a portable way and mobile WiMAX which supports easy hand-off between base stations just like mobile phones. The latter is thus highly suitable for users on the move.

Development of the technology and interoperability between different vendor's WiMAX equipment is governed by the global WiMAX Forum (www.WiMAXforum.org/ home).

To delve deeper into the nitty-gritty, WiMAX is a longrange system, covering many kilometers that typically uses licensed spectrum (although it is also possible to use unlicensed spectrum) to deliver a point-to-point connection to the Internet from an Internet Service Provider (ISP) to an end user.

#### The WiMAX DNA – How it all fits

The arrival of wireless broadband had in recent years revolutionised communications. Now, the next big wave, WiMAX, is set to change the broadband landscape even more, making it mobile and personal. One of the key factors to ensure this happens is the emergence of a vibrant and cohesive ecosystem which will ultimately determine WiMAX's success on the world stage.

The WiMAX DNA (Device, Network and Application) is eminently better-suited for widespread adoption than 3G was at its inception, derived from a suitable infrastructure which will maximise access and adoption.

WiMAX is set to define the next wireless frontier by virtue of it being IP-based and the vast amount of content people can tap into immediately.

When we talk about the WiMAX ecosystem, it is important to remember that WiMAX itself forms a crucial part of the ecosystem for many other industries, including businesses, entertainment and scores of others. That the WiMAX ecosystem becomes invariably intertwined with any industry that will benefit from reliable, high-speed and pervasive connectivity is beyond question. The question is how these other industries are geared for the global connectivity revolution (as the Yankee Group calls it) and what they are doing to support the WiMAX ecosystem. We are entering a brave new world of telecommunications and the firms that will thrive will be those who embrace it.

Thus, we must remember that the WiMAX ecosystem consists of more than the sum of its parts and exists not only for and in itself but is a key catalyst to move the industries of the future. This is the real WiMAX ecosystem. In expanding the WiMAX ecosystem, the worldwide deployment of WiMAX must take place as planned in order to capitalise on the momentum afforded by its time-to-market advantage in terms of standards and commercial availability.

WiMAX is now at a level of consumer readiness which is very impressive and can scale to millions of users and beyond with inexpensive equipment, requiring no service provider subsidies and not economically burdensome if subsidised. In the long range plan, WiMAX is the technology to bridge the digital divide. The wide coverage of WiMAX base stations will eventually prove its capability in increasing the broadband penetration in Malaysia.

A virtually limitless amount of content on the Internet today is IP-based and this is exactly the technology on which WiMAX is based. It means that the Internet is a readily available resource pool for any WiMAX user and Web 2.0 will only accelerate this phenomenon. In essence, anything that is developed for the Internet is developed for WiMAX. Out of the eight largest telecommunications vendors, seven are supporting WiMAX deployment, including Alcatel-Lucent, Motorola, Nokia Siemens, etc. WiMAX devices will be relatively cheaper than other telecommunications equipment because of its open ecosystem from day one.

![](_page_29_Picture_0.jpeg)

#### Nokia N810

Big players like Intel, Alcatel-Lucent, Nokia, Motorola, and many more have bet their company's future on WiMAX and many see WiMAX as the next frontier for wireless connectivity and communications. In terms of device vendors, where there were zero in 2007, there are now over 60 in 2008, with over 520 service providers rolling-out WiMAX services in various stages of deployment today. Soon, WiMAX chips will be embedded into every conceivable consumer electronic device - from mobile handsets, gaming consoles, PDAs, digital cameras, and home entertainment systems – which you can, and will buy. WiMAX will then achieve critical mass as prices fall and adoption skyrockets, making it truly ubiquitous in every facet of our lives.

WiMAX will enable us to download and upload data instantly on the move using WiMAX-enabled devices without being tied down by wires. It means impressive access speeds, reliability and rich features will enable even the most inexperienced user to quickly and accurately find the information they require. It also looks set to support many new applications not presently viable with today's access speeds. Just imagine, being able to upload instantly pictures you had just taken to your Facebook site for example, or being able to download and share MP3s with your friends wherever you are!

## The importance of the WiMAX ecosystem

So why is the WiMAX ecosystem so important? Consider the impact to a country: having high-speed broadband in Malaysia would create many job opportunities because it would help spur local digital-content creation and attract foreign direct investments. Korea is a good example, using broadband to dig itself out of recession. Foreign investors now always scrutinise a country's broadband speed when they decide on whether or not they want to do business with the nation and the benefits of having such a facility for the people and the nation are expected to be worth many times that investment. Another great example is the M-Taiwan project, a national programme to boost the nation's e-competitiveness where the entire country is gearing up to embrace WiMAX.

What do we need for all these to be effective? Firstly, a mindset change. For example, people have to start thinking

about not just working inside an office building but as working anywhere the Internet is -- which is now everywhere. The question for most people would no longer be "Where can I connect?" but "When do I want to disconnect?" In fact, it is unlikely that anyone will need or want to be disconnected in the future. The challenge is in getting people to get interested in WiMAX, adopt it and then to a point where they no longer even think about it because it would have become so ingrained in their lives.

At the heart of it, WiMAX is about life, not technology. The communities that develop it will mobilise the Internet and bring about a sea-change in the landscape of broadband. As WiMAX-embedded devices become more commonplace, people will not only adapt to WiMAX, but demand it in their daily lives. When WiMAX enabled gadgets do become available to the masses, the need for any form of wired communication would soon diminish and eventually we can truly live as a wireless society.

It is not far-fetched to say that we are on the crucible of a new wave of innovation, brought upon by a WiMAXenabled future. Applications may be integrated with devices; imagine being able to access the iTunes store from wherever you are with your new WiMAX-enabled iPOD. Why did a whole ecosystem spring up around the iPOD? Simple, it was cool, easy to use, and ultimately ubiquitous. WiMAX needs to have the same qualities to advance its own ecosystem.

Thanks to the foresight of the Malaysian Government in issuing the WiMAX 2.3GHz spectrum license in early 2007, this has put Malaysia on the world map as one of the pioneers in WiMAX technology. Malaysians should take this opportunity and strive to make Malaysia a WiMAX hub in the region.

Thus, I am very hopeful of the future. My children are examples of digital natives. Digital natives are your typical Facebook-loving, photo-sharing and Web messaging folk. More and more Malaysians are transforming themselves into Web denizens – and I am certain that it will be a matter of time before the majority of Malaysians start living the same way, after realizing the many benefits of the Internet.

One thing is clear as borne out by history however; and that is change is inevitable, extinction is optional.

"The future is here. It's just not widely distributed yet." - William Gibson.

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![](_page_30_Picture_1.jpeg)

# WILL COGNITIVE RADIO TAKE OVER SPECTRUM MANAGEMENT?

Mohd. Hasbullah Omar, a lecturer from Universiti Utara Malaysia, is currently doing Ph.D. research and is on attachment with SKMM. He examines a new frontier of radio technology and the challenges regulators could face from it.

obile radio systems have shown rapid growth and hence have increased the awareness for more efficient use of spectrum. With the advancements of technology, the development of radio systems which are dynamic and efficient in terms of spectrum usage can be realised.

Cognitive radio coined by Joseph Mitola is one of the advancements which may enhance the adaptive capabilities of radio systems and may contribute to more efficient, versatile and flexible use of spectrum.

It is based on software-defined radio with added intelligent signal processing, ideally based on logic, analysis and intuition, though early cognitive radios need not meet that level of sophistication. Cognitive radio has the ability to sense its surrounding environment and detect spectrum holes or white spaces, namely unoccupied frequencies, which it can use, rather than a fixed frequency assigned to it by the spectrum manager or regulator, as is currently the case.

For example, different sets of frequencies are currently assigned to radio and TV in different towns to prevent cochannel and adjacent channel interference but cognitive radio will detect which frequencies are currently in use within its vicinity and only use those frequencies which are unoccupied.

Cognitive radio was designed to address problems of spectrum scarcity in the Very High Frequency (VHF) and Ultra High Frequency (UHF) bands, especially since these bands are the sweet spot in the radio spectrum as it is preferred for use by FM radio and TV broadcasting, mobile cellular communications, wireless LAN and WAN for their good propagation characteristics due to less multi-path fading and better signal coverage.

Besides that, the UHF band includes the 2.4 GHz, Industrial, Scientific and Medical (ISM) band which besides ISM devices are populated with WiFi, Bluetooth, cordless phones and short range communications while amateur radio operators use several frequency blocks within the UHF band. Although fully allocated to these services, there are still holes or white spaces which the cognitive radio can take advantage of.

#### **Technology for the future**

Cognitive radio was developed for use by the United States military and is not yet available for commercial use just yet.

In December 2003, The Federal Communications Commission (FCC) released a notice of proposed rule making and order number FCC 03-322 to address the cognitive radio development.

According to FCC, cognitive radio systems can be deployed in network-centric, distributed, ad hoc, and mesh architectures, and serve the needs of both licensed and unlicensed applications. For example, cognitive radios can function either by employing cognitive capabilities within a network base station that in turn controls multiple individual handsets or by incorporating capabilities within individual devices.

In November 2004, the Institute of Electrical and Electronic Engineers (IEEE) formed the IEEE 802.22 Working Group to define a wireless air interface standard based on cognitive radio.

The working group is chartered with the development of a cognitive radio based Wireless Regional Area Networks (WRAN) Physical (PHY) and Medium Access Control (MAC) layers for use by license-exempt devices in spectrum that is currently allocated to the Television (TV) service.

IEEE 802.22 has specified that the network should operate on a point to multipoint basis (P2MP). The system will comprise base stations (BS) and customer-premises equipment (CPEs) and also Access Points.

![](_page_31_Figure_9.jpeg)

🗖 Cognitive Radio Mesh Network Access

In coordinating the work of Cognitive Radio, IEEE has created IEEE Standards Coordinating Committee 41 (SCC41) to address the issues related to the deployment of next generation radio systems and advanced spectrum management. The IEEE SCC41 was later preceded by IEEE 1900 task force which started in the first quarter of 2005. This task force consists of IEEE Communications Society and IEEE Electromagnetic Compatibility Society. In April 2007, the IEEE Standards Board approved the reorganisation of the IEEE 1900 effort as Standards Coordinating Committee 41 (SCC41), Dynamic Spectrum Access Networks (DySPAN).

The IEEE SCC41 is divided into four working groups (WGs) initially and added two more working groups to it. Each of the WG is responsible to formulate standards for different aspects of cognitive radio denoted as IEEE 1900.x. The six WGs and their responsibilities are listed in Table 1.

Working Group	Responsibility	
IEEE 1900.1	Standard definitions and concepts for spectrum management and advanced radio system technologies.	
IEEE 1900.2	Recommended practice for inter- ference and coexistence analysis.	
IEEE 1900.3	Recommended practice for confor- mance evaluation of software defined radio software modules.	
IEEE 1900.4	Coexistence support for reconfigur- able, heterogeneous air interfaces.	
IEEE 1900.5	Policy language and policy architec- tures for managing cognitive radio for dynamic spectrum access.	
IEEE 1900.6	Spectrum sensing interfaces and data structures for dynamic spectrum access and other advanced radio communication systems.	

Table 1 IEEE 1900 Working Groups.

Malaysia is closely monitoring its development both at the IEEE level as well as at the International Telecommunication Union (ITU) which is expected to move forward on the definition of cognitive radio and its implementation issues at the World Radiocommunication Conference in 2011 (WRC11). SKMM has also funded some research into this area in its collaboration with the Universities to understand its impact to spectrum use and its management.

Currently cognitive radio and its issues are being discussed by ITU Working Party 5A under the title of Cognitive Radio Systems in the Land Mobile Service and tentatively, it has provided a rough idea of what cognitive radio is:

"A radio system that has the capability to sense and be aware of its operational environment, to be trained to dynamically and autonomously adjust its radio operating parameters accordingly and to learn from the results of its actions and environmental usage patterns."

#### **Cognitive Radio Specifications**

However, some of the characteristics and specifications of cognitive radio can be outlined, as there have been many experiments to facilitate the standardisation of cognitive radios, the characteristics and specifications of which are described in the foregoing text.

#### **Operating Frequencies**

Cognitive radio is a possible solution to accommodate the lack of frequency resource in the VHF and UHF spectrum bands. The frequencies of electromagnetic waves in the VHF band ranging from 30 MHz to 300 MHz, while in the UHF band they range from 300 MHz to 3 GHz.

#### **Cognitive Techniques**

The key enabling technologies of cognitive radio networks are cognitive radio techniques which enable it to share the spectrum in an opportunistic manner and based on the definition of cognitive radio, its two main characteristics are:-

- **Cognitive capability**: using real-time sensing of the radio environment, spectrum holes or white spaces that were unused at a specific time or location can be determined. Therefore, the best spectrum can be selected, shared and exploited without interference to the licensed user.
- Autoconfigurability: taking advantages of cognitive radio evolved from the software defined radio, it should be able to be programmed to transmit and receive various frequencies and use different access technologies available. Therefore, the best spectrum band and its operating parameters can be selected and reconfigured.

