## CONVERGENCE Vol. 5 / No. 2 | JULY 2011

## DIGITAL LIFESTYLE MALAYSIA

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- SKMM IMPROVES POSTAL SERVICES IN RURAL SABAH AND SARAWAK
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**SKMM MagicMap** 

## An online service by SKMM providing an interactive map of facilities in the industry





Suruhanjaya Komunikasi dan Multimedia Malaysia Malaysian Communications and Multimedia Commission

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KMM is pleased to publish the eighth issue of .myConvergence magazine. Since SKMM began publication in 2007, .myConvergence magazine has served the dual purposes of imparting knowledge and sharing exciting developments in the multimedia and communications industries to readers, local and abroad.

Over the period, Malaysia has made impressive progress in its journey towards becoming a digitally empowered knowledge society. A perusal through the earlier issues of .myConvergence magazine serves as a record of the many initiatives that have brought us to this point.

And in this issue, the cover story titled Digital Lifestyle Malaysia is about the big picture in this journey of transformation. The article envisions a fully digital society in which every aspect of work and play is taken

digitally. SKMM is working in tandem with other planners and policy makers to build an ecosystem where various digital lifestyles are interconnected to one another via the Internet in a way that creates a truly Malaysian lifestyle. A fully connected digital ecosystem will bring about many conveniences and powerful tools to the rakyat. I am pleased that we are firmly on this path as the cover story unfolds the Digital Lifestyle initiative.

At the same time, our focus is also firmly on ensuring that we build a nation of people that are media literate and thus are able to utilise the advances in communications and information technologies that we are laying in place for the good of the nation and for their own benefit. The I, Gatekeeper article is a timely study of the need for sustainable regulatory practices and policies to manage the positive and negative aspects of networked media more effectively in the long run.

Similarly, another feature in this issue is on consumer protection in the era of broadband. SKMM has worked diligently to put regulations in place to address consumers' concerns, as well as mechanisms to address issues arising from the rollout of broadband ICT services in the country.

As always too, SKMM has never forgotten its responsibility towards the underserved areas and populations of the nation. In the previous issue, there was a feature story on the project to seed the underserved populations with netbooks. The 1Malaysia Computer programme has placed netbooks in the hands of those who really need this digital access tool. In this issue, we share another line of action that we have embarked on that synergises with the 1Malaysia Computer project. The article on the rollout of a WiFi network in a Felda plantation and the impact it is having in the daily life of the residents is an interesting read. Another very interesting article is on the innovative actions taken by Pos Malaysia in the rural areas of Sabah and Sarawak that are enhancing postal services in previously underserved areas.

Articles on RFID Track and Trace, smart networks, digital radio and cognitive radio top up this issue.

I take this opportunity to convey my greetings to all readers on the occasions of Merdeka and Malaysia Day. May our efforts to empower the nation with communication and multimedia technologies bring economic and social advances to this nation.

Thank you. Tan Sri Khalid bin Ramli Chairman, SKMM

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## Selamat Hari Merdeka & Hari Malaysia

**Towards a Connected** 

Malaysia

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SKMM MUMU

## **DIGITAL TIGSTY NALAYSIA A Digital Living Initiative**

In this first of a 3-part series, Yow Lock Sen provides an insight into the Digital Lifestyle Malaysia and the Internet of Things concepts. The second part will discuss the Digital Lifestyle Malaysia implementation strategies while the third will talk about the setting up of the Digital Lifestyle Engagement Centre.



ur daily lives nowadays depend very much on the environment in which we live and operate in. Much of our day is usually spent either at home, in the work place, at play, at prayers or travelling. In this respect, not much has changed for centuries as the capacity to work, play or travel is dependent on the surrounding factors, including costs of living, time taken to complete each chore and one's own tenacity to dictate the pace of life by doing as much or as little as required.

Examples of the impact of ICT on daily lives are prevalent almost everywhere. However, on the whole, they are not yet linked together on an expansive nationwide scale, simply because the reaches of the Internet were not available and thus were not utilised in many parts of the country for the last two decades. However, as we reachin national targets for household broadband penetration, economies of scale situation emerges. If the planners and policy makers are willing and able to create such an ecosystem or systems comprising of various digital lifestyles interconnected to one another via the Internet in a way which is truly suitable for and can be identified proudly as Malaysian, then perhaps it would become relevant and worthwhile. This is the aspiration and challenge in building Digital Lifestyle Malaysia (DLM).

#### The Internet of Things

The phrase the Internet of Things (IOT) - also known as the Internet of Objects - refers to the networked interconnection of everyday objects. It is generally viewed as a self-configuring wireless network of sensors whose purpose would be to interconnect all things.

In a nutshell, if all things or objects can be labeled with a distinct number, and all these numbers can be identified via the Internet, we would then be able to have much more applications on the Internet and a massive transformation of the way in which we plan and organize our society. The notion is simple, but its application is difficult. Take for instance if all boxes, phones, watches or parts of cars are equipped with minuscule identifying devices, daily life on our planet will undergo a transformation. Supermarkets will not run out of stock of supplies and wasted products will no longer exist as we will know exactly what is being consumed on the other side of the globe. Theft will be a thing of the past as we will know where a product is at all times. The same applies to parcels lost in the post.

Managing and fostering rapid technological innovation will be a challenge for governments and industries alike. But perhaps one of the most important challenges is convincing users to adopt emerging technologies like RFID. Concerns over costs, privacy and data protection are widespread, particularly as sensors and smart tags can track a user's movements, habits and preferences on a perpetual basis. Fears related to nanotechnology range from bio-medical hazards to robotic control. But whatever the concern, one thing remains clear: scientific and technological advances in these fields continue to move ahead at breakneck speed. It is only through awareness of such advances, and the challenges they present, that we can reap the future benefits of a user-centric 1Malaysia and global Internet of Things.

#### **Intelligent Malaysia**

To quote the International Telecommunications Union (ITU) Internet Reports 2005 – The Internet of Things, "It would seem that science fiction is slowly turning into science fact in an 'Internet of Things' based on ubiquitous network connectivity. Today, in the 2000s, we are heading into a new era of ubiquity, where 'users' of the Internet will be counted in billions and where humans may become the minority as generators and receivers of traffic." Therein lies the challenge within the above scenario whereby in order to build an intelligent Malaysia we have to confront and engage the Internet, with all its limitations and strengths and build for all in Malaysia something which is relevant and that can be sustainable for all communities.

Whatever system is created or evolves out of our National Broadband Initiative, its intelligence is only to such extent as created by its designers. If done in a cohesive ubiquitous manner there are greater possibilities of it being more progressive than others. Note that intelligence is not something general in nature<sup>1</sup>. To design an intelligent district, township, city or state is not the same as multiplying the same concepts and designs for an intelligent building.

As for an intelligent Malaysia, an intelligent national system has to be tailored towards certain well defined Malaysian objectives. A Malaysian socioeconomic community with its wish lists must exist, within which the intelligent system can interact and choose to be relevant. However, the practical need to identify specific priorities is a necessity. Hence SKMM has consciously decided to align as far as possible our objectives and deliverables of the DLM Initiative to run in tandem with the 10th Malaysia Plan (RMK10) programmes, New Economic Model (NEM) as well National Key Economic Areas (NKEA) initiatives outlined by the Economic Transformation Programmes (ETP) managed by PEMANDU. In this way we aim to work together and share our national broadband infrastructure as well as our next generation intelligent infrastructure, with all who share our core values and in building up 1Malaysia.

<sup>&</sup>lt;sup>1</sup> There are many definitions of intelligence. A person that learns fast or one that has a vast amount of experience could be called "intelligent". However for our purposes the most useful definition is: the systems comparative level of performance in reaching its objectives. This implies having experiences where the system learned which actions best let it reach its objectives.



#### **Objectives of DLM**

Objectives of the Digital Lifestyle Malaysia (DLM) initiative

To provide a better quality of life for all in Malaysia using ICT applications

To enable Malaysians to compete internationally by increasing productivity and sustainability through the adoption of intelligent ICT services and Internet of Things applications

Ultimately, to make Malaysia a high income nation by 2020 using broadband networks and ICT services

#### Creating a Better Quality of Life Within a Dynamic Digital Lifestyle Ecosystem

If there is anything which can be introduced to a typical village or rural community that the local population will accept and, without realising it, adapt and change their way of life for the better, it is most likely to be ICT-related. Social behavioural practice, whether as a result of better content on the local television or via the Internet, and whether they can do their shopping or arrange for tickets online, can have a direct effect on the benefits which members of society derive from ICT. However, ICT does present potential damages which may exert a negative influence. The same is true if one assumes technology will solve all social problems (although problem solving may often be related to technological change in one way or another).

We need to be guided by the principles that the adoption of Internet within communities may not make any sense to the laymen unless there is a benefit for them to use and eventually, to pay for such services. However in order for the communities to recognize the benefits for a ubiquitous digital lifestyle or ecosystem, there must be a sense of belonging. As such, in designing a digital lifestyle ecosystem, very often what matters most is relevance and buy-ins. However, the situation is not as simple as just asking the laymen about what they want from ICT. Very often, the benefits can only be ascertained after the ecosystem exists when the masses can begin to appreciate it<sup>2</sup>. In the sense, the philosophy behind most macro economic planners is still apt - supply has to come before demand. The planners have to create the platform first to test out the relevance and get the buy-ins. Change comes slowly but in a sense, if there are greater concerted efforts to promote the adoption of ICT services which can only come with publicprivate sector collaboration, change will happen in a sustainable manner.

#### Competing Internationally Using ICT Through Increased Productivity and Sustainability

Reality strikes us in a sense that in the competitive world of business and free market economies, we need to design a Digital Lifestyle system which discourages complacency, and more importantly, facilitates increased productivity and sustainability. Looking from the viewpoint of a typical small or medium-sized corporation, trying to increase productivity using ICT very often does not come free of charge as a business case has to be defined before there is a willingness to spend the investment amount on ICT services.