Cognitive radio will most probably also use Multiple Input, Multiple Output (MIMO) and Orthogonal Frequency Division Multiplexing (OFDM) techniques.

![](_page_32_Figure_10.jpeg)

MIMO or Multi Input Multi Output (a technique in the use of multiple antennas to improve communications data throughput and link range and reliability)

OFDM is a modulation technique used widely in wideband digital communications, whether over wireless or wired. OFDM techniques are found in digital terrestrial

![](_page_32_Figure_13.jpeg)

CR Ad Hoc Network Access

television and audio broadcasting, wireless networking and broadband Internet access systems.

Such techniques use many slowly-modulated narrowband signals rather than one rapidly-modulated wideband signal. This makes handling of frequency selective channel conditions much more simplified. OFDM has distinct advantages over the single-carrier wideband schemes as it has the ability to cope with severe channel conditions – namely, attenuation of high frequencies in a long copper wire, narrowband interference and frequency-selective fading due to multipath fading.

Low symbol rate makes the use of guard interval between symbols reasonable, making it possible to handle time-spreading and eliminate inter-symbol interference (ISI). The mechanism also facilitates the design of singlefrequency networks, where several adjacent transmitters send the same signal simultaneously at the same frequency, as the signals from multiple distant transmitters may be

![](_page_32_Figure_18.jpeg)

A typical example of OFDM-subcarriers as opposed to use of just one carrier as in the upper graph; each sub-carrier carries lower symbol rate data.

![](_page_33_Figure_0.jpeg)

🖥 Ubiquitous Heterogeneous Cognitive Radio Network

combined constructively rather than interfering as it would typically occur in a single-carrier system.

Cognitive radio will also be treated as a secondary user of spectrum, which will have to vacate the band if primary users start using it.

For example, a cognitive radio detects vacant spectrum in a band licensed to a 3G service provider and it uses it. Then a 3G subscriber makes a call from his or her phone, so the cognitive radio must vacate that band and hop to another vacant band.

It senses spectrum use or occupancy every 20 ms or 50 times per second and while its time to response has not yet been finalised, it should ideally be immediate.

In order to have a workable cognitive radio network, the cognitive radio system should accommodate spectrum sensing, spectrum management functionalities, support mobility and spectrum sharing. These functions must be incorporated in the design of any cognitive radio system to meet the definition of cognitive radio. The details of the function are described below:-

• **Spectrum Sensing**: detects the unused spectrum and uses it without causing harmful interference with other users. The cognitive radio device should sense the spectrum holes by detecting whether the primary user is using specific spectrum. This technique can be classified into three categories: transmitter detection, cooperative detection and interference based detection.

- **Spectrum Management**: this function deals with capturing the best available spectrum to meet the secondary user communication needs. The cognitive radios should decide on which spectrum bands are the best to meet the quality of service (QoS) require ments based upon all available spectrum bands. Therefore the function should assist the cognitive radios to do spectrum analysis and spectrum decision.
- **Spectrum Mobility**: this is a process where cognitive radio users change its operating frequency. The cognitive radio network's target is to use the spectrum in a dynamic manner by allowing the radio terminals to operate in the best available frequency band while maintaining seamless connection during the transition to better spectrum band.
- **Spectrum Sharing**: the function provides fair spectrum scheduling method. A major challenge in the open spectrum usage is the spectrum sharing where issues of interference would probably triggers the primary users. It is similar to the generic medium access control (MAC) problems in the existing networking system.

#### So are regulators redundant?

The distinctive and intelligent features of cognitive radio do raise the question as to whether cognitive radio can take over the spectrum management functions from communications regulators.

![](_page_34_Figure_0.jpeg)

Inter-Symbol Interference (ISI)

Inter-Symbol Interference (ISI) – shows overlapping signals from adjacent symbol or signals; main cause of errors in digital communications

The answer is no. The role of the regulator is still needed and its role is necessary to provide regulations, which would facilitate the use of cognitive radio. It cannot take over the role of spectrum management in the near future; since fully fledged cognitive radio will not be available until beyond the year 2020 but will improve utilisation of unoccupied spectrum. Also, while it efficiently uses spectrum, it poses a challenge to regulators to mitigate interference caused by this technology.

It will be difficult if not possible to know who is using a cognitive radio, since everything is software defined and is opened to tampering. For example, a user can create their own channels and provide their own network services within the unoccupied spectrum spaces.

In a study of Cognitive Radio Technology, conducted by QinetiQ on behalf of the United Kingdom regulator, the Office of Communications (Ofcom), it was determined that it will be difficult to know who is operating a cognitive radio, since it often hops between frequencies, much like a computer hacker use of proxy servers, which makes him or her difficult to be detected, so regulators worldwide are approaching cognitive radio technology with caution.

Manufacturers can also be required to observe standards or regulatory rules and ensure that their devices do not interfere with licensed spectrum users. This approach has already been used globally for most communications equipment in the form of product certification or type approval.

In the Malaysian context, three license categories for spectrum use may be applied – namely, Spectrum Assignment (SA), Apparatus Assignment (AA) and Class Assignment (CA) and cognitive radio could be licensed under AA or CA depending on the transmitted power, potential interference and limits of its configuration capability or behaviour.

CA applies to a person who wants to use communications devices or equipment in a specific frequency band on non-interference, non-exclusive or sharing basis. Thus, it is more suitable for licensing low power cognitive radio equipments. However, further studies need to be done in order to properly map the cognitive radio device behaviour to suit the license or assignment category.

One possible protection against abuse of cognitive radio by malicious users is to require the cognitive software to be locked and embedded into the chip or hardware, and encrypted to make it difficult to temper with.

Software in cognitive radio devices can also be remotely updated on-air, much like with the set-top boxes used with satellite TV and terrestrial TV services, since any software modifications made to the box will be overwritten by the software upgrade. This provides the flexibility to update and continuously improve the software and service without the need for a recall.

Basically, the main role of regulators is to ensure that cognitive radio devices don't interfere with the existing licensed services and if it happens, how to deal with it. Although cognitive radio technology is said to be able to self manage spectrum usage, regulators around the world are looking at it cautiously. There are still many issues that need to be resolved before the technology is actually implemented for commercial use. This technology could change the way spectrum is managed in the future.

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![](_page_35_Picture_1.jpeg)

# DEVELOPMENT OF A MALAYSIAN DIGITAL TV SET-TOP BOX

Mohammed Hakim Othman of SKMM has details of the initiative to bring terrestrial digital TV to our homes.

alaysians are pretty familiar with set-top boxes (STB), especially from the time Astro, Malaysia's first direct-to-home broadcast satellite TV service, was launched about 12 years ago in 1996. Today, Astro viewers can enjoy a choice of up to 80 TV channels, 17 radio and four pay-per-view channels.

Malaysians are also well accustomed to digital TV, since Astro's signals are Digital Video Broadcast – Satellite (DVB-S) compliant and are compressed using MPEG-2 (Moving Picture Experts Group-2) standards in Standard Definition (SD) of 720 x 576 pixels in a 4:3 aspect ratio and with Dolby Digital 5.1 surround sound.

However, Astro is a pay-TV service and its signals are encrypted, so only Astro subscribers with the requisite SIM card inserted in their STB can view its programmes.

In 2004, the Malaysian Government endorsed and soon after allocated funding for a pilot project trial of Free-To-Air (FTA) digital TV broadcasts based on the DVB-Terrestrial (DVB-T) standard. In 2005, the communications and multimedia regulator, the Malaysian Communications and Multimedia Commission (SKMM), allocated spectrum in the UHF band to trial broadcast digital terrestrial TV in the Klang Valley - a highly developed urban area, including the capital Kuala Lumpur and all the way to Port Klang on the coast, in which one quarter of Malaysia's population of about 26.45 million persons reside.

A year later, Malaysia's public-sector broadcaster Radio Television Malaysia (RTM) commenced the pilot trial and allocated 2,000 set-top boxes distributed to selected households in Kuala Lumpur and the surrounding areas. Four digital TV channels were made available daily from 7pm to

![](_page_35_Picture_9.jpeg)

Electronic Programme Guide (EPG)

midnight including RTM1, RTM2, Arena and Muzik Aktif. Digital radio services were available from 9am to midnight via Radio Active channel which broadcasts RTM's seven analogue FM radio stations in the Klang valley.

Similar to Astro, RTM has selected standard definition (SD) with a 4:3 aspect ratio and MPEG-2 video compression for the trial. An on-screen guide to scheduled broadcast television or radio programmes called Electronic Programming Guide (EPG) was also packaged in the trial.

On the trial Set Top box, a middleware system called Multimedia Home Platform (MHP) was chosen to provide interactive digital TV. MHP is an open middleware system standard designed by the DVB project for STB interactivity. The MHP enables user selection of programmes to view from the EPG. It also can be used to enable user selection of information services, games, interactive voting, e-mail, SMS, shopping and so on.

![](_page_36_Picture_0.jpeg)

MHP essentially specifies an application execution environment for digital interactive TV, which is independent of the underlying system hardware and software by using a Java virtual machine layer on top of the system software and with generic APIs (application programming interface) providing access to the interactive digital TV terminal's typical resources and facilities.

The interoperable MHP applications run on top of these APIs, while a Navigator-application – a part of the terminal software – lets user access all MHP applications and other DVB services, including TV and radio.

As of mid-2005, MHP's largest deployments were in Italy and South Korea (DVB-S), with trials or limited deployments in Germany, Finland, Spain, Austria and Australia.

But the main question remains: will MPEG2 compression, SD and MHP as demonstrated in the trial be adopted for the future digital terrestrial broadcasting specifications in Malaysia? The answer is; not quite.

#### Settling on MPEG-4

A newer compression technology has emerged and claims to be better in spectrum efficiency usage. Also known as H.264, MPEG-4 AVC is a video compression standard jointly developed by the International Telecommunication Union - Telecommunication Standardisation Sector (ITU-T) Video Coding Experts Group and the International Organisation of Standards/International Electrotechnical Commission - Moving Picture Experts Group (ISO/IEC – MPEG).

MPEG-4 compression is said to give up to twice the spectrum efficiency of that of MPEG-2. As spectrum is a limited commodity, MPEG-4 will bring up a huge benefit of freeing up significant amounts of spectrum in the VHF and UHF bands, and facilitate the opening up of more opportunities to provide new services.

As an example, a single SD service channel may require 4 Mbits per second (Mbps) but with MPEG-4 compression, the capacity may go down to half of that of MPEG-2. A UHF frequency channel of 8 MHz spectrum with a 19 Mbps throughput would allow up to 9 SD service channels compared to 4 SDs on MPEG-2. With this efficiency and benefits, SKMM has taken the initiative in 2006 to mandate MPEG-4 in parcel with mandating DVB-T standard as the Free to Air (FTA) Transmission of Digital Terrestrial Television.

The decision to mandate MPEG-4 was taken to avoid legacy issues in the longer term even though at this time MPEG-4 STB is still very limited and expensive in comparison to the established MPEG-2 STB. But in the long run, it will still be less costly to implement the higher cost STB right away compared to pulling back MPEG-2 STB from the market in the future and replacing it with the more spectrum efficient MPEG-4 STB then. However, with the rapid development of digital technology, it is envisaged that further upgrades in the adopted standards may be required.

On the positive side, many other countries in Europe and Asia have taken similar steps of requiring MPEG-4 compression for STB hence resulting in a faster drop of MPEG-4 STBs prices.

#### Multimedia Terminal Work Group

With the Mandatory Standard decided, further studies were required to work out detailed specifications of the STB so that importers and manufacturers could start importing

![](_page_36_Figure_14.jpeg)

or manufacturing compliant STBs for the market. The telecommunications and multimedia industry association, the Malaysian Technical Standards Forum Berhad (MTSFB) was given the responsibility of carrying out this task.

MTSFB was established as a private company limited by guarantee and one of its key objectives is: "To actively promote a co-operative environment to address in a timely manner national or international issues involving technical standards, technical codes and development of operational guidelines for Malaysian communications and multimedia industry." SKMM officially designated MTSFB on 27 October 2004 pursuant to Sections 94 and 184 of the Communications and Multimedia Act 1998. Its ordinary members include Maxis Broadband, Telekom Malaysia, DiGi Telecommunications, Time dotCom, ZTE, MiTV, Realm Energy, Measat Broadcast Network System, the standards body SIRIM, Masers Digital, DIS Technology Holdings, Smart Digital Communications, NTT MSC, telecommunications consultant Orbitage, high-altitude platform provider QucomHaps Malaysia and MIMOS Bhd.