However, in many instances, investment into ICT services may be a case of short term savings versus long term benefits. This is where if the initial costs factor seem to be the main stumbling block, the government perhaps has a role in facilitating a Digital Lifestyle ecosystem which enables the participation of the masses, thus creating the economies of scale. Sustainability of the ecosystem then becomes the next biggest issue for whatever the initial capital expenditure required for building the Digital Lifestyle ecosystem, it still remains usually a one-time investment but the success or failure of the project very often lies in whether the local business communities accept and use the system to maintain its sustainability.

#### **Boosting Economic Growth**

Economic growth using ICT as an enabler seems to be one of the best value propositions which transcends across race, religion or creed. Growth can be sustainable if we can add value to the extent where there is further contribution

2 SKMM intends to be guided by the principle of using ICT to bring greater socio-economic impact to the communities. The key words are relevance and sustainability, via pilot projects.





Ultimately, at the touch of a button, Digital Lifestyle Malaysia must be able to offer a better quality of life, create a more competitive environment and higher incomes.

towards the Gross National Income or GNI. Therefore SKMM's priorities would be to determine or ascertain key economically value added growth areas, which will then be the basis for building up our key Digital Lifestyle ecosystems.

As the nation moves into the constantly changing and dynamic world of ICT, what remains important to realise is that economic growth can only be sustained if it incorporates private sector participation. As such SKMM's role is in facilitating the growth of, in tandem with the NKEAs identified by PEMANDU, a few mega-ecosystems including transport and logistics, agriculture and telecommunications which will be the focal pillars for development into digital lifestyle ecosystems. In this respect, the cooperation of the relevant government agencies is often seen as the key ingredient to ensure success of such facilitation process.

## Enabling Higher Income for the Population

If the above objective of increasing productivity and economic growth comes into being, higher income may be a natural consequence. The question is how best to develop a digital lifestyle ecosystem where those who benefit most and enjoy higher incomes would be those that succeed in living, breathing and experiencing the new lifestyle, ensuring them not only a better living but also a more sustainable cash flow to afford new ICT services and content. In this manner, it would encourage by example those left behind to catch up and not remain behind.

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## Khairul Anwar, Lot.my A lot of entrepreneurs

He walked away from a cushy job to start up a business with his classmates. .myConvergence speaks to Khairul Anwar, one of the founders of Lot.my, an innovative Malaysian online store provider that is enabling thousands of Malaysians to join the e-commerce revolution.

#### Tell us about the company first.

Our holding company is called Aidan, and we started about 5 years ago. We are actually a group of three companies involved in IT, education and marketing. The education enterprise offers, among others, seminars and courses. We did some government projects in schools and lately we have expanded. We have started producing books – there are five books to date. We also have educational toys that we are selling through Petrosains at KLCC.

The marketing company is dormant for now and the one relevant to our subject today is Aidan Technologies. Aidan Technologies is involved in developing IT solutions for clients. We create software, applications and websites, built to our clients' requirements. Examples are asset systems, HR systems and so on.

#### I understand that there are quite a few of you in the business. How did you all get started?

Yes, we are an unusually large group of entrepreneurs and it can get a bit confusing because there are different directors in each venture.

But essentially, five of us started up the Aidan group. As for Lot.my, four of the five directors of Aidan are on board and we have roped in two more directors. So there are six of us in this Lot.my venture specifically.

You will be interested to know that all of us (whether in Aidan or Lot.my) are of the same age (28 going on 29). Most of us were in the same batch in our secondary school at Maktab Rendah Sains Mara, Jasin and we got to know the other two when we were in the same preparatory course before we were sent overseas for studies.

### Did you all decide to become business partners at school?

Not at all. After our SPM examinations, we said goodbye to each other and went our separate ways. I went to the US to study engineering and economics. So did a few more of my future partners. One of them, Suhaimi Ramly, who was our school president at MRSM Jasin went on to study at MIT.

By the time we met in 2007, all five of us have graduated and had been working for a couple of years in Malaysia (in Motorola, Khazanah, Intel, etc). I worked at Motorola Penang. But all of us were involved in some business or other. For example, I did a lot of trading; I sold books online. I got cheap books from suppliers in India and Pakistan and was selling them off to other parts of the world with nice profits. I also traded a lot of attires online, mainly shirts from China, to customers from more than 50 different countries. I did some offline trading too, supplying all kinds of printed shirts to schools and universities in Malaysia, as far as Sarawak. All of these while holding a day job as an R&D engineer at Motorola.



I can't remember the details, but one day I got the chance to meet the other four. Since everyone had businesses on the side, we thought it'd be great if we could combine them under one roof. So we quit our day jobs at the same time, sometime in October 2007.

Since we were of diverse backgrounds, we immediately set up Aidan Corporation Sdn Bd (AidanCorp) and several subsidiaries namely Aidan Technologies Sdn Bhd (AidanTech), Aidan Marketing Solutions Sdn Bhd (AMS), and Ardent Educational Consultants Sdn Bhd (AEC). AidanCorp is the holding company and all five of us are directors with equal shares.

#### What is Lot.my and why was it built?

Lot.my is a place for anyone to create online shops. It is very easy to use and anyone can set up an online store in 5 minutes. We decided to build Lot.my because people were coming to us and asking us to create customised online stores for their ventures.

However, these people could not afford the fees we quoted. We were frustrated because their products were great, but we could not help them. So we sat down talked about it and came up with the idea of Lot.my, an e-commerce site that offered online stores for free.

We then tried to seek funding. We presented our idea to the MSC Malaysia Pre-seed Fund. But you know what, the jury rejected us. We were told that we could not make money from this model.

We then decided to start small ourselves. We had no staff when we built the site. The site went online in February 2010. There was no marketing budget but the site took off. More and more users signed up and today, we have twelve people working in our company.

#### What was the response to Lot.my?

Lot.my, when it started, was totally free. We did not charge store owners anything and neither did we put up ads on their stores. All transactions went directly to the store owners.

We had tremendous response. People began to open online stores and now we have more than 9,000 stores on Lot.my. Most of them are individuals and we are helping people who don't have the necessary IT resources to be able to sell online.

#### How was Lot.my publicised?

We did get some media publicity here and there. Various newspapers and other media saw our site, liked it and featured us, and we are grateful for their support. But mainly, Lot.my has grown through word of mouth. Someone would set up a store, find success and then he would tell his friends about it and some friend would set up his or her own store.

There was also a time when we went around giving talks on e-commerce opportunities, in collaboration with Utusan Malaysia. This was back in April and May 2010. We went to several cities around the country to promote e-commerce. We found that that method enabled us to reach people who are not IT savvy. Most of the people who came to the seminars were above forty years old and the face to face approach was useful in getting them started on e-commerce. Young people were coming on board on their own.

We are also proud that Lot.my has been recognised as a successful startup. We won the 'Best New Media Application' at the NEF-Awani Awards. And recently we were recognised as one of the 'Most Innovative Malaysian Websites' at the My Innovation Award.

#### What kind of items are sold on Lot.my and how well are these stores doing?

Lot.my store owners sell all kind of stuff on their stores. The most popular items are shoes and attire. There are also a lot of people selling jewellery, computers, perfumes and food items. We also have unusual and interesting stuff such as belacan being sold online.

Of course, the stores have varying success. Some do very well and some not so well. We know of individuals who are making thousands of Ringgits a month from their store. One of our most successful e-commerce stores is run by a young 19-year old entrepreneur who makes almost fifteen thousand Ringgit a month in sales. He sells shoes that he designs himself. He gets them produced in China and sells exclusively in Lot.my.

#### Lot.my Team



Akmal Akhpah is a graduate of Rennselear Polytechnic Institute, New York, in Computer Science.



Khairul Anwar M. Zaki studied Engineering and Economics in Purdue University, Indiana.





New York, in Information Technology.

Luqman Zulhusni Ismael

is a graduate of Rennselear,



M. Suhaimi Ramly is a graduate of MIT, Boston, in the field of Mathematics.



Shahabudeen Jalil studied in UiTM and UIA.

## What is the profile of the store owners?

Most of the store owners are individuals though we have recently seen more businesses joining. A large majority of our users are Malays, but this is mainly because our promotions were mostly done through the Malay language media.

Unlike other websites, we also have help files in both English and Malay, and that would be another reason for this characteristic. Our Facebook page is also popular and again, most of the comments are in Bahasa Malaysia. But Lot.my is aimed at all Malaysians and we hope that people of all ethnic backgrounds will make use of it.

#### Who are Lot.my's competitors?

We have no direct competitors. There are custom builders that charge people fees to build their online stores. Then there are companies like Mudah.my and Lelong.com who, I suppose, can be called our indirect competitors, and Facebook as well.

### What are your plans, going forward, with Lot.my?

After one year of having this application online for free - and earning no income from it - we have started recently a Premium Account for our users. We will still have free accounts but these free accounts will now be allowed to list a limited number of products and will only be able to use standard templates.

Premium accounts will have unlimited number of products. They will have a lot more design templates to choose from or even have their own custom template. The premium accounts will also have their own free domain names and the Lot.my platform will be invisible. In other words, their users won't know that Lot.my is powering their e-commerce site. The premium accounts are priced at RM39.90 per month.

We began offering them two months ago and we have customers upgrading their stores every day. Our target is to have 1000 premium accounts by the end of 2011 but from the response we are getting, I believe we will exceed our target.

## Will you expand outside the country?

We have received a fair number of enquiries from other countries. Many of them are interested in buying our script to offer similar services in other countries. We're not sure yet how we would grow outside the country. We're contemplating going global ourselves and because of that we have not sold our script to any other company.

Very recently, representatives of a very large International e-commerce company contacted us. They were interested to know what we were doing and how we could possibly collaborate. They have since visited Malaysia twice for discussions, but it is still early days and we'll see what happens.

## Can you tell us a bit about your family background? For instance, anyone else involved in business?

I am the first of five children. I got married about three years ago and my wife works as a finance executive in a telecommunications company. My siblings are all studying, some overseas, and in different fields of studies such as engineering, business and teaching.

My mom is a head of department in a teacher's institute. Dad worked in an organisation but he quit during the 1997 economic crisis to start his own pharmaceuticals distribution business. I suppose there is a link there. But more importantly, I am grateful that my parents always encouraged us to do whatever we want to do. If I had wanted to become a painter or a chef, they would have said yes too.

#### Back to the business: Does every partner look into every business or have you all divided the various businesses of Aidan into different responsibilities?

Each of us have our own responsibilities. We divide the responsibilities according to our expertise. Like many companies, each of the positions comes with a set of job scope. For example, in AidanTech, I handle sales. I meet clients a lot and become the bridge between

them and my technical staff. In Lot.my, I am in charge of marketing – from product usability to promotions.

How do you six partners make decisions? It's rare for a company to have so many partners so it would be interesting to know how you guys make key decisions. For instance, surely you have disagreements. How do you resolve them?

Now, because of our busy schedules, we meet only once a week to update and discuss important matters.

To ensure everything runs smooth, it is imperative that we delegate a lot of things. Although we now have emails and BlackBerry messaging, we realise that it is no good to overwhelm each other with too much minute details so often – the human mind can only take in so much. So we only update each other the details once a week, and it is only via emails. The weekly meetings are dedicated for more major issues – in which the agenda is set beforehand.

Yes, we do quarrel a lot, especially during meetings. But it's always because everyone wants what's best for the company. So we don't take it personally. In meetings, the decisions are made by the majority. Everyone knows that we can oppose another's idea during meetings, but once the final decision is made, everyone has to follow and execute the final decision as if it is his own.

Check out Khairul and partners' innovative e-commerce venture at www.lot.my

Marketing Director, Lot.my can be contacted at tanya@lot.my blog.lot.my twitter.com/lotdotmy



## **Felda Jelai** A Plantation Moves Into The Digital Age

WiFi hotspots are not just found in urban locations. An innovative government initiative is rolling out wireless hotspots where they are perhaps needed the most – in rural underserved communities. Mohd Shafie Othman has the story on village wireless hotspots (Kampung Tanpa Wayar).

smart

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wenty to thirty years ago, the homes of the settlers at Felda Jelai would have been typically simple wooden structures. Life at the innovative plantations was tough in the early days. The crops had just been planted and the smallholders received meagre incomes. Because of this, even till this very day, the perception that the settlers at Felda schemes earn low incomes is ingrained in the minds of many people.

What is not taken into account is the success of the Felda programme. Over the years, smallholders who moved into these schemes have prospered along with the rise in the prices of oil palm and rubber.

Today, the average Felda settler earns RM3,500 per month, with some said to earn above RM10,000 per month. Accompanying the increase in income is a rise in the quality of life. The average settler's home is no longer a wooden home on stilts; it is more likely to be a brick bungalow. Cars are found in the compounds and inside the house, the latest consumer electronic goods. The main commercial areas of the schemes are mini towns with petrol stations, mini markets and other shops. The large Felda plantations will like to have more than one primary school and a secondary school, government clinic and other public facilities.

The latest arrival in the community life of these schemes is Internet access, first in the form of community broadband centre and now, area wide WiFi networks. One of the Felda plantations that have seen the installation of a WiFi network in populated areas is Felda Jelai. A recent visit to this Felda scheme shows a community quickly adapting to a connected lifestyle.

#### Felda Jelai

Felda Jelai lies in Negeri Sembilan near the border of Johor. The entire scheme actually encompasses four plantations – Felda Jelai 1, Felda Jelai 2, Felda Jelai 3 and Felda Jelai 4. Unlike many other Felda plantations, the homes of the settlers in all four plantations that make up Felda Jelai are located in the same area; creating a reasonably large township of homes, shops, plantations facilities and government facilities.

The houses and offices are located in a mini township located about 20 kilometres away from Gemenceh town. The settlers' houses are laid out in neat rows around a main thoroughfare that houses a petrol station, a small supermarket, shops and restaurants. An estimated 4,000 families live in the Felda Jelai township area.

The latest landmark in this commercial zone is a tall telecommunications tower. It can be seen from almost anywhere within a few kilometres distance because there are no tall buildings here. Other than the houses and offices, the gently rolling hills are planted with rubber trees and a little bit of oil palm. It is this tower that serves as the Internet gateway for the Kampung Tanpa Wayar (KTW or wireless village project).

The KTW project innovatively tackles the broadband penetration conundrum in the underserved areas of Malaysia. It provides Wireless Internet Access Services to the community by providing a collective access system for a locality. It is a special initiative under the Universal Service Provision programme of Dato' Seri Utama Dr. Rais Yatim.

This project, which is being rolled out in many rural locations across the nation, serves as an important companion project to the 1Malaysia Netbook programme. A million netbooks are being distributed to needy recipients in Malaysia and KTW installations are enabling the recipients of these netbooks to access the Internet.

#### The KTW Infrastructure

The tower at Felda Jelai was installed by Celcom, the service provider providing the wireless hotspot service to Felda Jelai. The tower connects wirelessly to the many access points that dot the populated areas.





Settlers and citizens around the locality are enjoying access to the Internet.

The access points are placed on poles that are of 5 metres in height. Devices with WiFi built-in can detect these access points that have names like CelcomC2H\_JLl\_163. Users connect to the access point with the strongest signal.

The KTW offers the WiFi service to residents of Felda Jelai for a very reasonable fee of RM15 per month (about 50 sen a day). Residents who sign up for this service can conveniently pay their monthly KTW fees at the Community Broadband Centre (CBC) that is located in Felda Jelai.

At the same time, some key personnel at Felda Jelai are given free access passwords to the KTW network. These include some teachers, appropriate Felda staff and so on.



Speedwise, we found that the WiFi service was running at 270 kbps download and 120 kbps upload on the day we visited Felda Jelai. While these speeds are less than that enjoyed by urban broadband users in Malaysia, it was good enough for the users to access websites and receive emails.

The performance of the WiFi network is monitored by the administrators of the CBC in Felda Jelai. Hasanatul Atiah Binti Jaidin is the CBC Manager and she handles the administrative work related to the KTW network. Wan Mohd Safwan Bin Wan Mohd Salleh, the Assistant Manager of the CBC monitors the network. One of Safwan's weekly duties is to travel around the township and check on the status of each access point. He runs speedtests at each point to ascertain if the network is performing satisfactorily. Safwan also interacts with the residents as he moves along and he takes down suggestions and feedback on the network, which is then passed on to higher authorities.

#### A community of Users At Schools

Safwan showed us around the Felda plantation when we were there for the visit. Our first stop is a primary school. Mohamad Abdul Wahab is the Senior Assistant at Sekolah Kebangsaan Jelai Dua. He says that the arrival of the KTW WiFi service is very welcomed. This is despite the school having its own WiFi network installed previously under a school IT programme. The new KTW service, he says, provides better coverage all over the school. This is because one access point has been placed inside the school compound.

The KTW WiFi network is used mostly by the teachers at the school. These teachers use the Zoom-A student tutorial website for preparing their lessons and also as revision material for their students. En. Wahab added that his primary school students do not bring computers to the school but many do access the Internet when they are home.



Shah Rizan Abdul Wahab, a plantation administrator. Shah Rizan has worked for 5 years in Felda Jelai. He tells us that he is delighted that a KTW network has been installed at Felda Jelai. "It makes my job easier," he says. Shah Rizan uses the service for work related activites such as checking real time rubber prices with Lembaga Getah Melaysia, oil palm prices and for communicating with Felda Headquarters.

Even though there is a fixed line connection at the office, Shah Rizan says that the KTW network is an excellent back up network, which he often resorts to. Also, he can access the Internet from his house, located 1.5 kilometres away.

#### **For Business**

Shah Rizan also told us that many residents at Felda Jelai were involved in business. Some had set up construction companies while others were involved in small enterprises such as welding businesses. Quite a few of the residents were into



When he comes across a network issue, Safwan does basic troubleshooting and tries to solve the problem. If he cannot resolve the issue, he sends in a report and someone comes in from Celcom to get the network up and running again.

#### At the Office

From the school, we moved on to the plantation office. There we met Mohd



## Provisioning Kampung Tanpa Wayar (KTW)



#### Background

In the efforts to increase broadband take up in Malaysia, Kampung Tanpa Wayar (KTW) was developed to provide collective Wireless Internet Access Services to the community especially to recipients of netbooks for Komputer 1Malaysia programme at selected underserved areas.

KTW is an outstanding initiative from YB Dato' Seri Utama Dr. Rais Yatim which has brought ICT facilities to the doorsteps of localities. It has increased the intensity of connectivity between villages and furthermore it can also be utilised in local administrative matters. There are positive benefits from KTW. It will generate a knowledgeable society, connect small business entrepreneurs, tourists and villagers, and significantly help to boost economic activity.

KTW comprises of three (3) programmes, namely CBC-to-Home (CTH), Collective Broadband Access (CBA) and Corporate Social Responsibility (CSR) which will be executed in phases.

#### **CBC-to-Home**

The Community Broadband Centre (CBC) programme is an initiative to develop and implement a collaborative programme that has a positive social and economic impact to the community by providing broadband Internet access facilities of up to 2 Mbps at suitable premises to support the National Broadband Plan and improve broadband take up. As of today, 251 units of CBCs have been completed and in operation nationwide.

CBC-to-Home is the provision of individual broadband connectivity to the households living within the CBC hinterland across all CBC areas nationwide.

### Collective Broadband Access (CBA)

The implementation of CBA are mainly focused at public areas such as the local Rural Library (Perpustakaan Desa), and other suitable locations such as schools and community halls, to benefit the students and surrounding communities. Specifically, CBA is providing individual broadband connectivity to households living outside the CBC areas.