Its associate members include Rohde & Schwarz, Nokia Siemens, Ericsson, Alcatel-Lucent, TMNet, Celcom, Motorola Technology, Electroscon, HAPS Network, AsiaSpace, National Advanced IPv6 Centre (NAV6), Packet One Networks, BT Multimedia, Panasonic R&D, ADA Cellworks and institutions of higher learning including Universiti Teknologi Malaysia, Universiti Putra Malaysia, University Teknologi MARA and Universiti Sains Islam Malaysia.

Several working groups were established under the MTFSB, including the Multimedia Terminal Work Group (MT WG) which was given the responsibility of developing the STB specifications.

Since every increase of functionality may increase the price of the STB, each specification had to be studied and debated thoroughly to ensure that the functions are justified and necessary to meet the needs of the viewers as well as the industry.

This challenge was successfully undertaken by the MT WG and a technical specification for FTA Terrestrial Television Receiver (STB) was submitted to SKMM in June 2008 after going through a public consultation. The specification was finally registered by SKMM and taken into effect on 13 August 2008. The following sections will highlight the significant functionalities included in the technical specifications.

#### Going HD

HD, in short for High Definition is the capability to display better resolution (minimum of 720 horizontal lines as opposed to 576 lines for SD) than the traditional SD which is the basis of the transmitted television services in Malaysia today. HD would be able to create a superior display presentation especially on big screen televisions for better watching or cinematic experience by viewers. Most of the LCD and Plasma Televisions available in the market are HD ready and can display in full widescreen aspect ratio of 16:9.

![](_page_37_Figure_8.jpeg)

Typical MHEG-5 STB Architecture

Currently, the only way to watch HD content is via HD DVD or Blu-Ray video playbacks. Hence with the capability of the STB to process HD signals, HD services would also be available via terrestrial broadcasting.

Nonetheless HD services would require higher bandwidth of around 8 to 12 Mbits per programme service channel when using MPEG-4 compression while MPEG-2 compression will require an entire UHF 8 MHz channel for a service channel. Since spectrum is a limited commodity, HD service channel would only be for unique services and SD service channels would still be necessary and dominant for the current compression capability.

#### MHEG-5

Though MHP was selected in the RTM trial, the MT WG which was also represented by RTM has selected MHEG-5 system instead for the middleware.

It must be noted that MHEG-5 does not have the processing power of the MHP which uses Java based technology. Also, MHP is designed by the popular DVB system from which the terrestrial system (DVB-T) has been adopted in many countries including Malaysia.

The reason then for choosing MHEG-5 middleware technology has to do more with commercial implications not only for end users, i.e. STB owners, but also for the broadcasters. Broadcasters will need to pay middleware licenses fee if they use MHP technology. On the other hand, no known license fee is being imposed either for FTA (Free to Air) or subscription broadcasters for MHEG-5, which is being promoted by IMPALA (The International MHEG Promotion Alliance). This, in effect, placed MHP at a disadvantage.

To counter this perceived disadvantage, it was announced in June 2008 that MHP will offer free licenses for FTA broadcasters. However this development has not impressed our local FTA broadcasters as a general survey indicates that they have the intention to also provide subscription services in the future.

For STBs, it appears that only a slightly more expensive one time license fee will be necessary for MHP as compared to MHEG-5. However other considerations such as complexity and the processing needs will contribute to make the MHP based STB appear as the higher cost option.

Nonetheless, at the end of the day, the price and availability of both middleware STB types lie in the take-up globally. Hence both middleware marketers are aggressively marketing each of their systems.

Currently, MHEG-5 is adopted by broadcasters in UK, New Zealand and Hong Kong and a few evaluations are ongoing in other countries. Freeview UK and New Zealand are two FTA brand names utilising MHEG-5 middleware.

#### **ASEAN Initiatives**

The ASEAN initiative on broadcasting is pioneered by the ASEAN Digital Broadcasting (ADB) cooperation. In technical terms, a harmonised technology is pursued to ensure economy of scale in bringing down equipment prices in STBs. The first success story was getting an agreement on adopting DVB-T standards by member countries. The ASEAN Ministers Responsible for Information (AMRI) has endorsed the decision taken by ADB in June 2007.

The next step was to have harmonised STB specifications among member countries which is currently ongoing. Naturally, the issue of middleware is among the heavily discussed subjects. A member country is pressing for MHP whereas some countries are observing the debate. In the ADB meeting held in Bali in Dec 2008, claims were made that DVB is prepared to drop all license requirements. However this announcement is yet to be confirmed. This move indicates that the battle for dominancy in middleware is expected to go all the way as it will probably determine the growth or survival of either middleware technology.

Currently at the time of writing, Malaysia is still at its present position of adopting MHEG-5 and will further conduct a wide industry trial in 2009 as well as monitoring and watching further developments in both middleware technologies globally.

#### **Conditional Access**

Conditional Access (CA) is a security feature in protection of content by requiring certain criteria to be met before granting access to the content. CA is required for subscription services. There are a few major vendors providing CA service including NDS, Conax, Irdeto, and NagraVision. One vendor might fulfill the CA requirement of a broadcaster better than another thus DVB has developed Conditional Interface (CI) for STB to interact with different CA vendors which would be embedded in modules called Conditional Access Module (CAM). CI was made a requirement in the technical specification.

The availability of the CI would enable the FTA STB to provide subscription services by inserting the CAM of the subscription broadcaster. It will avoid the need to have multiple STBs in a household to receive FTA and subscription services.

#### **Output Interfaces**

The primary output for the STB will be HDMI (High-Definition Multimedia Terminal) to match with the standard

![](_page_38_Picture_12.jpeg)

Samples of Conditional Access Modules (CAMs)

interface adopted in new TV sets. Though it is termed as HD, it is downward compatible and would be able to support on a single cable any TV or PC video format including standard, enhanced, and high-definition video along with up to 8 channels of digital audio.

The requirement also stated the need for the HDMI to have HDCP (High-Bandwidth Digital Content Protection) which encrypts the signal if required by the source. HDCP is a form of digital copy protection developed by Intel Corporation to prevent copying of digital audio and video content as it travels across the HDMI. More and more content developers and owners are requiring HDCP functionality to be provided by broadcasters before they would sell them their contents. HDCP is also seen as robust and reliable as FCC has approved HDCP as a "Digital Output Protection Technology" and European Information, Communications, and Consumer Electronics Technology Industry Associations (EICTA) announced that HDCP is a required component of the European "HD ready" label.

The secondary output would be the usual 3 RCA connecters Red, White and Yellow. Red would carry right audio, white would be left audio and video would be carried by the yellow connector. Dolby Digital AC-3 is also a requirement which is carried out through either optical and/or Coaxial Digital Audio Outputs. Other standard video and audio outputs than those mentioned above are optional.

Either USB (Universal Serial Bus) or RJ 45 data interface is required to perform software upgrades and interactivity. Lastly, an STB would not be complete without a remote control.

#### **Frequency Band**

DVB-T systems are designed for both VHF bands (Band III, 174-230 MHz) and UHF band (Band IV and V, 470-860 MHz). Thus the STB specification includes the VHF band as this has been included in the spectrum planning and reserved for future use of broadcasting. The GE06 Agreement (harmonisation agreement in Europe) has also allocated parts of the VHF band for Digital Terrestrial Television Services.

#### Integrated Digital Television (IDTV)

In a global development, convergence between STB and Digital Television called IDTV (Integrated Digital Television) has become prevalent among digital television

![](_page_39_Figure_0.jpeg)

Malaysian VHF Band III & UHF Band IV and V

manufacturers. Major names such as Sony, Panasonic, Philips, Samsung and others have shown great interest on developing IDTV. In effect, many have the opinion that at some point in the future, STB would be obsolete due to IDTV. However, certain other quarters feel that STB will remain simply because one does not need to change one's television set for a hardware upgrade on the STB portion.

Perhaps certain common functionalities will remain in IDTV and extra requirements will be available on purchase of STB. Or STB could be made into PCMCIA (Personal Computer Memory Card International Association) card size which would be inserted in television sets and which would be replaceable at any time. Even the relevancy of the "Set-Top-Box" term becomes a discussion point looking at the space available on top of the modern LCD or Plasma Televisions. Perhaps a better term would be SST (Set-Side-Box) or just digital TV tuner/receiver. Whatever the opinions; the debates continue. But one surety is that analogue TV switch-off is a certainty which has already been completed in some countries.

#### **Future Outlook**

MyICMS 886, the Malaysian strategic blueprint for the Information, Communications and Multimedia Services 2006-2010, identified Digital Multimedia Receivers (Set-Top Box) as one of 6 growth areas.

It is expected that the availability of low cost and wide range of choices for STB will stimulate the quick migration towards digital services reaching the desired penetration rate. Though the MyICMS goal for medium term (2008) of 60% household coverage has not been met, the momentum towards meeting the 2015 analogue shut off is still on target through the hope of shortening the very costly simulcast period. Simulcast is the period where both analogue and digital signals are broadcasted for every FTA service channel. Currently the price of STBs similar to the specification set out for Malaysia is still expensive. In New Zealand, an STB with MPEG 4, MHEG-5 and HD capability cost between RM800-RM1000. However, in South Africa, it is targeted at a price below US\$200 (RM700). As an economics rule of thumb, the longer a product is in the market and the bigger is the take up rate; the price will go down reciprocally. An observation done in Australia on MPEG-2 STB prices since 2001 show that prices have dropped to 5% of the original value in a period of 8 years and are still falling. It is expected that the prices of STB for Malaysia and globally will follow a similar trend.

Post 2009 sees the extension of the RTM initiated trial, albeit with the upgrading of MPEG-4 compression with HD capability. The extension trial, funded by SKMM, will include around a thousand STBs with MHEG-5 middleware. The transmission for the trial will be provided by Telekom Malaysia with the participation of other private broadcasters as content providers. The trial is expected to last a year followed by a national digital broadcast network roll out. Evaluation and testing will be done during the trial and if need be, the technical specifications for the STB will be reviewed at the end of the trial before the national digital roll out. As it is, there is already a functionality identified which may need to be reviewed in the STB specification. This is the CI functionality because a more secured CI+ is now available.

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![](_page_40_Picture_0.jpeg)

![](_page_40_Picture_1.jpeg)

USP Symposium on Communication Technologies for Underserved Communities 12 & 13 June 2008

SEREMBAN

#### **Universal Service Provision (USP)**

The Universal Service Provision (USP) project is an ongoing effort to promote the widespread availability and usage of network services and applications services by encouraging the installation of network facilities and the provision for network services and applications services in underserved areas and/or for underserved groups within the community ("universal service targets").

The ultimate goal of this project is to ensure that communities living in underserved areas are connected to mainstream Information and Communications Technology (ICT) development thus enabling and empowering these "connected communities" and bring about socio-economic development for those communities in the various sectors such as agriculture, education, health, business, amongst others.

![](_page_41_Picture_0.jpeg)

# **Technology for USP**

In the January 2008 issue, Md. Rusli Hj. Ahmad spoke about SKMM's role in bridging the digital divide under the Universal Service Provision programme. In this issue, he covers the USP Symposium on Communications Technologies for Underserved Communities which looked at choices of suitable technologies to achieve this objective.

he Universal Service Provision (USP) programme, a global programme championed by the International Telecommunication Union (ITU), strives to ensure that everyone is connected and isolated populations are not left out in the information age.

Left to private initiatives alone, these marginalised areas would be left out as they would not be commercially viable.

In Malaysia, the push to narrow the digital divide has been entrusted to the Malaysian Communications and Multimedia Commission (SKMM), the country's regulator for the communications and multimedia sector. The Government places great importance on bringing modern communications services to every corner of the country and since the turn of the millennium, SKMM has overseen projects that have steadily reduced the communications gap across underserved areas and groups within the community that were not served by telecommunications services through the implementation of the Universal Service Provision system.

The USP system is designed in accordance to Section 202 of the Communications and Multimedia Act 1998 (CMA 1998) which aims to promote the widespread availability and usage of network services and/or applications services throughout Malaysia by encouraging the installation of

network facilities, the provision of network services and/or applications services in underserved areas or for underserved groups within the community.

With regards to the determination of "underserved areas", SKMM will take into account the level of competition in particular areas or places; the availability of services in particular areas or places; and/or the commercial viability of installing network facilities or providing network services or applications services in particular areas or places.

Arising from the definition, an underserved area with respect to broadband access service would be areas where the broadband penetration is lower than the national average. Conversely, for public cellular service, this would typically represent population density of 80 people per square kilometer or lower where no cellular coverage is present whilst for the PSTN service; the underserved areas are those which are 20% below the national average.

As for the "underserved groups within the community", SKMM will consider such to be groups of people in served areas with similar characteristics as those that do not have collective and/or individual access to basic communications services.

An industry fund known as the "Universal Service Provision Fund" (USP Fund) was established, controlled and operated by the SKMM with the sole objective of bridging the digital divide.