The minimum backhaul for each identified Kampungs/Rural Libraries is 2 Mbps using Microwave, VSAT or ADSL network and a minimum of three (3) Access Points for the WiFi Hotspot.

### Corporate Social Responsibility (CSR)

As of 2010, 12 KTW installations have been completed under the KTW Pilot project. These installations are the results of collaboration between service provider Pernec Corporation and SKMM and were implemented as a corporate social responsibility of the service provider.



trading and there were also many others who offered services such as wedding planning.

Many of the businessmen at Felda Jelai carried notebook computers and the WiFi service provided through the KTW programme was a heaven sent for them. They were able to source for projects as well as obtain business related information conveniently.

#### At Home

Nordin Osman has built his life at Felda Jelai. This settler has lived there for more than thirty years and has seen the changes brought about by development. Today, his house is a comfortable brick structure. His children use the Internet more than him. On occasion though, he does go online, with assistance from his children.

He tells us that he is pleased that the government has brought communications services like the KTW project to his home.

#### Into the Digital Age

By the end of our visit, it is evident that the people of Felda Jelai are making use of the WiFi network enabled through the KTW project. The tower that is so prominently placed in the centre of the township is a very welcome landmark.

Having just been installed a few months ago, the usage of the WiFi services is expected to grow even further as more and more residents of Felda Jelai discover the benefits of wireless access on the go. my

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Postal services are being modernised and upgraded in rural areas in Sabah and Sarawak. Suhairi Hj. Salim explains how SKMM is bridging the postal divide.



esidents of Pulau Banggi in Sabah can now count on Rupiah Ghafur, a newly appointed Posmen Komuniti (PK or community postman) to deliver their mail directly to their homes. The 30-year-old woman from the island's main town of Karakit is one of two people appointed by Pos Malaysia to deliver mail in Pulau Banggi. Pulau Banggi is located on the northern tip off the coast of Sabah. Pos Malaysia sends mail addressed to the residents of that island to Rupiah, using the daily ferry service from Kudat, about 35km away or 90 minutes by ferry. "Once I get the mail, I distribute it to the homes or postal representatives on the island. This is a big responsibility for me because the island is large and there are a lot of people here," she said of the island with a population of 20,000 and 50 villages.

Pulau Banggi is the largest island in Malaysia. Before the introduction of PKs, the islanders had to rent postal boxes (P.O. Box) at the nearest post office in Kudat town on the mainland. The journey to the mainland is an hour's boat ride away and boat travel is often unavailable in rough weather conditions in the South China Sea and Sulu Sea. When someone from the island was expecting an important letter, such as a job appointment or college acceptance letter, he would have to go through such hassles just to check the postal box every day. Not checking it could mean the loss of a once in a life time golden opportunity.

Valuable time, money and energy were being wasted.

Farmer David Lingki, when not tending to his 12sq km paddy field, ensures mail reaches hundreds of people in his native northern Sabah district of Kota Marudu. The 54-year-old father of five drives 10 km to Kota Marudu town in his Perodua Rusa van to collect letters and other mails meant for villagers staying in about 10 settlements near his home of Kampung Ganai. "I know they appreciate the mail being sent to them because it is quite difficult for some of them to go to the post office in town," said Lingki.

The appointments of Posmen Komuniti like Rupiah and David Lingkid are part of the Postal Service Transformation Plan introduced by SKMM to improve postal services in Sabah and Sarawak.

## Rural Postal Service Study by SKMM

Three years ago, SKMM formed a special project group to study the rural postal service in Malaysia. The main objectives were to develop a rural postal policy and to prepare a development plan that will improve the level of mail delivery service and access to postal outlets in rural areas.

The project team visited several rural post offices, including that in a small township known as Long Lama in Sarawak. The journey took eight hours of a bumpy boat ride negotiating the Baram River, locally known as Batang Baram. This river is the second longest river in Sarawak and cuts through the thick Borneo's rainforest. The town has no other proper save access except the rugged logging dirt road which is inaccessible during heavy rain and which is also flood prone.

Postal "last-mile" dialogues with postmen were also held at Kota Kinabalu, Kuching and Miri chaired by YB Dato' Joseph Salang, Deputy Minister of the Ministry of Information, Communications and Culture. The team wanted to understand the rural postal service issues before formulating practical solutions for the people.

The Malaysian rural postal service provisioning in Sabah and Sarawak is exceptionally challenging due to several factors. Firstly, a quality addressing system is substantially lacking. It is burdened and hampered by enormously challenging geographical terrains, wide population dispersions and extremely remote locations.

The cost of rural service provisioning is also very high and without the help of the government, difficult to establish and sustain. Furthermore, most rural post offices are operating at a loss due to inadequate numbers of counter transactions, thwarting the expansion and establishment of new full-fledge post offices in rural areas, even for a one-man counter.

Rural Pos Mini entrepreneur module operators (Mini Post outlets) are also struggling, barely making a minimal profit per month. The only way pos mini operators have been able to continue serving the public is by making their postal operations a secondary business, in addition to their existing businesses such as sundry or stationery shops.

A new formula was inevitable to address the postal exclusion issue in Sabah





and Sarawak, and it required immediate attention by the Government and SKMM.

## Postal Transformation Plan in Sabah and Sarawak

The provision of sustainable universal postal service is a complex issue and central in the postal policy discussion worldwide. In the Malaysian context, Pos Malaysia has been entrusted to carry out the obligation of providing the postal service universally without undue discrimination, irrespective if a person is living in a town or in a rural area as stipulated in its licence conditions.

In the light of mail volume decline and increase in population and delivery points, the burden of providing the postal service in rural areas in particular has become an issue to be addressed by the policy maker. The new postal legislation is intended to provide a solution to this issue by introducing multiple approaches such as postal fund, reserve service, and a new tariff regime.

13 May 2010 was a historical date for the rural postal service in Malaysia when YB Dato' Seri Utama Dr. Rais Yatim, Minister of Information, Communications and Culture launched the Postal Transformation Plan (PTPSS) in Sabah and Sarawak in Sibu, Sarawak.

PTPSS will be jointly funded by SKMM and Pos Malaysia. SKMM allocated RM10 million to support the implementation of PTPSS, and Pos Malaysia will absorb operational cost including logistics, uniforms, identification, signage, awareness campaigns and training. This two years public private initiative programme is consistent with the objectives set by the National Postal Strategy to achieve home mail delivery service level of 95 percent and 15,000 people per postal outlet by 2014. The PTPSS initiative was engineered to help achieve SKMM's and national aspirations of improving home mail delivery and access to basic postal service in rural areas. The New Economic Model aims to ensure an inclusive socio-economic development for the rakyat in rural parts of Sabah and Sarawak.

Under the programme, Pos Malaysia will appoint 400 Posmen Komuniti, 1,000 Wakil Pos Komuniti (WPK) community postal representatives and 10 mobile post offices.

#### Posmen Komuniti

PTPSS targeted to appoint 400 PK, 200 in Sabah and 200 in Sarawak. They are paid a maximum of RM500 allowance based on the distance from the nearest post office and the size of mail delivery area coverage. The prerequisite of this programme is that the appointed PK must be a local residing in the village to ensure that the mails are delivered efficiently, easily and safely. The houses in the vicinity are usually without complete addresses and very remote. Mails cannot be delivered by conventional postmen. By being a local resident, the PK is able to identify the delivery point or the recipients' house to deliver their mail. This concept is similar to the normal postmen in a small town who are able to identify the dwellers, including their children's names, after years of experience serving the place.

A PK usually already makes trips to the nearest town to run errands like paying bills, buying or replenishing groceries and household needs. Since the PK is required to go to the nearest post office two or three times a week to collect the mail, this is easily handled during their regular trips. The monthly allowance provided becomes the incentive for the PK to collect and deliver mail to recipients consistently.

In addition, a PK who possesses some amount of basic entrepreneur savvy can buy products from the town and supply





them to the villagers. This will supplement his income and travelling cost. Eventually a PK might end up becoming the most popular person in the village. As of April 2011, all 400 PK have already been appointed by Pos Malaysia.

#### Wakil Pos Komuniti (WPK)

The PTPSS aimed to appoint 1,000 WPK, equally divided between Sabah and Sarawak. A WPK receives an allowance of RM50 a month. Unlike the Posmen Komuniti, a Wakil Pos Komuniti does not deliver or collect mail from the post office. Instead his main function is as a drop-offpoint and caretaker for the mail.

The PK will deliver mails to the WPK's premises, either to their house, sundry shop or food stall. The villagers or the rumah panjang (long house) dwellers on the other hand, will then visit WPK to check if they have mail or not. They can do this almost every day since the WPKs live very near to them or in the same longhouse.

The WPK will ensure that the mails are safely kept and not tampered with. Some WPKs have also, entirely voluntarily, taken the additional initiative of delivering mail to recipients at no additional cost. Not only are they proud to be appointed and entrusted as a WPK, they are voluntarily delivering mail because they realise that they are contributing to the wellbeing, interests and benefits of their own community. 575 WPK have been appointed so far.

#### **Pos-on-Wheels**

The Pos-on-Wheels (PoW) is a mobile post office. The specially modified vehicles are equipped with VSAT capability at the service cost of RM70,000 a year. VSAT is a two-way satellite to ground service that enables a PoW to conduct online services. A PoW provides all the postal and agency service transactions similar to that of a regular post office's counter. A PoW will frequent at least 5 rural locations in a week. PoWs are stationed at the district post offices and travel to pre-determined locations to offer their services.

Such great flexibility enables one PoW to be considered to be equal to five postal outlets. A PoW is able to reach out where other amenities like banks cannot operate. In rural areas where there is no banking facility, the community will often turn to the Permodalan Nasional (PNB) unit trust agency services provided by Pos Malaysia. The unit trust options become similar to banking functions to them. 10 PoWs are planned to be actively operational by 2012. 4 PoWs are currently fully operating and the number of patrons is growing fast as the service gains popularity. The remaining 6 PoWs are expected to be running by September 2011. Grueling journeys to the town just to patronize a post office will be something in the past for some fortunate rural villagers, thanks to these mobile post offices equipped with online access capabilities.

#### Positive Response from Citizens

Thousand of hearts have been touched by the PTPSS. One of the villagers in Pulau Banggi, a retired army man, related his heartfelt appreciation when he received his first mail delivered at his home. It was just a normal bulletin from the Defense Ministry, received after years of leaving the corps. But the touchpoint impact was huge. Just by receiving that bulletin, he felt that the precious years of his life spent guarding our nation were appreciated. He felt that he was remembered.

Thanks to the many innovative initiatives launched under the publicprivate partnership PTPSS, the goal of quality postal service inclusion in rural Sabah and Sarawak has taken a major step closer to reality.



#### Table 1: PTPSS development status as at April 2011 by state

	SABAH		SARAWAK	
	Target	Completed	Target	Completed
POSMEN KOMUNITI	200	200	200	200
WAKIL POS KOMUNITI	500	279	500	296
POS-ON-WHEELS (PoW)	5	2	5	2

#### Table 2: Numbers and coverage of operating PoWs since March 2011

	SABAH	SARAWAK		
Base	Service Points	Base	Service Points	
Kota Kinabalu	<ol> <li>Kg. Moyog</li> <li>Pekan Kawang</li> <li>Kimanis</li> <li>Sabindo</li> <li>Bangunan Konsulat Indonesia</li> <li>Pangkalan TLDM, Sepanggar</li> <li>Grand Millennium, Penampang</li> </ol>	Kuching A	<ol> <li>Sematan</li> <li>Gedung, Serian</li> <li>Balai Ringin, Serian</li> <li>Kg. Santubong</li> <li>Kg. Muara Tebas</li> </ol>	
Sandakan	<ol> <li>Sibunga Jaya</li> <li>Batu 16</li> <li>Taman Fajar</li> <li>Batu 32</li> <li>Batu Sapi</li> <li>Bandar Indah</li> <li>Pekan Sukau</li> <li>Batu Putih</li> </ol>	Sibu	<ol> <li>Selangau</li> <li>Stapang</li> <li>Sekuau</li> <li>Durin Bazaar</li> <li>Bawang Assan</li> <li>Sungai Sadit</li> <li>Penasu</li> <li>Rantau Panjang</li> <li>Pasai Siong</li> </ol>	

#### Table 3: Coverage of PoWs expected to be operational by September 2011

	SABAH	SARAWAK		
Base	Service Points	Base	Service Points	
Tawau	<ol> <li>Kalabakan</li> <li>Merotai</li> <li>Umas-Umas</li> <li>Balung</li> <li>Semporna</li> </ol>	Kuching B	<ol> <li>Sadong Jaya</li> <li>Kg. Tun Razak and Balai Ringin</li> <li>Penjara Pusat</li> <li>Kg. Annah Rais</li> </ol>	
Lahad Datu	<ol> <li>Jericco</li> <li>Silam</li> <li>Sepagaya</li> <li>Kg. Panji</li> <li>Pekan Tangku</li> </ol>	Sri Aman	<ol> <li>Pekan Lachau</li> <li>Kg. Batu Lintang</li> <li>Taman Seri Jaya</li> <li>Kg. Beladin</li> </ol>	
Beaufort	<ol> <li>Sindumin</li> <li>Weston</li> <li>Batu</li> <li>Kota Kilas</li> <li>Kerukan</li> </ol>	Miri	<ol> <li>Luak Bay</li> <li>Kg. Bakam</li> <li>Bakong</li> <li>Simpang Bekenu</li> <li>Simpang Batu Niah</li> </ol>	

#### Items delivered by posmen komuniti from January to May 2011





# **J GATE GATE GATE**

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SKMM is utilising media literacy as a sustainable regulatory strategy in today's borderless connected world. Mooi Mee Mee explains the rationale behind this.

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e live in exciting times. Never has the world been so "borderless" and yet "connected" at the same time. Through technology, Man has advanced the boundaries of civilisation tremendously. Yet, despite all his achievements, safety and security remain a fundamental concern and a basic need. Doors and locks and what they symbolise are no less important in today's society than they were at the dawn of civilisation. It is not merely a protection from the elements but an establishment of law and order, limits and stability. In that regard, most countries today have laws that enshrine the individual's right to privacy and security.

The arrival of the digital age marked a leap into the new frontiers in the history of mankind. Through the Internet, societies discovered and experienced new social frontiers in the form of online social networking. The phenomenal popularity of online social networking is evident in the changes it brought to our lifestyles. As a result, whole generations are drawn into these virtual communities.

These new social frontiers in the cyberspace bring exciting new opportunities for self-presentation, for learning and access to an ever widening and changing circle of relationships. Today, the most prominent of social networking communities is Facebook, which has members numbering in the hundreds of millions<sup>1</sup>.

#### The Double-Edged Nature of New Media

No doubt we have made tremendous strides using ICT and continue to make amazing advancements, while generating economic growth with numerous spillover social benefits.

To the uninitiated, the cyberspace promises excitement and entertainment, all from within the safety of your own home. After all, one is not physically present in the online world. This false sense of security has often led to indifference on the part of the parents towards their childrens' online activities. While the Internet holds a host of new things to discover and experience, there are also dangers lurking, ever ready to pounce on the unsuspecting and gullible user.

While the benefits of cyberspace are embraced and its influence gradually increasing in level of pervasiveness in our society, too few are willing to acknowledge the negative influences that come with it, least of all parents who are more concerned that their children do not get left behind in the information age.

Today, content on the Internet is increasingly personalised. An individual has unprecedented control over the media and content he or she generates and consumes. However, along with this new autonomy, social media presents new risks to the individual, exposing them to loss of privacy and security, cyber bullying, and a host of other vulnerabilities that are social and psychological in nature.

#### Media Literate Versus Media Savvy

Without doubt, the net impact of the Internet on our society is immeasurable. Whether we like it or not, the Internet has irrevocably transformed the way we communicate and connect with other individuals and communities. We have become an information society where technology is being leveraged to improve every facet of our lives, communications being no exception. Its pervasiveness is such that we are immersed in media in our everyday life and to a large extent we have become dependent on media and particularly new media to function in our daily lives.

Pervasive as it may be, most people are left to manage their relationship to media by themselves.

In many countries around the world, media literacy is viewed as a necessary competency. The incorporation of media literacy into formal education bears testimony to the widespread acceptance of media literacy as an integral educational component.

#### The Malaysian Context

In today's media landscape, certain key characteristics are shaping the modern media consumers' attitude in consuming content. Content is increasingly personalised as evidenced by the slew of devices and services that enable users to generate their own content. Advancements in technology have also meant that communication networks can reach virtually every corner of the world, creating a 'global village' where connectedness denotes simultaneous access to content of other cultures and values and vice versa.

As we look to the nation's aspirations beyond Vision 2020, there is a need for

sustainable regulatory practices and policies to manage the positive and negative aspects of networked media more effectively in the long run.

Some trends and patterns have emerged from the data and information gathered from the research conducted on young Malaysians, providing a glimpse into the attitudes and behaviours behind new media consumption. The findings of the research indicate that the level of awareness vary among young people on the negative impacts of the Internet and the consequences of their online actions.

In a 2010 study<sup>2</sup> of 14 and 16 years old students from across the country, it was found that most were exposed to new media devices before the age of 13, using the Internet from as early as when they were 8 years old. With the rise in popularity of social networking sites, in particular Facebook, it is not surprising that 78% of those surveyed belonged to such virtual communities.

Nearly half of respondents admitted to never learning about online security, the risks and challenges, and about media violence. It is also to be noted that just as many hardly ever talked about these with their parents. Furthermore, slightly more than half revealed that they did not receive any formal instructions or guidance on Internet threats at school.

Clearly, the picture painted by such empirical studies evokes a sense of urgency for heightening awareness and education among young users, if not for everyone who are using the Internet.

This leaves only the parents to supervise and moderate their children's use of the Internet. However, the media environment has long changed from one where parents could serve as effective gatekeepers<sup>3</sup>; the gates can no longer hold back the labyrinthian flow of information.

Total of 665 million Facebook users as at 07.04.2011 (Source: http://www.socialbakers.com/blog/100facebook-reaches-another-milestone-600-millionusers/).

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<sup>3</sup> In medieval times, the city gate was a guarded and controlled access point of a walled city. Guarding these gates were gatekeepers who carried out the many functions these gates would have served: from defence and security, to trade and taxation. The gating process determined what or who might pass through the gate. Gatekeepers served to decide which of a certain commodity - be they materials, goods or information, might enter the system. Today, the gatekeeper is a metaphorical role used particularly in modern times. It still symbolises a role for ensuring security and controlling access.

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The information and data will aid in understanding the changing consumption patterns and consumer behaviour and attitudes towards networked media content over time. For example, the creation of baseline data for young people's media use can provide a reference point to measure future changes and to determine implications for regulation and provide a basis for regulatory practices and policies in relation to content regulation.

The industry and universities are also encouraged to propose research areas relevant to networked media content that will grow capacity and productive knowledge resources.

While new media has become a major distribution channel for entertainment and media, traditional media such as television still ranks highly as one of the most popular leisure activity even among young people. As such, traditional media remains very much a relevant area for research under this programme.

#### I Am Gatekeeper Unto Myself

Going forward, regulatory approach should be aimed at promoting a balance between statutory regulation and media literacy. The reach of media is so pervasive that regulators stand as much chance as parents do in holding back the floodgates.

On the other hand, when we are individually equipped and trained with the know-how to traverse the media landscape, we hold the key to managing our relationship to media and its content and become our own gatekeeper. In that way, the individuals can then approach media with media literacy skills such as critical inquiry and awareness that is crucial particularly in understanding consequences of online actions and the other realities of today's media landscape.