#### **USP Symposium**

The inaugural USP Symposium on Communications Technologies for Underserved Communities was held in Seremban, Negeri Sembilan from 12 - 13 June 2008.

SKMM organised the symposium, the plenary opening session of which was witnessed by over 200 delegates from the communications and multimedia industry, representatives from the Federal & State Governments, technology experts, academia, and international speakers.

The 2-day symposium aimed to identify the right technology mix for the USP rollout to ensure that the universal services offered are adequate to cover the needs of the underserved communities targeted under the USP projects.

Among the objectives of hosting the event were:

- To seek collaboration and the views from technology experts in assessing and choosing the most suitable communications technologies for the USP rollout in rural and underserved areas;
- 2) To assess new approaches to increase Internet and basic telephony access to underserved areas using wireless and wired technologies;
- 3) To work around options of technology applications for electronic-community (e-community) development; and
- 4) To develop a new model for the USP project based on experience and past achievements in bridging the digital divide in other countries.

Topics presented throughout the symposium covered a variety of wired and wireless communications technologies which could reach people in rural, remote and underserved

![](_page_42_Picture_15.jpeg)

Some of the panelist speakers in action

areas, as well as technology applications for e-community development.

SKMM had also set up a special Technology Assessment Team (TAT) charged with the task of developing conclusive findings on the most appropriate technology to be used in USP areas, taking into consideration relevant factors such as technology limitations, availability of current services, costs, scalability and interoperability.

The TAT comprised selected internal and external members (from SKMM, academia, and community ICT practitioners) who are knowledgeable in technical and financial matters. They were tasked with conducting observation, assessment and analyses on the overall technology for USP project implementation. The TAT also collated comments, remarks, and additional inputs arising from the discussion sessions. This specialised team is led by Prof. Dr. Mahamod Ismail of UKM Pakarunding (a consulting unit from Universiti Kebangsaan Malaysia). Their final assignment was to recommend the most suitable communications technology for USP rollout to the underserved communities.

#### Technology options for USP

Multiple technologies were presented and recommendations were made on the different technology types, applications and usages.

For example, Alcatel-Lucent showcased technologies which could provide broadband for all based on their analysis of the situation in Malaysia, where 70% of the land

![](_page_42_Picture_23.jpeg)

mass is rural. It determined that e-Health, e-Education, e-Government, e-Entrepreneurship, e-Business, e-Agriculture, e-Employment, and e-Science could all be provided over a broadband platform which were required or important for social and economic growth.

One of the challenges is to set up broadband community centres in rural and underserved areas, which would enable the above services to be accessed.

Alcatel-Lucent proposed five business models for delivering services to rural and underserved communities via wired or wireless broadband.

First is a purely public sector model where access facilities are provided in post offices and schools; second is the development-NGO model such as the e-Tuk-Tuk used in Sri Lanka, where a notebook PC and multi-function device is installed on a light vehicle similar to Bangkok's motorised three-wheeler taxis called "tuk-tuks" in Thai or a light van, with Internet access provided over wireless broadband.

The e-Tuk-Tuk would travel around like a mobile cybercafé and let people use the facility for a small fee. The service provider would be trained to fully assist them in its use.

Third is a public-private model such as e-Seva, an e-Government service by the Government of the state of Andra Pradesh, India. These e-Seva centres operate privately and charge a fee for access to over 150 e-services besides e-Government, registration and bills payment services.

Fourth is the purely private model such as e-Choupal, also in India, an initiative by ITC Limited to link directly with rural farmers for the procurement of agricultural and aquaculture produce such as soybeans, wheat, coffee, and prawns.

ITC established computers and Internet access in rural areas across several agricultural regions of the country, where the farmers can directly negotiate the sale of their produce with it and bypass the middleman. It has 6,500 centres across nine states and covers 38,500 villages and a total of 3.5 million farmers.

The fifth model is a purely entrepreneurial model, such as cybercafés.

For all these initiatives to succeed, leadership and support would be needed, including regulatory and policy intervention by Governments, e-Government content and services. Private applications would have to be developed for the network or centres.

Small businesses could provide web-hosting and webdesign services, while local entrepreneurs could provide training programmes, certified ICT programmes could be delivered to the centres, the centres need to be promoted to the community and they will need people to provide technical support.

#### Wireless possibilities

As for technologies reaching rural communities over wireless broadband, Celcom proposed using 3G and HSPA (High-Speed Packet Access) technologies to provide voice and broadband data, including Internet access to islands, villages, longhouses and remote tourist areas.

![](_page_43_Picture_13.jpeg)

VSAT installation. Antenna & Outdoor Unit

3G would provide speeds between 128 to 384 Kbps, while HSPA would provide from 1 to 10 Mbps. It also proposed using 3G at 900 MHz, which would extend its cell range to a radius of 9.85 km, and cover up to 305 sq km, instead of 139 sq km.

It would support mobile consumer, residential and business, as well as fixed services, and provide services such as voice and video calls, Internet access, e-mail, messaging, mobile TV and location-based services to end users.

Maxis proposed using its Skyway VSAT (very small aperture terminal) technology which has already been proven at the Community Broadband Library & Basic Telephony projects in Bau, Sarawak and Yan, Kedah respectively.

The system provides cellular voice and data services in remote areas via Binariang's Measat-3 satellite to the VSAT (small satellite dish) in the remote locations connected via a remote IP gateway and a nano-BTS cellular base station which provide the local service coverage.

Maxis has already deployed about 1,600 VSATs. They can be deployed quickly in a week and since they operate in the C-band, they are much more resistant to adverse weather conditions than the KU-band used for direct-to-home satellite TV in Malaysia.

Packet One cited the project which provided broadband Internet access to the remote village of TA Van in Vietnam using a combination of WiMAX in the village, a VSAT dish, with the backhaul connection to the communications backbone via Thailand's IPStar broadband satellite.

Locally, a 2.3GHz WiMAX antenna has a range of 5.5 km and 40 km radius respectively for indoor and outdoor reception. The backhaul provides 2 Mbps downlink and 512 Kbps uplink.

Since WiMAX is fully IP based, it can provide both data and voice-over-IP services over the same network.

Nokia Siemens Networks proposed its Village Connection, which has been commercially available since the first quarter of 2008.

Village Connection is based on a PC controlling the small base station equipment connected to an antenna on the rooftop and which is operated by a village entrepreneur who not only provides cellular voice, SMS and Internet

![](_page_44_Picture_0.jpeg)

USP sites - Bau Library Project

access, ideally for a flat fee for voice calls within the village and on a timed basis for outside calls.

Subject to local regulations, entrepreneurs can also provide Internet kiosks, public payphones, fixed line voice and fax services.

Traffic between villages is passed through access centres without involving the network core. These access centres are connected to the network core via different long-haul wireless technologies, such as Flash OFDM, satellite or others.

UT Starcom from the United States proposed its IP-CDMA (Internet Protocol – Code Division Multiple Access) technology based on CDMA2000 for delivery of voice and data services to rural communities.

The advantage of this technology compared to traditional TDMA (Time Division Multiple Access) technologies such as GSM is that IP-CDMA calls between the rural communities are routed through the local packet network, rather than through the mobile switching centre (MSC) at the core network.

Bandwidth costs over an all IP-based network are also 98% less compared to a traditional network, since an IP-based network require only about 563 Kbps backhaul capacity, compared to about 22 T1 lines totaling about 33.88 Mbps required by a traditional network.

Telekom Malaysia (TM) had already implemented a proof-of-concept project using the IP-CDMA concept with USP funding from the Ministry of Energy, Water and Communications in the village of Kampong Lebir, 80 km from Gua Musang town in Kelantan state, with Maju Nusa as the local systems integrator. It covered 200 households with about 1,000 residents.

The project cost a total of RM2.25 million, including the cost of the 10,000 line MSC in Putrajaya, the radio access network (base station, antenna, etc) in the village, a 128

Kbps VSAT satellite backhaul to the MSC, network interconnection and integration with the fixed telephone network in the area, Internet, roaming, transmission & signaling, system integration and interoperability for product development, customer registration, billing & support and five years maintenance.

Prior to this project, there was only a Klinik Desa (community telecentre) with office telephones, PCs, Internet access and public phones but since it was launched commercially on 1 December 2006, the rural network supports up to 15 simultaneous calls and has 100 subscribers. The network is operated by Telekom Malaysia.

#### Wired solutions

TM, with its 120 years experience in fixed line solutions, has installed the widest and most extensive fixed line access network based on copper wire pairs throughout the country and all of it utilised copper in the forward connections from the respective distribution cabinet into homes and offices in the different localities, as well as in the backhaul from the cabinets into the local exchange.

Copper pairs allowed effective voice communications up to 5 km from the exchange and in the 1980's TM started installing fibre, primarily between exchanges, such as within the Kuala Lumpur multi-exchange area. Later, it used fibre in parts of the way from the exchange to customers and continued over copper to ensure that the total length of copper did not exceed 5 km to ensure good voice quality.

Traditional circuit switched exchanges limit the frequencies carried to a band between 300 Hz to 3.4 KHz which allowed for acceptable voice fidelity but which had limited data carrying capacity, despite advances in modulation techniques used by dialup modems.

On the other hand, a pure fiber network can deliver 100 Mbps to homes and offices at distances up to 20 km between

#### **METHODOLOGY FOR TECHNOLOGY ASSESSMENT & FITTING**

#### Stage 1: Developing Relevant Criteria for Technology Assessment

• Choice of suitable criteria for technology(ies) to be deployed in rural and remote part of the underserved areas:

- Technology characteristics for deployment in underserved areas
- Technology requirements
- Experience & track record of technologies for USP implementation
- Community Engagement with respect to technology

#### Stage 2: Scenario Fit for Technology Deployment

• Development of USP target profile based on geography/demography to ensure the right technology blend for the target locations i.e.:

- Geographical nature of the target terrain
- Accessibility for target areas
- Existing network within target areas (e.g. Cellular, PSTN, Internet access)
- Distance of target areas from nearest backhaul point
- Basic Utilities within target areas
- Weather Condition in target areas
- Population Density
- Community Involvement, Education & ICT

#### Stage 3: Aligning the Technology Choice with USP Objectives

 Selection of technology to reflect the objectives of USP, in accordance with Regulation 3 of the USP Regulations, to deliver:

#### Basic telephony for voice communications

- Individual access e.g. fixed and mobile technology; and
- Collective access e.g. public payphone.
- Internet access
  - Individual access 128 kbps min.; and
  - Collective access 2 Mbps min.

#### SUMMARY FINDINGS BY TECHNOLOGY ASSESSMENT TEAM (TAT) Figure 2

#### Technology Mix

TYPE OF UNIVERSAL SERVICE	LAST MILE - WIRELESS	LAST MILE - WIRED	BACKHAUL - WIRELESS	BACKHAUL - WIRED
Basic Telephony	• CDMA • 3G • 2G • IPCDMA • VSAT • WiFi • WiMAX (VoIP)	• Fiber • Copper • BPL	• Microwave • VSAT • WiMAX	• Fiber • Copper
Internet	• WiFi • WiMAX • 3G • HSPA • GPRS • EDGE • IPCDMA • VSAT	• Fiber • Copper • BPL	• Microwave • VSAT • WiMAX • 3G	• Fiber • xDSL

#### Technology Fit: Extreme Rural

TARGET PROFILE	LAST MILE	BACKHAUL
<ul> <li>Hilly</li> <li>Forested</li> <li>No Access Road</li> <li>No Electricity from national grid</li> </ul>	GSM	
	IPCDMA	VSAT
	WiFi	
	Wired (Copper)	

#### Technology Fit: Rural

TARGET PROFILE	LAST MILE	BACKHAUL
• Hilly • Forested • Accessible by road • Electricity available	GSM	• Microwave • VSAT
	3G	• Microwave • VSAT
	IPCDMA	• Microwave • VSAT
	WiFi	• Microwave • VSAT Fixed WiMAX (LOS)
	WiMAX	• Microwave • VSAT Fixed WiMAX (LOS)
	Wired (Copper, Fiber)	• Microwave • VSAT

#### Technology Fit: Sub Rural

TARGET PROFILE	LAST MILE	BACKHAUL
• Hilly • Forested • Accessible by road • Electricity available	GSM	• Microwave • VSAT
	3G	• Microwave • VSAT
	IPCDMA	• Microwave • VSAT
	WiFi	• Microwave • VSAT Fixed WiMAX (LOS)
	WiMAX	• Microwave • VSAT Fixed WiMAX (LOS)
	Wired (Copper, Fiber)	• Microwave • VSAT

#### Technology Fit: Semi Urban

TARGET PROFILE	LAST MILE	BACKHAUL
<ul> <li>Accessible by road</li> <li>Electricity from national grid</li> <li>Flat land</li> <li>Available network within 20 km range</li> </ul>	GSM (EDGE)	• Microwave • Copper • Fiber
	3G (HSPA)	• Microwave • Copper • Fiber
	WiFi	• Microwave • Fixed WiMAX (LOS) • Copper • Fiber
	WiMAX	• Microwave • Fixed WiMAX (LOS) • Copper • Fiber
	Wired	• Microwave • Copper • Fiber
	BPL	• Microwave • Copper • Fiber

![](_page_47_Picture_0.jpeg)

USP sites - Bau District

the optical line terminal (OLT) in the exchange and the optical network unit (fibre modem) in user premises. This Fiber-to-the-Home (FTTH) solution is being considered as the main choice in High-Speed Broadband (HSBB) connections to homes and offices albeit urban areas, predominantly.