The Research Collaboration between SKMM and Institutions of Higher Learning on Networked Media Content is a programme funded solely by the Malaysian Communications and Multimedia Commission (SKMM). It operates under the guidance of the steering committee, the National Research Committee on Networked Media Content, whose members represent the media content industry, public and private universities.

The author is a member of the Secretariat to the steering committee and is based at the Content Monitoring and Compliance Department of SKMM.

For more information about the programme, please contact networkedmedia@cmc.gov.my or visit our website at http://www.skmm.gov.my/index. php?c=public&v=art\_view&art\_id=767.

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## The Communications, Content And Infrastructure NKEA: A Progress Report

Eight months into its launch, the Communications, Content and Infrastructure NKEA has seen progress. Dr. Fadhlullah Suhaimi Abdul Malek of PEMANDU reports on this National Key Economic Area.

he Communications, Content and Infrastructure (CCI) sector is one of the 12 National Key Economic Areas (NKEA) under the Economic Transformation Programme (ETP) announced on 25 October 2010 by the Prime Minister, Dato' Seri Najib Tun Abdul Razak.

The 12 National Key Economic Areas were jointly identified by the private and public sectors to kickstart the Economic Transformation Programme. These NKEAs represent economic sectors that will drive the highest possible income over the next ten years.

Focus on these NKEAs will ensure that high impact projects, together with policy support and incentives from the government, will collectively contribute towards Malaysia achieving its goal of becoming a developed nation by 2020.

The other 11 NKEAs are Wholesale & Retail, Tourism, Oil, Gas & Energy, Education, Electrical & Electronics, Healthcare, Palm Oil, Agriculture, Business Services and Financial Services with the Greater Kuala Lumpur geographical area listed as another NKEA.

On the economic front, Malaysia is one among 13 countries in the world to have a sustained growth rate of 7% for 25 years. The incidence of poverty has been reduced from 49.3% in 1970 to just 3.8% in 2009 while the Gini coefficient went down from 0.5 to 0.441 over the same period.

Named after Italian statistician Corrado Gini, the Gini coefficient is a measure of inequality of distribution, where 0 means total equality, while a 1 means maximum inequality.

Also, the average household income has increased significantly from RM1,582 in 1980 to RM4,025 in 2009. However, in its quest to become a high-income nation by 2020, the annual income per capita must rise to RM48,000 vs RM23,770 now. Malaysia's gross domestic product (GDP) must grow 6% per annum till 2020. The 12 NKEAs will be the engines of growth which will get us there, and which will altogether contribute 73% to the gross national income (GNI) in 2020. Towards that end, the CCI sector will contribute 3.4%.

Overall, 92% of the funding from the implementation of the 12 NKEAs will come from the private sector. Specifically for the CCI NKEA, 97% of the funding for the identified Entry Point Projects (EPP) will be from the private sector.

The ETP is managed by the Performance Management and Delivery Unit (PEMANDU) under the Prime Minister's Department.

#### The CCI Sector

The CCI sector has a wide ecosystem covering content, network applications, services and devices. In 2009, it contributed RM22 billion of gross national income (GNI) from telecommunications, TV, broadcasting, post and courier, and of that, telecommunications contributed the bulk of the GNI.

JP Morgan estimates that in 2010, both fixed and mobile voice contributed RM21.8 billion. Data defined as Frame Relay, leased lines, SMS and MMS contributed RM11.0 billion, while fixed and mobile Internet contributed RM3.7 billion. The telecommunications industry is important to Malaysia's economy. In 2009, Malaysia's telecommunications industry contributed 4.9% of its GDP, ahead of Singapore, Thailand, Hong Kong, South Korea, China and Indonesia.

The CCI ecosystem broadly comprises content and information, aggregation, network, transaction and services, application, device, logistics and fulfilment. As ICT becomes more prevalent and digital lifestyle takes precedence, the ecosystem that today defines CCI will change and expand.

Communications, Content and Infrastructure industry encompasses a large ecosystem in Malaysia, with particular depth in network

Content and Information	Aggregation	Network	Transaction and Service	Application	s Device	Logistics and Fullfilment
Sosial content Networks,	Fixed Line (Voice and Internet	Fixed Line (Voice and Unified Internet Communications	Business to Business Applications	Media Players, Video Game Consoles		
Messages,	Stores	Data)	Data)	C	Laptops and	
Business-to- Business	ness	Mobile Data Centre (Voice and Services Internet Data Including 3G, Wimax) Authentication	Data Centre	re Applications Smartphones, Co Mobile Pos	Netbooks	
data exchange	Instant Messaging,		Services		Courier and Post Services	
Pictures,	E-mail, SMS		Handset and	Handset and		
Videos, Music,	Videos, Music,	,	Services	Smartphone	Fixed Line	
Games Television,	Broadcast and Cable		Applications	Modems		
Advertisement, News, E-Commerce	Video-on- demand	Video-on- demand (Terrestial TV, Satellite, Cable)	E-Commerce, Payment Services, Billing	PC and Laptop Applications	TVs, Personal Video recorders	

Today among some of the components that make up this sector are social content; business-to-business data exchange; videos, content and games; advertisements, news and e-commerce; unified communications, data centre services, authentication services, e-commerce, payment services and billing and so on.

Of these, content and services providers particularly have reason to cheer, as global content and services revenue has grown 33% year-on-year (y-o-y) from RM67 billion in 2006 to RM157 billion in 2009. Revenues have gone up even as costs have continued to fall. The global consumer price per megabyte for DSL connections has dropped 28% year-on-year from RM80 in 2008 to RM42 in 2010, due to the commoditisation of infrastructure and access.

#### **Industry Input**

Unlike earlier government initiated programmes where the government and/ or its consultants formulated the ideas, with the ETP, many of the ideas it incorporates were mooted by private industry.

Each NKEA had a lab which brought together key personnel from the industry to brainstorm, deliberate on priorities, issues of relevant industry growth, competition, regulatory impediments, market choices, benchmarking and formulate detail plans. This was an intensive process, carried out all day long for several weeks. These plans were then syndicated for inputs and feedback from Corporate Chief Executive Officers (CEOs), the Prime Minister, the relevant Cabinet ministers, heads of relevant government agencies, the Economic Planning Unit (EPU) and others key stakeholders over a period of two months.

The ideas generated from each of the NKEA labs were cross-pollinated with those of the rest to further enhance and enrich their ideas and insights. Altogether, more than 500 individuals were involved in the NKEA Labs. 35 people participated in the NKEA CCI Lab.

#### **The CCI NKEA**

Over the past 10 years, Malaysia had focused on the supply side of deploying the broadband communications infrastructure. After having reached over 53% household broadband penetration as of the end of 2010, the major emphasis has now shifted to driving and satisfying demand for content, applications and services over that infrastructure. There is still minor emphasis on continuing to enhance the availability and capacity of infrastructure to cater to growth in the demand, while realising a return on investment on the supply side as well.

The NKEA CCI Lab looked into how relevant industries could grow faster and what are the levers of growth to drive up the country's GNI. It came up with ten Entry Point



Projects (EPPs) based on principles of supply and demand. The ten EPPs were further grouped under three themes.

The first theme is Serving Tomorrow which aims to create demand across multiple segments of society. The EPPs listed under this theme were Nurturing Malaysia's Creative Content, Connecting 1Malaysia and Track and Trace using RFID.

The second theme is Pushing Boundaries. These projects will drive strategic national industry verticals, namely, Education, Healthcare and Government Services. These three verticals are similar to those identified in the developed countries. For example, the Federal Communications Commission in the United States and the South Korean government also identified these same three verticals as strategic. The EPPs under this theme are Establishing Learning for Students and Workers, Launching e-Healthcare and Deepening e-Government

The third theme is Enhancing the Foundation which will work towards enhancing the capacity of international connectivity. This will make it easier to deploy both fixed and wireless broadband. It will assist in extending broadband infrastructure to rural areas to reduce the digital divide. The communications industry will also be galvanised to provide more affordable broadband to consumers. The EPP's under this are:-

- 1. Ensuring Broadband for All
- 2. Extending Reach (to reduce the digital divide)
- 3. Offering a Smart Network (to provide more affordable broadband)
- 4. Extending the Regional Network

The themes and identified EPPs were adopted through the learned guidance of the Lead Minister for the NKEA CCI, YB Dato Seri Utama Dr Rais Yatim.

#### **Serving Tomorrow**

On Nurturing Creative Content, the goal is to increase the value for creative content

exports from RM270 million in 2010 to RM300 million this year. As of mid May 2010, the uplift was already at RM26m, showing a very healthy and promising progress.

The second goal is to digitise 28,000 hours of nationally owned content in 2011. This would enable the government to monetise analogue content stored in the National Archives. Feature films produced previously by the national film company, Filem Negara, are of historical and commercial value. One example of this is the popular Gerak Khas TV series, the rights of which are owned by Radio Televisyen Malaysia and other governmentowned content.

The digitisation would also provide a resource for the Malaysia's creative content developers to incorporate clips from these digitised films into their current works or even to produce enhanced and modernised versions of them, in return for the government receiving a share of the revenue from the screenings of their works.

At mid May 2010, 15,000 hours were digitised but as more infrastructure is developed in parallel, it is expected that demand for content will increase.

On Connecting 1Malaysia, the objective is to provide a market for services which support person-to-person communications and so far, feasibility studies have identified two projects to be undertaken by the industry.

The first is a Collaborative Hub which is a video conferencing centre operated either by the government or preferably the private sector, where the public can go to conduct video conference sessions with remote parties for a fee. The goal is to have 40 sites nationwide by the end of the year. A few parties have shown interest in wanting to realise the concept but it is too early to reveal details of their proposals. At time of writing, these proposals have yet to be evaluated by the Connecting 1Malaysia EPP workgroup.

The second project is a Managed Digital Media Network. These could be digital

billboards located in strategic areas on which notices and advertisements can be customised to suit geographic location, the type of traffic passing by, upcoming festivals, ongoing sales and so on. There has been initial interest from the private sector which is mulling over the business model to apply.