TM, Fiberail and Fibercomm each have their own fibre trunk network and regional fibre rings connecting cities and towns across Peninsular Malaysia but TM still sees wireless solutions based on CDMA and VSAT as having the best reach into rural communities, while providing entrylevel broadband speeds.

VSAT is currently used in 778 USP projects across Malaysia, including 279 in Sabah and 318 in Sarawak, to provide Internet access, office telephone and payphone services in these areas.

Both CDMA 450 and CDMA 800 which use the 450 MHz and 800 MHz frequencies previously used by the ATUR and Mobikom analogue cellular networks carry voice, fax and data up to 144 Kbps at ranges up to 20 km and 10 km respectively, while a VSAT carries voice and data up to 2 Mbps.

TM expected to complete the migration of its current aging wireless local loop (WLL), radio local loop (RLL) and MARS networks (mainly serving rural communities) to CDMA 450 and CDMA 800 by December 2008. It is expected that TM will leverage its service availability to further improve services to the rural folks.

#### Power line solution

Almost all homes and offices in Malaysia are served by electricity, the cables of which can also be used to provide broadband communications in the final connectivity (or last mile). Realm Energy was set up in early 2003 solely to provide this typical technology known as Broadband-over-Powerline (BPL) solutions in Malaysia. The system uses adaptors in electrical substations, in customer premises and at nodes in between which couple data between the Internet and the electric wiring to homes and offices, with the backhaul between the master adaptor and the Internet provided either over fixed cable or wireless links.

Each transformer in an electrical sub-station serves between 160 and 200 households and BPL technology can serve up to 10 users per household. Each installation can serve up to 1,000 users based on one transformer per substation, with an average deployment cost of RM800 per household.

Realm conducted a comprehensive BPL pilot trial at University Putra Malaysia between 2004 and 2006 and provided BPL service to university campus apartments in Institut Teknologi Maju and Institut Rekabentuk.

In another case, it provides BPL service to eight blocks in the Queens Avenue mixed development in Cheras, Kuala Lumpur where installation in each block took less than three days.

Besides Malaysia, BPL is being used in 50 sites in the United States. It is also used in Germany, France, Spain, Switzerland and Hong Kong.

#### Deciding what is best

Based upon all the above presentations, the symposium provided for analyses of all proposed technologies at length, with all perspectives being considered for their suitability. It considered their capabilities in terms of reach in different rural and underserved areas. It also studied whether Line-of-Sight (LOS) or Near-Line-of-Sight (NLOS) technologies had to be used to suit the terrain, their robustness, access speed, coverage, operational cost and maintenance requirements, and the ability to serve the needs of the rural communities.

Each technology was evaluated vis-à-vis five main aspects and deliberated under specific working groups

namely Technology Characteristics for Underserved Community, Issues and Challenges in Implementing USP for Underserved Areas, Sustainable Application Technologies of e-Community Development, Meeting USP Objectives Through Reliable, Accessible and Affordable Last Mile Solutions and Future Model for Community Projects.

All the ensuing issues were extensively discussed and debated. Also discussed was the best type of USP community model; whether it should be a social entrepreneurship, e-Commerce or other models being more suitable to ensure its sustainability and continued development.

The collaborative relationship with local and state authorities also had to be considered, as well as the relationship with the local community.

In view of ensuring the technology deployment which fits the requirement of the underserved communities whilst ensuring that USP objectives are met, the service providers will compete through open tenders and SKMM will assess them to ensure the right fitting of technology (-ies) against the USP target profiles (both geography & demography) and its sustainability within the context of community development.

## The Technical Assessment Team methodology

The TAT's approach in determining the most suitable technology for USP implementation comprised three different stages. (Figure 1)

The first stage looks into critical reliability factors for that technology to operate within remote area environment. Towards that end, its characteristics, implementation requirements, its track record as a technology for USP and community engagement and whether the community is ready to adopt and adapt the technology upon expiry of the USP project funding.

The second stage is to develop different scenarios to fit the technology. All factors such as availability of transportation facilities, which technologies were already in place, whether there is sufficient electricity supply to power the relevant technologies or other forms of alternative energy supply such as solar power which depends on the amount of sunlight exposure available, the level of community involvement and the anticipated response towards the technologies introduced to them.

All these geographic and demographic profiles must be factored into the technology proposals by each service provider for each and every target area.

The third stage was to take the criteria of each technology and to map the profile and technology in line with USP objectives – namely, to provide collective access to basic telephony and Internet services; followed by individual access to both of these services.

The definition of basic telephony applies to the public cellular service due to the pervasiveness of its coverage and it is widely regarded as one of the basic livelihood toolkits nowadays as far as voice communications is concerned.

Once all the USP areas' profiles and community needs are mapped out, it is possible to decide which technology to use at a particular location for a particular community and this forms part of the requirements set forth in bidding for USP projects.

Bidders will have to provide a summary listing of possible last mile and backhaul technologies proposed and the combination of technologies to address the connected community project.

Guided by the geographic profile of the underserved areas, they would then propose either wired or wireless solutions for deployment purposes.

For instance, in the case of rural profile they have to consider hilly terrain, forest, accessibility conditions, and availability of electricity. The possible solution could be wireless consisting of deploying GSM for the last mile, with microwave links or VSAT for the backhaul.

If the electrical grid does not serve the area, the service provider could propose a hybrid of solar cells, battery banks and a generator set, with fuel for the generator set being provided through collaboration with the Ministry of Rural and Regional Development (KKLW) programme or by the service providers themselves.

#### **TAT's Conclusions**

After thorough analyses and discussion at the symposium, the TAT presented its conclusions and recommendations on communications technologies for USP programme. These conclusions are summarized in Figure 2.

The TAT further concluded and recommended:

- that community expectations are independent from the technology choice and that adequate marketing and promotional plan needs to be undertaken;
- the utilisation of available technology and existing infrastructure at the locality for USP target areas to avoid duplication, wastage, and incremental costs; and
- that technology selection should be based on the respective USP area profiles. The USP implementation may require usage of hybrid technologies for last mile and backhaul e.g. WiFi / WiMAX, WiFi / VSAT and costs represent the major constraints especially when nominal Internet speed of 2 Mbps is imposed.

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![](_page_49_Picture_0.jpeg)

The Malaysian Internet Exchange or MyIX for short is just over two years old and was conceived to efficiently route local Internet traffic by keeping it within local networks. Ahmad Razif Ramli provides an update on where MyIX is at today.

he Malaysian Internet Exchange or MyIX (<u>www.myix.gov.my</u>) for short was launched on 15 December, 2006 and allows Internet traffic between users and servers on more than 20 different Internet service providers' (ISPs) networks within Malaysia to flow between each other without having to pass through international gateways.

The intention is to reduce the number of hops and latencies when people in Malaysia access locally hosted websites and to reduce the massive costs of locally destined traffic routing through international links.

This has greatly helped reduced the outflow of foreign exchange in terms of charges for the use of expensive bandwidth on international networks, as well as response times.

#### **The Rationale**

In the early days of the Internet in Malaysia or around the mid-1990s, an e-mail sent from a Jaring account holder to a TMNet address within Malaysia had to go all the way to the United States.

Also, if an Internet user in Malaysia on one ISP accessed a web server connected to another Malaysian ISP's network, the data transactions between users and server had to pass through the nearest server overseas before reaching each other, which not only resulted in delays but also high costs to both ISPs.

With MyIX, the edge routers of local ISPs are now no more than four milliseconds away from each other.

While users might not enjoy a drastic drop in Internet charges, they are experiencing faster browsing when accessing local websites because of the reduced latencies.

#### MyIX setup

![](_page_50_Picture_1.jpeg)

That enhances the broadband experience of users and at the same time attract international content providers to host their content in the country.

While announcing MyIX on September 14, 2006, the then Minister of Energy, Water and Communications Tun Dr Lim Keng Yaik said that MyIX would reduce local ISPs' costs for routing local Internet traffic and thus save the country some RM2.36bil in foreign exchange outflow over five years.

With 70% of Internet traffic going out from Malaysia, it makes sense for content providers to establish servers in Malaysia. Tun Dr. Lim made it clear that MyIX was part of the MyICMS 886 strategy to propel the country to becoming a respectable Internet hub in the region.

After its launch, MyIX took a record three months from conceptualization to be up and running.

#### **MyIX**

When Tun Dr. Lim announced MyIX, he said it would be a neutral IX and that the Malaysian Communications and Multimedia Commission (SKMM), the communications regulator, would be the body in charge of it.

MyIX's neutrality is ensured by the fact that it is operated by a consortium of ISPs. Its 20 founding members are AIMS, Airzed, Bizsurf, Clearcomm, CNX, DiGi, Extreme BB, FreeNet, Heitech Padu, Izzinet, Jaring, Maxis, MyKris, Nasioncom. NTT MSC, Packet One, Pan Eagle, TimeNet, TMNet and VDSL.

A major milestone for MyIX in July 2008 was the registration of the Persatuan Pengendali Internet Selangor & Wilayah Persekutuan (Association of Internet Operators of Selangor and the Federal Territory) with the Registrar of Societies, with its members comprised of the heads of each MyIX member organisation.

Now that it is registered, the consortium can consider new applicants. These applicants will be scrutinised for their nature of business as the consortium will only accept local ISPs with a local Autonomous System (AS) number as members.

![](_page_51_Picture_0.jpeg)

Entrance to AIMS

"AS numbers" are globally unique identifiers for autonomous systems, which is a group of Internet protocol (IP) networks having a single clearly defined routing policy, run by one or more network operators.

Currently there are 22 members peered with each other and 17 of them are hosted by AIMS at MyIX at Menara Aik Hua near the KL Tower. Maxis and Jaring are hosted by Jaring at MyIX in Technology Park Malaysia, while TMNet and Celcom are hosted by Telekom Malaysia TM at MyIX-NCC which is located at the headquarters of Keretapi Tanah Melayu Bhd (Malaysian Railway).

Infrastructures are funded by seed money provided by SKMM and there are three reference sites. AIMS is the control centre of MyIX. Another site is at Fiberail which is located at the headquarters of Keretapi Tanah Melayu Bhd (Malaysian Railway) and which is operated by Telekom Malaysia. The third site is at Jaring in Cyberjaya. All 3 sites are connected via optic fiber. Each site has equipment in over 1000 square feet of space each.

![](_page_51_Picture_5.jpeg)

🖬 Network Management Team

The server rack that houses the MyIX exchange

Because of the technology used, these machines do not need much attention. All they need is a low temperature clean-room. Neverthelesss, network performance is managed through a Network Management System Platform by engineers on a round the clock basis. These engineers are tasked with monitoring and reporting performance levels of the MyIX. They troubleshoot issues that arise and more importantly, pre-empt potential problems. These are usually in the nature of links that are down or faulty port connections.

#### **Two Years On**

2007 was the year MyIX attained maturity, since its infrastructure had to go through a proof-of-concept, including its configuration, peering technology and so on. Many of the finer points related to Internet Exchanges were not generally known about by local ISPs and SKMM had to educate their engineers.

However, it greatly helped that Jaring and TM engineers had some experience, which when coupled with that of the engineers from the vendors which commissioned the equipment, enabled a series of training sessions to be held for the others.

Traffic through MyIX has certainly grown since it was launched. Initially MyIX had 1 Gbps pipes between its nodes. Towards the end of 2007, it encountered traffic congestion with 98% packet drops plus some diversion which led to the bandwidth of connections between nodes being increased to 10 Gbps.

This has ensured that capacity is more than enough to meet current and foreseeable growth in network traffic.

#### IPv6

MyIX is peered through the creation of virtual circuits done at OSI Layer 2, the Data Link Layer, which requires knowledge of multi-protocol layer switching (MPLS), unlike the earlier attempt at creating an Internet exchange in Malaysia.

The previous attempt at a Malaysian exchange, MIX, used Layer 3 or Network Layer switching, which resulted in a mass of RJ-45 ports. Layer 3 also requires much overhead, including cyclic redundancy character check (CRC) and other headers which not only consume bandwidth, leaving less for the useful payload. While it makes peering simple to set up, its configuration is rigid at 10 Gbps, 100 GBps and so on, with re-configuration for higher speeds complex.

SKMM decided to adopt the state-of-the art Layer 2 peering used by the London Internet Exchange (LINX). With Layer 2, bandwidth is charged on a pay-per-use basis according to the average bandwidth throughput in Mbps (megabits per second), so if for example, the average bandwidth is 480 Mbps, the user would be charged for say 500 Mbps, irrespective of the actual speed of the connection.

Layer 2 peering also requires much fewer packet headers and together with MPLS, Layer 2 is embedded with IPv6 (Internet Protocol version 6) features.

SKMM has a sub-committee working on IPv6. At a meeting of the 22 ISPs in Malaysia on 22 September 2008, SKMM discovered that five did not have IPv6 blocks, so it still had to use dual stacks.

SKMM wants MyIX to be a leading Internet exchange worldwide. However IPv6 was announced less than 10 years ago and it took time to learn as not all network vendors are well versed with IPv6 compliance.

Still, awareness of IPv6 has been growing and the MYNIC domain name Registry has commissioned IPv6 services and it has IPv6 addresses to offer, so there is no excuse now to not use it.

With IPv6, all desired features such as IPSec, multicasting, stateless address autoconfiguration, many times larger address space than IPv4 which eliminates the need for network address translation and others are included at no extra cost. Furthermore according to APNIC (Asia-Pacific Network Information Centre), IPv4 addresses will be depleted by 2011.

To align Malaysia with the goals of the MyICMS 886 national ICT strategy, the Government wants the industry to be IPv6 enabled from the beginning.

Besides NTT MSC, Jaring also began offering IPv6 services, while TM will follow soon. The banking sector will benefit most due to its in-built IP security (IPSec) features.

#### **Upgrades and Strengthening**

When MyIX was conceptualised, it was designed with redundancy in mind but lacked resilience. Resilience is based on backups, which means that if the fibre is cut in one location, there is an alternative channel for the data to flow which minimises the effect of the cut or other possible mishaps which could otherwise disrupt communication.

SKMM is now working towards MyIX upgrading its resilience to achieve 99.99% uptime. Achieving redundancy and resilience require that there be two rings which take different routes. However that will cost another RM9 million

![](_page_52_Picture_13.jpeg)

Closer look at the connections from MyIX members

on top of the RM3 million already spent and it will require Ministry of Finance approval.

The development of MyIX is divided into three phases. The first phase is about the proof of concept and ironing out infrastructure needs which was already completed in March 2007.

The second phase will extend the number of MyIX nodes to Penang, Johor Bahru and Kuantan based on traffic demand and the network will be divided to cover the Northern, Southern and Eastern regions of Peninsular Malaysia. For now these centres will be connected to the current centres at 1 Gbps. When second phase is complete, it would have cost RM12 million.

The final phase will be to connect to Sabah and Sarawak as well so that they are able to enjoy the benefits of the national IX.

There is also an ongoing initiative by the Terengganu State Government to set up their own IX but in actual fact it is a super data centre or a node that will be connected to the MyIX.

The total budget committed to MyIX rollout is RM30 million, which is a small sum to pay compared to the RM2.36 billion in foreign exchange which would be saved in five years.

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![](_page_53_Picture_1.jpeg)

# Mobile Communications

Mobile communications and in particular mobile phones have made huge advances since early forms made their debut in the twenties.

#### ccording to the GSM Association, there are over 3.46 billion GSM and 3GSM (3G) mobile connections at time of writing, while the CDMA Development Group reported 475 million CDMA subscribers worldwide with second-generation cdmaOne or thirdgeneration CDMA2000 handsets.

That adds up to around 4 billion cellular subscribers worldwide, including any lesser known cellular technologies which may still be in use today.

The first use of non-cellular mobile communications is believed to be the experimental use of one-way radios in police cars in Detroit in 1921, which were used to dispatch police to scenes of crimes.

A two-way mobile radio system was first deployed in New Jersey. It was a half-duplex, ``walkie-talkie" type system where users push a button to speak and release it to listen.

The development of FM or Frequency Modulation in 1935 paved the way for low-powered transmitters and receivers in vehicles, and this development was spurred on by the demands of World War II.

In 1946 public mobile phone systems were introduced in 25 cities in the United States. These were initially based upon a single transmitter covering a whole city or town, but even 30 years later, the system in New York could only support 543 users. In 1958, Bell Systems proposed an 800 MHz system with a speech channel bandwidth of 75 MHz and that was considered a broadband system back then.

#### Enter cellular

While the terms "mobile phone" and "cellular phone" tend to be used interchangeably these days, especially by the media, not all mobile phones are cellular and not all cellular phones are necessarily mobile.

In 1970, Bell Laboratories developed the concept of a mobile cellular communications system comprising a honeycomb of non-overlapping, hexagonal cells, each with its own transmitter and receiver – or base station -- for communication with mobile cellular handsets which happen to be within a given cell at the time.

#### The rollout

The first mobile cellular system to be introduced is believed to be the Aurora system designed in 1978 for the Alberta provincial Government-owned telephone company in Canada.

The 400 MHz Aurora 400 system had a total of 120 cells across Alberta but it did not support handoff, so calls were dropped when subscribers crossed cell boundaries while talking. Handoff capability was introduced into the 800 MHz Aurora 800 system which followed.

Meanwhile, after much consideration of bandwidth demands of other users and potential users, the United States Federal Communications Commission (FCC) allocated a 40 MHz frequency spectrum in the 800 MHz band to each cellular operator within a particular market.

In 1979 the FCC authorised the Illinois Bell Telephone Co. to develop a pilot commercial cellular system in the Chicago area and American Radio Telephone Service Inc to operate cellular systems in Washington D.C. and Baltimore.

About a year earlier, the Nippon Telegraph and Telephone Corporation (NTT) introduced its own 800 MHz mobile phone system in the Tokyo area. It supported 600 x 25 KHz channels.

Over in Europe, Ericsson and Nokia developed the 450 MHz analogue Nordic Mobile Telephone / 450 (NMT 450) system, which was introduced in the Nordic countries (ie Sweden, Norway, Denmark and Finland) in 1981. NMT 450 supports 180 x 25 KHz channels and was designed for their rugged mountainous terrain.

Malaysia's first mobile cellular phone system – an NMT 450 system known as ATUR (Automatic Telephone Using Radio) - was introduced by Telekom Malaysia in the mid 1980s.

The first generation of mobile phones are better described as portable phones. An early example of these first generation phones is the Motorola 4500X. These phones evolved from earlier models that were mounted into cars. One had to be strong to carry them and rich to afford them. These phones sold for more than RM20,000 when they first arrived.

In 1983, the first 800 MHz analogue mobile cellular system based upon the Advanced Mobile Phone System (AMPS) standard was launched in the United States. Mobikom was the only AMPS service provider in Malaysia which operated both AMPS and DAMPS services at 800 MHz.

In January 1985, Cellnet in the United Kingdom launched that country's first cellular phone system based upon the 900 MHz, Total Access Communications System (TACS), followed later by Vodaphone.

In the late 80s, Celcom operated analogue cellular services based on the Extended Total Access Communications System (ETACS), an extended version of TACS with more channels at 900 MHz. The phone that became a symbol of this time was the Motorola.

Mobile devices got smaller but were still a far cry from today's sleek handsets. The phone that became the icon of this time and which could be described as the first truly mobile phone was the Dynamic Adaptive Total Area Coverage (DynaTAC) 8000X and its later evolvements were the Motorola 8800 and 8500. The phones were known as the brick phones. You could carry them around but they still did not fit into pockets.

In 1989, Motorola redefined the face of the mobile phone with the launch of the MicroTAC. This brought major new advances in miniaturisation, style and usability. Many of these pioneering features have survived the test of time and can still be seen in many of the handsets of today. It also introduced the flip phone concept which is still popular to this day.

The growing popularity of handsets led to other brands challenging the dominance Motorola had in the cellular

market. Japanese brands were prominent. Oki, Sony and NEC developed handsets that were popular at one time or the other. From Europe came brands like Benefon.

According to the GSM Association, there were only 309,621 analogue subscribers left worldwide as of 22 September, 2008.

#### **Digital systems**

While analogue cellular systems were mainly based on national standards, digital systems also known as second-generation (2G) systems were generally based on continent-wide standards.

The advantages of 2G systems are their better voice quality and improved security against interception. They also support value-added services such as short message services (SMS) and data communications. standing was signed by 13 countries to use the standard in that continent.

Responsibility for GSM was transferred to the European Telecommunications Standards Institute (ETSI) and phase I of the GSM specifications were published in 1990.

The first GSM network was launched in 1991 by Radiolinja in Finland and by the end of 1993 there were over one million GSM subscribers and 70 GSM service providers across 48 countries.

GSM originally operated at 900 MHz but today it also operates at 850 MHz, 1800 MHz and 1900 MHz. Today, GSM and its enhancements are used by over 3 billion subscribers in 218 countries and territories.

One of GSM's key advantages is international roaming, which lets users on a network in one country roam on partner networks in another and this is believed to be the main reason for its huge success compared to other

![](_page_55_Picture_10.jpeg)

Some personal digital assistants (PDAs) and palm PCs and notebook computers fitted with cellular card modems, or attached to suitably equipped digital mobile phones were used to send and receive faxes and e-mail, perform data communications and browse the Internet over the cellular network.

In the longer term, they paved the way for value-added services to be developed with the enhanced second (2.5G) and third generation (3G) systems and devices.

#### GSM

The road to the GSM digital cellular system began with the formation of the Groupe Special Mobile in 1982 by the European Conference of Postal and Telecommunications Administrations (CEPT) to develop a standard which could be used across Europe and in 1987, a memorandum of undersystems.

GSM now stands for Global System for Mobile Communications and today Maxis, Celcom and DiGi operate GSM systems.

According to the GSM Association, there were 3.05 billion GSM subscribers worldwide as of 22 September, 2008.

In 1992, a company called Nokia introduced the Nokia 101 which could be said to be the first of the so called 'candy bar' phones. Worldwide, there were many brands active in the cellular markets. European brands like Bosch, Ericsson, Philips and Alcatel had handsets in the market. Alcatel had the 'One Touch Easy' phone in 1998 which interestingly worked on AAA batteries.

Also in 1998, Nokia introduced the 5100 series of handportable phones at the CeBIT exhibition in Hannover, Germany. These phones featured Nokia's NaviTM Key concept that provided an ease of use through an intelligent menu system. The popularity of Nokia phones to this day can be attributed to this easy menu system.

Nokia later introduced the Nokia 5130 which transformed mobile phones into fashion pieces because it provided inter-changeable covers allowing for a new range of colour options.

#### The US and Japan

The United States followed with its 800 MHZ NA-TDMA or North American - Time Division Multiple Access system (a.k.a. D-AMPS or Digital-AMPS) in 1993. Again, Mobikom was the only Malaysian service provider to operate an NA-TDMA service.

Japan followed with its 1.5 GHz PDC or Personal Digital Cellular system in Osaka in June 1994. The PDC system operates in the 800 MHz and 1.5 GHz frequencies. communications) respectively were originally PCN services, though today, they continue as part of the GSM services operated by Maxis, Celcom and DiGi respectively. The first two also operate 900 MHz GSM service, with seamless switching of phones between their 900 MHz and 1800 MHz frequencies.

According to the GSM Association, as of 22 September, 2008, there were 6.9 million cdmaOne subscribers worldwide.

#### **Enhanced 2G**

Enhanced second generation (2.5G) mobile phone systems are based on existing digital technology but support better coverage, capacity, quality and data rates.

Two major 2.5G GSM enhancements are HSCSD (High-Speed Circuit Switched Data) and GPRS (General Packet Radio Services).

![](_page_56_Figure_10.jpeg)

#### **CDMA**

In 1995, the United States introduced a new digital communications technology -- CDMA or Code Division Multiple Access, also known as Narrowband CDMA or cdmaOne.

CDMA was never used in cellular networks in Malaysia but is now used by Telekom Malaysia to provide fixed wireless local loop (WL) access in areas where there are no fixed lines.

Meanwhile, in Britain in 1988, Britain's Lord Young initiated development of an 1.8 GHz PCN or Personal Communication Network system based upon GSM technology and was later adopted by the GSM Association as a GSM technology and is now referred to as 1,800 MHz GSM.

In Malaysia, the Adam, TMTouch (originally Emartel) and DiGi 1800 systems operated by Sapura, Telekom Malaysia and Mutiara Telecommunications (now DiGi TeleGPRS was originally expected to support packet-based data rates of up to 115 Kbps over channels which are always on -- much like a wireless LAN and it is best suited for wireless data services – but when implemented, it typically supports up to 47 Kbps.

A further enhancement of GPRS is EDGE (Enhanced Data Rates for GSM Evolution), sometimes regarded as a 2.75G technology with three times GPRS' data rates.