On the Track and Trace EPP, there currently is a project by Smartag Solutions to use RFID (Radio Frequency Identification) to support the business of exporting swiftlet bird's nest, announced in April by the Prime Minister, Dato' Seri Najib Tun Razak. This is an extension of SKMM's and the Malaysian Department of Islamic Development's (Jakim) e-Halal pilot project launched in November 2010, to track and trace shipments of JAKIM certified halal food from Malaysia to Guangzho, China using RFID during the recent Olympics.

#### **Pushing Boundaries**

On establishing learning for students and workers, there's a project running to provide a minimum speed of 4Mbps Internet connection to 3,000 schools by the end of 2011. As of the end of the first quarter of this year, 563 schools had been connected. The Ministry of Education has also announced in early May 2010 the Request for Proposal (open RFP) for its 1BestariNet project that will help realise these ambitious targets.

On e-Health, there is a project to provide all public and private healthcare facilities, including hospitals, clinics, pharmacies, pathology labs and dental clinics with a minimum of 2Mbps Internet connection but this is still a work-in-progress because the government's proposed 1Care national health financing scheme is itself still a work-inprogress. 1Care is patterned on the National Health Service in the U.K. and similar national healthcare schemes in other developed countries such as Canada, Australia and others, where citizens contribute into the fund and will receive free primary care anywhere, while the government pays out of the fund. It's expected to be available to government servants, pensioners and the disabled by the end of 2011 and to other citizens later on.

There are two projects under Deepening of e-Government. The first is to do a baseline study of the status of information and communications technology use in government, targeted for completion at the end of April 2011. The findings from this study will enable MAMPU to identify more projects involving better adoption models of ICT by the government, such as the consolidation of government data centres through their outsourcing to operators with facilities in more consolidated locations. Other initiatives would be the introduction of more cloudbased government applications which can be uniformly used by all government agencies, for example the Web-based meeting management application, myMeeting, developed by MAMPU.

The second project that came out as a result of the study has resulted in 21% of government services available online as of mid May 2010.

#### **Enhancing the Foundation**

On Ensuring Broadband for All, the goal is to achieve 60% household broadband penetration by the end of 2011. As of mid May 2010, penetration was 58.1%, based on weekly monitoring results by the Ministry of Information, Communications and Culture (KPKK), SKMM and PEMANDU.

There are two projects under Extending Reach. The first aims to achieve 30% household broadband penetration non-urban areas by the end of 2011. The penetration achieved was 10.7% as of mid May 2010. Under the Malaysian National Broadband Initiative, SKMM had allocated RM1 billion out of its Universal Services Provision fund to provide one million netbook PCs to students in underserved areas. Service providers were urged to provide cheaper packages which are more affordable to people in rural areas, for whom speeds such as 384Kbps is sufficient for their Internet access needs, unlike urban people who are more demanding.

The second project is to increase community broadband access to 902 sites by end 2011. The number stood at 200 as of the end of the first quarter.

In Offering a Smart Network, the objective is to get service providers to offer tiered price plans based on monthly data transaction volume instead of download speed, so light users pay less, while heavy users pay more, while all enjoy the same speeds. For example, service providers Maxis and DiGi offer such plans with the same download speed but with different monthly quotas at different prices. The goal is 15% of all broadband plans by the end of 2011. At time of writing, it was 5.3%.

In a similar vein, the objective of the Extending the Regional Network includes the increasing of submarine cable out of the country to reduce international bandwidth costs, so as to reduce the cost of broadband passed on to end users.

The problem is that over 70% of Internet traffic in Malaysia transits overseas through international Internet connections owned by third parties who charge according to data volumes transacted and the cost of international capacity accounts for 40% of the cost of providing broadband services, which is passed on to consumers.

Malaysia has a total of 37 licensed broadband service providers, most of which are small and cannot afford to buy large enough international capacity to justify



lower unit capacity prices or to participate in international submarine cable consortia, such as the 20,000km long Asia-America Gateway Cable System connecting South East Asia to the United States, in which Telekom Malaysia is one of the 19 consortium members.

Telekom Malaysia is also laying the Cahaya Malaysia submarine cable linking Malaysia to Japan in collaboration with NTT Communications Corporation.

While many criticise Telekom Malaysia for having a 'monopoly' over international links, the fact of the matter is that this an entity that is over 120 years old and an established service provider. It has the deep pockets to buy capacity in bulk at bulk rates and to participate in cable consortia, while most of the others don't, so the 'monopoly' is not by design but as a result of the market.

So this EPP's strategy is to get all service providers to come together and pool their resources so that they can collectively buy international capacity at lower bulk rates and in turn be able to attract more international cable operators to base their landing points in Malaysia, so as to have more options.

On 25 April, the Minister of Information, Communications and Culture, Dato' Seri Utama Dr. Rais Yatim announced a new constortum, Konsortium Rangkaian Serantau Sdn Bhd, established to buy international bandwidth to lower the costs of Internet transit traffic for its members, as well as to plan and manage the international submarine cable on behalf of its members.

The consortium's 24 members include Telekom Malaysia, Time Dotcom, Maxis, Celcom Axiata, DiGi.Com, U Mobile, Green Packet, YTL Communications, RedTone International, OCE, Fibrerail, Jaring, Sacofa, Sarawak Information Systems, Fibrecomm Networks, V Telecoms and others. While he gave no time frame, he expects this to eventually result in lower broadband costs for consumers.

#### **Steady Progress**

As at time of writing, the NKEA CCI has seen a steady progress of development and attaining of the set targets. This is by no means a small feat. Thanks to the industry who responded positively to the ideas and plans mooted by the industry itself, the EPPs are getting traction and more and more ideas are coming through from the private sector. Big and small players are excited by their own business prospects and what the market can offer, with the government playing a strong facilitating role to help them realise their investment plans.

The next milestone for the public and industry to watch for is the ETP Forum, where the public will be provided with a view of each and every project that has been initiated, and see where the progress is. This is scheduled for in July 2010 as part of a bi-annual Forum organised by PEMANDU.

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## Towards Consumer Protection In The Era Of Broadband

The consumer protection policy of SKMM encompasses information, education, compliance and regulation. Sharizan Abdul Aziz examines the issues involved.

**Useful websites** 

http://aduan.skmm.gov.my www.cfm.org.my www.cmcf.org.my

elecommunications and ICT services have become indispensable. These days, social and economic activities run over networks that reach into every office and just about every home in the country. Whether for work or play, broadband has moved from luxury to utility status.

The stunning advancement of these technologies, while very welcome, inevitably leads to diversification of service contents and service menus available to consumers. Consumers may end up facing difficulties in selecting the right services and not knowing what to do when they face problems with these services.

With millions of Malaysians counted among users of broadband ICT services,

the protection of the users' rights and entitlements become even more imperative. Consumers have become informed of the recourses and means available to them to ensure that the telecommunications services they receive match the quality of services they pay for. At the same time, they can be assured that the government too places the well being of the consumer at the centre of its regulatory and policy making initiatives.

At first look it may appear that a consumer will face a daunting challenge in seeking the right channels of support and recourse available when he or she faces issues involving such pervasive services. However, an informed user will discover that various levels of support in ensuring his rights are protected exist within the system. Before we examine these, it is important we understand that, broadband and telecommunications services in this country have flourished tremendously in recent years, so that we may appreciate the challenges faced in addressing consumer protection and rights.

#### **Broadband is Everywhere**

One of the goals of the Malaysian Information, Communications and Multimedia Services 886 (MyICMS 886) national development strategy was achieved ahead of schedule, when Malaysia's fixed and wireless household broadband penetration reached 60.3% on 13 July, 2011, or 4 million households. By



2015, Malaysia is targeting 75% penetration or 5.3 million households.

These laudable achievements were a result of Malaysia's Broadband Plan that was launched in 2007 and the National Broadband Implementation Strategy in 2008. A privatepublic partnership between the Ministry of Information, Communications and Culture and Telekom Malaysia would deploy High Speed Broadband (HSBB) services with speeds above 10Mbps over fibre to homes, especially in urban areas, while the private sector would continue to deploy Broadband to the General Population (BBGP) with speeds up to 2Mbps to households in sub-urban and rural areas. Mobile services played a notable part too. Of the 9.7 million 3G users, 2.9 million contributed to wireless broadband customers.

To ensure equitable access of services, this penetration was augmented by the Malaysian Communications and Multimedia Commission's (SKMM's) 105 Community Broadband Libraries (CBL) and 246 Community Broadband Centres (CBC) in rural areas throughout the country, with 1Mbps and 2Mbps broadband Internet connections respectively.

Altogether, over 16 million Internet users use community broadband access in

clinics and hospitals, schools, WiFi hotspots, institutes of higher learning, enterprises, libraries, telecentres and other agencies, CBCs and CBLs, government offices, cybercafes and homes.

All these add up to a huge number of consumers; with even more coming on stream in the near future.

### Attractive Content, Reliable Services

The focus has thus shifted to satisfying the demand side by providing quality of service (QoS) over the broadband infrastructure, value-for-money, ensuring broadband speeds and reliability are up to consumer expectations and above all, consumer protection against fraud, misrepresentation, online intimidation and inappropriate content.

Consumer protection is one of the fundamental principles of CMA 1998, together with licensing, economic regulation, technical regulation and social regulation.

The key elements of the broadband consumer challenge are to have costbased tariffs which are fair and reasonable, without anti-competitive practices, to attract investment. Broadband quality and cost must commensurate with the application accessed, such as email, web browsing or content, and provide a good user experience. There must also be greater awareness of choice of services and supplies on the part of consumers.

An effective dispute resolution process must also be in place. There must also be standard operating procedures such as itemised billing that must be implemented by all service providers. Also, the privacy of customer information must be maintained. Finally, the segments of the populations whose needs are not being met by market forces must be protected through social programmes like the Universal Service Fund. The overarching objectives are to ensure the best deal for the consumer and the accessibility of services to everyone.