The Nokia 6310 was introduced in 2001 and was one of the first to feature Bluetooth technology. The Nokia 7650 was one of the world's first camera phone and also marked Nokia's entry into Symbian devices. Earlier, Ericsson had garnered a cult following for its Symbian based smartphones. When it became Sony Ericsson following a merger, arguably its finest production was the P900 smartphone.

## A Mobile Phone Timeline

Year	Phones
1983	Motorola Dynatac 8000x – The world's first portable cellular phone
1992	Nokia 1011 - The world's first mass produced GSM phone
1993	BellSouth/IBM Simon Personal Communicator - The world's first phone with PDA features
1996	Nokia Communicator - The world's first phone to enable internet connectivity and wireless email
1998	First GSM cellular phone with colour display
1999	Nokia 7110 – The world's first WAP Phone Samsung SPH-WP10 – The world's first CDMA watch phone
2000	Ericsson T36 – The world's first phone with Bluetooth Motorola Timeport P7389i – The world's first GPRS cellular phone
2001	Siemens SL45 – The world's first mobile phone with expansion memory Sharp J-SH04 - World's first commercial camera phone
2002	Sony Ericsson T68i – The world's first phone with MMS Samsung SCH-T100 – The world's first phone with a TFT-LCD colour (4096 colours) screen Nokia 6650 – The world's first 3GPP compliant WCDMA-GSM dual mode phone
2003	Nokia 5140 – The world's first phone with push-to-talk over cellular (PoC) Motorola A760 – The world's first handset to combine a Linux operating system and Java technology with full PDA functionality
2005	Samsung SCH v770 – The world's first 7mp camera phone
2006	Samsung SCH B600 – The world's first-10-megapixel camera phone Samsung SGH-i310 – The world's first 8 GB phone with a hard disk
2008	HTC MAX 4G – The world's first GSM-WiMAX phone

Note: This timeline is based on information sourced from the Internet

![](_page_57_Picture_3.jpeg)

#### **The Third Generation**

Despite the adoption of 2G digital standards, the standards they were based upon were largely associated with continents and it was hoped that the development of a thirdgeneration (3G) cellular communications would lead to a single global standard.

In the late 1980's, the International Telecommunications Union (ITU) formed a study group to evaluate and specify requirements for a future global standard for high-speed mobile data and wireless services to mobile phones and today, this 3G cellular specification is called IMT-2000 (International Mobile Telecommunications - 2000). It defines 3G systems as providing voice and data communications at 2 GHz frequencies.

Standards bodies in Europe, Japan and the United States worked on respective regional standards proposals to meet IMT-2000 requirements. December 2001. An economic slowdown forced many service providers to delay their 3G launches but over the last two years many service providers worldwide have launched 3G services.

#### What's next?

3G technology has continued to evolve and there already are 57.9 million WCDMA HSPA (High Speed Packet Access) subscribers worldwide as of 22 September, 2008. HSPA includes HSDPA (High Speed Downlink Packet Access), theoretically capable of up to 14.4 Mbps peak downlink data rates and complement High Speed Uplink Packet Access (HSUPA) which supports up to 5.8 Mbps uplink.

By 2010, we can expect to see the next stage in 3GPP's technology roadmap, namely 3G LTE (Long Term Evolution) capable of 100 Mbps and 50 Mbps peak downlink and uplink speeds respectively. In fact NTT DoCoMo aims to

![](_page_58_Picture_8.jpeg)

In Europe, the European Telecommunications Standards Institute (ETSI) developed a standard for a pan-European 3G system called Universal Mobile Telecommunications System (UMTS).

However, the IMT-2000 goal for single, worldwide 3G standard was not achieved. Instead, today it comprises six core standard air interfaces, namely Wideband-CDMA, CDMA2000, TD-CDMA (Time Division Duplex – CDMA) & TD-SCDMA (Time Division Duplex – Synchronous CDMA), UWC-136 a.k.a. EDGE, DECT and WiMAX.

#### **3G rollout**

South Korea's SK Telecom launched the world's first commercial 3G service based on CDMA2000 1X in October, 2000. LG Telecom and KT Freetel, both in Korea, followed with their own CDMA2000 1X service. Sprint launched its nationwide CDMA2000 1X service in the US called Sprint Power Vision.

Europe's very first 3G network was launched by ManxTelecom on the Isle of Man off the UK mainland in

launch a commercial LTE network by the end of 2009, while Verizon Wireless, the US's largest CDMA service provider, is currently conducting trials of LTE and aims to launch commercial services in 2010.

The ITU may finally realise its vision of a global cellular standard in its fourth-generation (4G) IMT Advance networks due to make their debut from 2015 and the ITU hopes IMT Advanced will result in the convergence of 3GPP, 3GPP2 and WiMAX technologies into a single IMT Advance global standard, all using OFDM.

Handsets development has mirrored advancements in cellular technologies and will continue to do so as new technologies are launched. Lately, with mobile networks increasingly focused on high data speeds, manufacturers focused on creating phones with computer like capabilities and made for surfing the web.

In 2008, netbooks – very tiny notebooks with 3G chips built in - have become popular and may be an indication of where handsets are evolving towards.

#### Happenings

## EXPERIENCING CONVERGENCE.MYBROADBAND '08 CONFERENCE & EXHIBITION

![](_page_59_Picture_2.jpeg)

The Experiencing Convergence.MyBroadband '08 conference and exhibition that took place on 28 October 2008 at the Kuala Lumpur Convention Centre was a showcase of convergence and broadband technologies as well as an industry celebration of ten years of convergence that started with the establishment of SKMM in 1998.

Yang Berhormat Dato' Shaziman Abu Mansor, Minister Of Energy, Water And Communications said at the launch that there was rapid growth of the communications and multimedia sector in which Cellular services grew from 21.8% in 1998 to 90.7% in 2008. Broadband was almost non-existent in 1998 but now is available in 17% of Malaysian households. He added that content is an equally important component in the whole scheme of the communications and multimedia services sector. Parallel to network growth is also the growth of Networked Content, in which for 2007, revenue has grown to RM6.34 billion.

Dato' Shaziman spoke of the numerous initiatives to transform the communications and multimedia industry to propel us along the national vision of becoming a knowledge driven economy by 2020. Among the initiatives was the implementation of the National Broadband Plan in 2004. In 2005, the Government launched the national ICT blueprint, the MyICMS 886, that detailed the nation's information, communications and multimedia services agenda for the period 2006 – 2010.

The Minister also shared initiatives the Government had lined up that were aimed at bridging the digital divide. These include the production of low cost Internet devices to address broadband affordability for users and the BBGP programme under the "bridging the digital divide" initiative, where 500 additional community-based telecentres will be implemented. He added that these initiatives were over and above the Universal Service Provision (USP) programme designed to bring communications services to underserved areas, utilizing the USP fund that is being contributed by the industry.

The Experiencing Convergence exhibition was held concurrently with two other international expos which are the ACM 2008 Expo and the International Broadcasting Industry Show (IBIS) 2008.

#### Mobile Number Portability Realised in Malaysia

Mobile Number Portability (MNP) was finally realized in Malaysia after months of deliberation and planning with the telecommunications industry. The Minister of Energy, Water and Communications, Yang Berhormat Dato' Shaziman bin Abu Mansor announced that it will benefit consumers in terms of flexibility and choice of subscription plans as competition among mobile service providers is expected to intensify.

"The MNP will give consumers more freedom and flexibility to choose the mobile products and services that best serve their needs. It will remove what could be a hindrance to consumers switching service providers and therefore generate further competition in the mobile market to benefit all consumers" said Dato' Shaziman Abu Mansor during the nationwide launch of Mobile Number Portability (MNP) at Putra World Trade Centre. Yang Berbahagia Datuk Dr Halim Shafie, Chairman of the Malaysian Communications and Multimedia Commission (SKMM) and representatives from the telecommunication service providers were also present to witness the launch.

"Based on the studies undertaken by SKMM, it was felt that the market condition was just right for the introduction of MNP. With

![](_page_59_Picture_13.jpeg)

Malaysia's mobile subscription standing at more than 24.25 million, this clearly shows there is an increasing number of mobile subscribers with healthy growth for the past few years. In addition, there are in existence advanced networks offering leading-edge services and a big number of consumers are becoming more technology-savvy by the day."

The porting process takes place not more than 5 business days for individual porting while for business porting, it will not take more than 10 business days. Porting fees of RM25 is absorbed by mobile operators at this moment.

### **TM** launches High Speed Broadband (HSBB)

![](_page_60_Picture_1.jpeg)

The Ministry of Energy, Water and Communications (MEWC) and Telekom Malaysia Berhad (TM) recently signed the Public-Private Partnership agreement to officially launch Phase 1 of the national High-Speed Broadband (HSBB) initiative.

HSBB is a premium broadband service with speeds of 10 Mbps to 100 Mbps for residential customers and up to 1 Gbps for businesses for high economic impact areas delivered via fibre optic infrastructure. The infrastructure will be rolled out over a period of 10 years with the Government investing RM2.4 billion and TM RM8.9 billion to provide HSBB access to over 1.3 million premises by 2012.

Phase 1 of the project will cover the Inner Klang Valley, all key economic and industrial zones throughout the country, the Iskandar Malaysia Region, all IPTAs throughout the nation and all IPTS within the rollout areas.

Under this initiative, TM will roll-out last mile access network to homes and businesses to facilitate HSBB services using 3 main technologies, i.e. fibre-to-the home (FTTH), Ethernet-to-the-home (ETTH) and Very High Speed Digital Subscriber Line (VDSL2). In addition, TM will be rolling out its Next-Generation Network (NGN) core backbone network based on an all IP Platform as well as grow the nation's global capacities by building new international gateways for enhanced connectivity and network efficiency.

YAB Dato' Sri Najib Tun Razak, Deputy Prime Minister and Dato' Shaziman bin Abu Mansor, Minister of Energy, Water & Communications witnessed the signing of the partnership between the Government and TM. Dato' Dr. Halim Man, Secretary General of the Ministry of Energy, Water & Communications represented the Government while Dato' Zamzamzairani Mohd Isa, Group CEO of TM signed on behalf of the Company.

Speaking at the event, YAB Dato' Sri Najib Tun Razak said, "HSBB will be a key national infrastructure initiative which will allow Malaysia to enhance its economic competitiveness in the region, help attract

FDI to the country as well as accelerate the nation's ICT and high-tech aspirations and agenda through an enhanced knowledge capital workforce. More importantly, consumers will now be able to enjoy an exciting lifestyle with a variety of services such as high speed Internet access, file sharing, e-commerce, e-Government, e-learning, video-conferencing, web browsing, IPTV and high definition TV."

Realising the importance of the contribution of this industry to the country's growth, Dato' Shaziman Abu Mansor said, "The Ministry has taken numerous initiatives to expedite the implementation of projects and activities to increase the penetration of broadband in Malaysia. To ensure that we achieve 50% penetration by 2010, the approach taken by the Ministry is to fulfill the supply and demand of the service. The supply of the service is focused on the provisioning of infrastructure facilities and to meet the supply requirement, the Government will not only focus on the HSBB initiatives, but also Broadband to the General Population (BBGP)."

"The Government is confident that with the combination of the current available technologies such as Fibre-to-the-Home (FTTH), WiMAX, ADSL and 3G/HSDPA and the commitment from all relevant parties, we can achieve the 50% broadband penetration target," he added.

#### First WTSA-08 meeting in Africa defines new standards landscape

![](_page_61_Picture_2.jpeg)

The World Telecommunication Standardisation Assembly (WTSA-08), which closed in Johannesburg, South Africa on 30 October, decided on a wide range of issues that would impact the future direction of the information and communication technology (ICT) industry.

ITU members across the global ICT industry and administrations from across the world, asked for increased emphasis on key areas such as ICTs and climate change, the deployment of IPv6, accessibility to ICTs for persons with disabilities, conformance and interoperability testing, and encouraging academic participation in ITU's work.

Delegates at the ten-day meeting in Johannesburg agreed on measures including a restructuring of ITU's standards work and a revised focus that will serve to strengthen ITU's position as the world's premier ICT standards body. Eight new chairmen were elected bringing a fresh outlook to many of ITU's areas of study. 768 delegates, including 13 Ministers or Vice-Ministers from 99 countries participated.

A key agreement encapsulated in a Resolution adopted by the Assembly is that ITU members will work towards reductions in greenhouse gas (GHG) emissions arising from the use of ICTs, in line with the United Nations Framework Convention on Climate Change (UNFCCC).

The Resolution also recognizes that ICTs can be a major mitigating factor in efforts to moderate climate change and to limit and ultimately reduce GHG emissions across all industry sectors. It also acknowledges that ITU has committed to achieving climate neutrality within three years.

Another Resolution tasks the ITU secretariat with carrying out studies in order to introduce the use of an ITU Mark as a voluntary programme permitting suppliers to make a visible declaration that their products conform to ITU-T Recommendations.

ITU Secretary-General Dr Hamadoun Touré said, "We have made significant strides in the development of a knowledge-based information society. This World Telecommunication Standardisation Assembly, which has brought together close to 800 experts from nearly 100 countries, has laid out a road map for the future development of standards that underpin the world's communications networks. This is a critical input for all stakeholders who join ITU in our commitment to connect the world."

The closing plenary of the Assembly saw Dr Ivy Matsepe-Casaburri, Minister of Communications of South Africa switch on South Africa's digital broadcasting signal, which will be fully implemented in time for the Football World Cup in 2010.

# ACMA to pilot cybersafety programme for primary and secondary level educators

**The Australian Communications and Media Authority** (ACMA) launched the pilot of 'Cybersafety Outreach - Professional Development for Educators' around 30 October, 2008.

The initiative is ACMA's national cybersafety programme designed for primary and secondary level educators. It aims to equip educators to teach their students about cybersafety, in keeping with the Australian Government's broad commitment to cybersafety education.

Fifty teachers and industry stakeholders attended the pilot in Melbourne on 31 October and 3 November. Their feedback would shape and inform the final Cybersafety Outreach programme that will be rolled out nationally in early 2009.

The Cybersafety Outreach pilot will provide valuable feedback to ACMA and will help ACMA to further develop the planned programme to ensure it best meets the needs of Australia's educators. The pilot will provide practical strategies and classroom resources for educators to assist their students become responsible digital citizens.

# Phones 4U commits to stop breaches of consumer law

• One of the roles of communications regulators is to protect the interests of consumers and on 10 November, Ofcom received legally-binding undertakings from mobile service provider Phones 4U committing itself to change a

![](_page_61_Picture_18.jpeg)

number of its practices which would stop it from breaching consumer protection laws relating to the sale of mobile handsets and contracts.

In a joint investigation over a six month period, Ofcom and Staffordshire Trading Standards found that Phones 4U had breached several consumer protection laws.

Phones 4U were found to have not provided customers with a refund when they returned faulty handsets within a reasonable period of time, that were purchased directly from Phones 4U. Ofcom found Phones 4U to be having unfair terms in their handset return policy; using unfair terms contained in 'chequeback' schemes; and making misleading, false or deceptive representations or omissions to consumers about matters such as network coverage in particular areas, or what was included in their mobile phone plan.

Since the investigation began, Phones 4U has made changes to a number of its consumer policies and processes, in particular its handset return policy; 'chequeback' terms and conditions; sales practices, particularly relating to informing consumers what their network coverage will be, what their mobile plan will contain and cancellation rights and upgrades.

Phones 4U had cooperated fully during the investigation leading to a substantial reduction in complaints. In addition, Phones 4U implemented changes to its staff training procedures and operations which enabled Ofcom to swiftly complete its investigation.

Earlier in 2008, Ofcom published a range of proposals to further clamp down on mobile mis-selling.

![](_page_62_Picture_0.jpeg)

## Hong Kong proposes Fixed Mobile Number Portability

While the buzz has been about mobile number portability, on 31 October, Hong Kong communications regulator, the Office of the Telecommunications Authority (OFTA) issued a consultation paper to solicit public opinion on various issues related to the voluntary implementation of Fixed Mobile Number Portability (FMNP).

At present, subscribers of one fixed network operator may port their numbers to another fixed network operator and likewise, subscribers of one mobile network operator may port their numbers to another mobile network operator but cross platform number portability between fixed and mobile networks -- or FMNP -- is currently unavailable in Hong Kong.

FMNP would allow fixed and mobile users to port their fixed or mobile numbers to any fixed or mobile network as they like, which generally would help increase cross platform competition between the fixed and mobile network operators, provide innovative solution to meet the demand of the customers and encourage more efficient use of the scarce public resource of numbers. However, there are concerns over the impacts brought about by the introduction of FMNP and the need for a regulatory regime which is conducive to market development and consumer welfare.

A consumer survey commissioned by the Telecommunications Authority (TA) reveals that around one-fourth of respondents who are using fixed service may port their numbers to mobile service if the FMNP service is provided free of charge. The corresponding figure for porting mobile numbers to the fixed networks is much lower, the survey found.

Having considered the public demand for FMNP as revealed by the consumer survey, relevant overseas experience and the fact that market force is the best way to determine the market outcome, the TA is of the preliminary view while there is insufficient justification to mandate the implementation of FMNP, it should be in the public interest to allow individual network operators to make their own business decisions to implement FMNP on a voluntary basis.

#### Australia to implement mandatory Internet censorship

Australia's Federal Government reportedly plans to implement mandatory censoring of the Internet.

US tech giants Google, Microsoft and Yahoo, and a coalition of human rights and other groups reportedly had unveiled a code of conduct aimed at safeguarding online freedom of speech and privacy.

The Australian Government had declared that it would not let Internet users opt out of the proposed national Internet filter. The plan was first created to combat child pornography and adult content, but could be extended to include controversial websites on euthanasia or anorexia.

Communications minister Stephen Conroy revealed the mandatory censorship to the Senate estimates committee as the Global Network Initiative, bringing together leading companies, human rights organisations, academics and investors, committed the technology firms to "protect the freedom of expression and privacy rights of their users". Communications minister, Stephen Conroy said that trials had yet to be carried out, but that they were talking about mandatory blocking, where possible, of illegal material.

The System Administrators Guild of Australia, Electronic Frontiers Australia and others had attacked the proposal, saying it would unfairly restrict Australians' access to the web, slow Internet speeds and raise the price of Internet access.

EFA board member Colin Jacobs believes that the proposed measure would have little effect on illegal Internet content, including child pornography, since it would not cover file-sharing networks.

However, the Australian Christian Lobby welcomed the proposals and its managing director Jim Wallace said the measures were needed to prevent access to illegal hardcore material and that child pornography must be placed above the industry's desire for unfettered access.

## PLACES Kuala Selangor and its fireflies

How about a cruise down the river in the evening and seeing the surrounding environment around you light up? Enjoy one of nature's wonder at the Firefly Park Resort Kampung Bukit Belimbing in Kuala Selangor. You will be amazed during your cruise as the fireflies come alive. Fireflies, locally known as kelip-kelip look like tiny wasps with lights at the end of their bodies. The light is chemically produced and emits from the lower abdomen which may be yellow, green, or pale red in colour.

Back in the old days, fireflies were relatively common all over Malaysia but most of the fireflies' habitats are slowly deteriorating due to pollution. Even the fireflies in Kuala Selangor are an endangered species. They inhabit the branches of a certain mangrove plant known as the Berembang tree found along the riverbank and they survive be asked to remain quiet as not to scare these beautiful and rare creatures away. The image resembles a lighted Christmas tree. The bugs produce synchronized and rhythmic flashing which makes the trip even more memorable. Male fireflies flash in unison to attract a mate. But it is a wonder how a female firefly is able to pick a mate from thousands of potential lighted partners.

The park is a short drive from Kuala Selangor town and there are restaurants and toilet facilites. A tip though, bring along insect repellent. More details at www.fireflypark.com

![](_page_63_Picture_6.jpeg)

in Kuala Selangor is protected. The best times to meet the fireflies are about one to four hours after sunset. Usually you will board a small unmotorised boat and taken on a tour You will

because the site

![](_page_63_Picture_8.jpeg)

### **HEALTH** Aromatherapy and its benefits

The use of aromatic oils has a very long history. But back in 1920 there was a French chemist named Rene-Maurice Gattefosse who was credited with defining modern aromatherapy. The discovery was accidental. His arm was on fire in his perfume laboratory and to save his arm, he immersed it in a vat of lavender oil. Throughout his healing period, he noticed the burn healed quickly with no scars.

Aromatic oils are prevalent today and are in a lot of daily use products especially bath and body care products. Here are some popular oils and their benefits.

Bergamot – acts as insect repellent, helpful for urinary and digestive tract and when combined with eucalyptus oil it can be used for cold sores and chicken pox.

Jasmine – apart from its soothing and relaxing functions, it is also believed to be an aphrodisiac.

Lavender – used as an antiseptic and purportedly has calming properties but should be avoided during early stages of pregnancy. Neroli – considered a natural antidepressant, it is used to relief panic attacks, nervous tension and even flatulence.

Rose – warm but floral at the same time, it is used to treat insomnia, broken veins, aging skin and headaches.

Sandalwood – this has a strong woody smell and sometimes can be too pungent for some. It can clear blackheads and spots, but should be diluted with a carrier oil.

Tea tree – best used on its own, it has cleansing and refreshing properties. Used widely in cosmetics and body care products, it acts to cure acne, Candidiasis, dandruff, minor wounds and insect bites.

Ylang-ylang – the name is derived from Tagalog, meaning wilderness. It has a strong aroma and is popularly used to aid sexual dysfunctions but useful to relieve high blood pressure as well.

These oils are potent in pure form and should not be used before consulting your dermatologist or licensed aromatherapy practitioner.

## FOOD Fusion food, the Malaysian way

Nyonya cuisine is a perfect example of how our culture melted into each other. It is a type of food native to the Peranakan people. Peranakans or also known as Baba Nyonya are descendants of very early Chinese immigrants to the Nusantara region, who have adopted a number of Malay customs to blend into the local communities. Most of them are of Hokkien ancestry but there are some of Cantonese and Teochew descent.

Their food also reflects on their unique ancestry. Mainly it is Chinese cooking but

![](_page_64_Picture_3.jpeg)

• Assorted Kui

relies heavily on local spices such as coconut milk, lemongrass, turmeric and chillies. Nyonya food is prominent in Penang and Malacca where Baba Nyonya communities were most vibrant.

One of most famous Nyonya fare is the Asam Laksa. It comprises of thick white rice noodles served in a tangy fish-based soup. Tamarind, onion, basil, pineapple and cucumber are also added in. Another variation of that is the Laksa Lemak, in which rich coconut milk is added into the soup.

Perut Ikan is another spicy and sour stew of fish bellies preserved with daun kaduk (wild pepper leaf) with vegetables and herbs. Its taste is very distinct and best taken with freshly cooked fragrant rice.

Otak translates to brain in Malay but otakotak is a delicious and popular fish dish, often wrapped with banana leaf. Most otak-otak are grilled but the Penang otak-otak is steamed together with daun kaduk and coconut milk.

Other popular dishes include Jiew Hu Char and Cencalok. Jiew Hu Char is made of stir-fried turnip, carrot, cabbage and thinly shredded dried cuttlefish while Cencalok is a condiment made of fermented shrimp.

The Klang Valley has a fair number of restaurants that serve decent Nyonya cuisine. Search for them on the Internet. Many of them are well rated by food bloggers.

![](_page_64_Picture_11.jpeg)

Famous Nyonya Cena

![](_page_64_Picture_13.jpeg)

Nyonya Assam Laksa

![](_page_64_Picture_15.jpeg)

No one would say no to becoming more productive at work. Making it happen is the difficult part. One way to achieve more productivity is by staying focussed on a task. Focus can be on different levels such as focussing on a year's or months's goals. The most vital to success however are at the daily and current levels.

#### Daily

At the daily level, set your goals for the day. Ask yourself questions to help you determine them. What are the things that you want to achieve today? From the list you come up with, set your most important tasks.

Your Most Important Task (MIT) should be

the thing that will make the most difference if you accomplish it today. Here is a question that can help you set your MIT:

"If I can only finish one task today, what will that be?"

Then ask yourself, "If I can only finish one more task today, what will that be?"

By asking these questions repeatedly you will get a list of the tasks based on priority.

#### **Current Moment**

After setting your goals for the day, the next level is the present. This level makes all the difference and where focus is a priority.

To get optimum result, you should be focused in whatever you are doing. Here are

some tips on staying focused.

Do not multitask. It is a fallacy that multitasking makes one productive. Focusing on one task allows you to give it the necessary attention to come up with excellent work in optimum time.

Don't let distractions derail your daily plans, concentration is vital. Take necessary steps to eliminate any possible interruption as much as possible (turning off the mobile phone, telling people around you not to interrupt you, and so on).

There is one thing to remember though: while being focused at all levels is good, we should stay flexible. Be flexible enough to adapt to changes that happen during the day.

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#### **CELEBRATING 10 YEARS OF CONVERGENCE**

In celebration of its first decade, SKMM organised the EXPERIENCING CONVERGENCE. MyBROADBAND 2008 Exhibition and Conference with the theme "10 Years of Experiencing Convergence" for regulators, service providers, R&D institutions, academicians, content and application developers, speakers and dignitaries to reflect on the progress of convergence, SKMM's role in its growth, and risks and opportunities facing the converging industry during its second decade.

On 1 November 2008, SKMM celebrated its 10th Anniversary. A decade after its inception, SKMM continues to lead the converging C&M industry in Malaysia and is recognised as among the leading regulators in the world to drive the industry towards convergence.

KTAK and SKMM wish to thank everyone for making this event a success!

![](_page_67_Picture_5.jpeg)

![](_page_67_Picture_6.jpeg)