#### **Consumer Complaints**

In 2010, SKMM's consumer complaints bureau, received a total of 8,013 complaints, of which 43% were about poor services. Most of these complaints were about Internet connection and issues of speed.

The complaints include slow Internet download speeds, unstable connections with frequent disconnection, recurring connection problems even after they have been rectified by the technician and about throttled speeds after the fair usage policy (FUP) quota had been exceeded being too slow for even basic Web surfing.

Coming a distant second were content related issues at 1,205 complaints, followed by billing and charging disputes (835), SMS services (826) and no or poor service coverage (573). Other complaints, each numbering two digits were misrepresentation of service, unfair practices, and disputes over terms and conditions, false or fraudulent registration and other issues.

Many of the general complaints that SKMM observed include late or no service restoration after a report has been made, slow network response, unprofessional staff and other complaints related to customer services.

As the industry regulator, SKMM not only wants service providers to increase their number of subscribers but to also address issues related to minimum standards of quality of service (QoS), consumer satisfaction and consumer protection.

During the year 2010, a review of the Mandatory Standard for Quality of Service for Broadband Access Service (wired) was conducted and at the same time, a public inquiry to propose a new Mandatory Standard for Quality of Service for wireless broadband was undertaken. The feedback from these public inquiries will be used



as a guide for regulatory intervention to control industry standards and quality of service.

### Complaints Handling and Resolution

SKMM Consumer Complaints Bureau (CCB) was set up to act as a focal point to deal with public complaints regarding SKMM's and service providers' provisioning with regards to communications and multimedia services. Nevertheless, the first avenue of complaint is the service providers. If the complaint is unresolved, consumers can lodge the complaint to the Communications and Multimedia Consumer Forum of Malaysia. The consumer may lodge their complaint to CCB if they are unsatisfied with the resolution made by the Forum.

Based on the General Consumer Code, a service provider must acknowledge a complaint received within 3 working days. In terms of resolution, 90% of the complaints must be resolved by the service provider within 15 days and 95% of the complaints to be resolved within 30 days.

Consequently, service providers must meet the standard of not receiving more than 50 complaints per 1,000 subscribers over a 12 month period. Network service providers (NSPs) and applications service providers (ASPs) must maintain complete and accurate records of customer complaints and submit reports to the SKMM from time to time as required.

#### **Billing Complaints**

The percentage of complaints about billing must not exceed 2% of all bills issued within a billing period. 90% of billing complaints must be resolved within 15 business days following receipt of the complaints; and 95% of billing complaints must be resolved within 30 business days following receipt of complaints.

#### **Network Performance**

On network performance, the latency of the network – i.e. the packet round trip time between the broadband user and the Malaysia Internet Exchange (MyIX) should not be more than 250ms 95% of the time. The throughput between the broadband user and MyIX should be not less than 70% of the subscribed speed for 70% of the time and the packet loss should not exceed 5%.

#### **Better User Experience**

So as to provide better services to subscribers while complying with mandatory standards for quality of service (QoS), service providers shall improve their respective network infrastructure to maintain QoS at the required level.

They must also modify their package pricing to subscribers to commensurate with attainable QoS, if they are unable to upgrade their network infrastructure to provide the minimum QoS as required here.

#### **SKMM's Role**

SKMM has regulations in place to protect the interest of consumers. SKMM requires service providers to clearly inform the subscribers upfront what they are signing up for. Information on product brochures and service providers' websites for example must be in large fonts.

The CCB has a portal at http://aduan. skmm.gov.my with information on how to make complaints. The Commission also has other information for the public's knowledge on consumer codes, regulation and so on in its own website (www.skmm.gov.my). To enhance network security and integrity, SKMM regularly monitors services and content to prevent against cyber attacks. The Commission also manages the mobile ecosystem – for example, to ensure proper prepaid mobile registration.

SKMM has also made non-compliance a serious offence. Breaches of Section 105 (3) of the CMA 1998 such as inaccurate reporting, late submissions of reports and sub-standard performance are liable to a fine not exceeding RM100,000 or to imprisonment not exceeding two years or both.

#### **Industry Self-Regulation**

Besides the above mandatory standards, consumer codes and its Complaints Bureau, the Communications and Multimedia Consumer Forum CFM) was established by SKMM to enable its members – i.e. the service providers to regulate themselves.

Another body, the Communications and Multimedia Content Forum of Malaysia (CMCF) established at the same time, is an industry association responsible for the preparation of a Content Code, or codes as the need may arise.

#### Communications and Multimedia Consumer Forum

CFM is a national organisation funded by SKMM that was established in February 2001, in line with the requirement of the CMA 1998. CFM functions not only to provide an avenue and channel for complaints but also to draft, develop and prepare Codes that protect the rights of the consumer, recommending procedures for compensation and any other courses of action to the customer in case of a breach of the Consumer Code. CFM was established as a society with representation from all relevant parties, including the 'supply and demand' side of the communications and multimedia industry. There are 13 members. Seven of the members represent the 'supply' or industry side and are drawn from the industry, such as senior executives of telcos and mobile service operators. Six other representatives are from the 'demand' side, such as representatives from consumer bodies, NGOs and so on.

CFM set up its own voluntary benchmark for the communications and multimedia industry to provide and set the standard for an effective complaints handling system. Known as the General Consumer Code of Practice (GCC Code), it sets benchmarks for service providers on areas such as advertising and representation of services, charging billing as well as privacy of personal information to the setting up of a complaints handling system. The GCC is a self-regulatory Code and binding on and requires compliance from all licensees under the CMA 1998.

The CFM also endeavours to promote and encourage high standards of service and conducts performance audits throughout the communications and multimedia industry and to develop consumer confidence. Consumers who are unhappy with the quality of service they receive can also lodge complaints. The procedures to do so can be found at the forum's website located at www.cfm.org.my.

#### Communications and Multimedia Content Forum of Malaysia

The Communications and Multimedia Content Forum of Malaysia (CMCF) was established in February 2001 under a clause in CMA 1998 to govern content and address content related issues. CMCF is made up of six 'Ordinary' member categories, namely Advertisers, Audiotext Hosting Service Providers, Broadcasters, Civic Groups, Content Creators / Distributors and Internet Access Service Providers.

Functioning as a self-regulatory body, the CMCF governs content by self regulation, in line with the Malaysian Communications and Multimedia Content Code registered with SKMM.

The Content Code under Section 211 of the CMA 1998 prohibits content application service providers or any other person using a content applications service such as email, blogs, websites, SMS, etc to provide content which is indecent, obscene, false, menacing or offensive in character, with intent to annoy, abuse, threaten or harass any person, by making such guilty parties liable to a fine, imprisonment or both.



Besides that, the code's scope includes but is not limited to methods of classifying content, procedures for handling public complaints and for the public to make complaints to the SKMM, the representation of Malaysian culture and national identity, the providing of public information and education regarding content regulation and technologies for end user content, and other matters of concern to the community.

CMCF operates a Complaints Bureau that addresses grievances from consumers and industry members on matters relating to content over the electronic networked medium. The forum's website can be found at www.cmcf.my.

#### A Comprehensive Approach

As described above, SKMM has over the years aided the creation of a comprehensive consumer protection structure for the multimedia and communications consumers.

Aggrieved consumers can lodge complaints with the service providers, approach industry forums for more support and lodge complaints with SKMM itself. It encourages consumers to familiarise themselves with the complaint process and exercise their rights as consumers. It continually monitors the operations of service providers and has, whenever necessary, implemented regulation and appropriate interventions that protect the interests of consumers and their rights.

The Commission has also overseen the rollout of infrastructure and broadband services in underserved areas. At the same time, SKMM regularly conducts consumer education and awareness programmes to empower and inform consumers on their rights and obligations, as well as make known various avenues to resolve their grievances.

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# Track And Trace Is Happening...

Ultra tiny radio chips are simplifying the global supply chain management process. John Tay explains how items are tracked from point to point electronically. Il producers and service providers receive inputs from one or more upstream suppliers and deliver outputs to one or more intermediaries downline, who in turn supply their intermediaries until the products reach consumers.

These days, parts are sourced from around the world. Companies are divesting themselves of their vertical operations to focus on their core competencies. The resulting network of suppliers can thus be long, from end to end, with greater reliance on logistics companies to transport the goods between each node efficiently, securely and on time in an increasingly complex supply chain.

Mentzer et al (2001) define a supply chain as a set of organisations directly linked by one or more of the upstream and downstream flow of products, services, finances and information from source to consumers.

Supply Chain Management (SCM) addresses problems in distribution network configuration, distribution strategy, trade-offs in logistical activities, information, inventory management and cash flow. Information and communications technology (ICT) in the form of specialised software and its associated communications infrastructure are increasingly being used to help improve the efficiency of SCM, including tracking and tracing the movement of goods along the chain.

Today, a technology called Radio Frequency Identifications or RFID is increasingly used to further enhance the efficiency and effectiveness of SCM to provide a more automated and granular tracking and tracing of goods throughout the chain. This is done by providing suppliers and their recipients with real-time or near real-time information on the location of their goods, inventory status and related information vital to their operations.

#### What is RFID?

RFID is a technology which communicates by using radio waves to exchange data between a reader and an electronic tag attached to an object for the purpose of identification and tracking.

Its early manifestation was in the Identification, Friend or Foe (IFF) transponders mounted on military aircraft, vehicles and troop formations during World War II.

The world's first IFF device transponder was the FuG-25a developed by the Germans in 1940 and installed on their aircrafts. Two keys with 10-bit codes each were inserted into it before takeoff. To interrogate the aircraft, the ground operator switched the frequency of his radar from 3,750 to 5,000 Hz and the FuG-25a receiver detected this shift and transmitted its code. Unfortunately for the Germans, the British also developed their own IFF system and were also able to trigger a response from the FuG-25a, thus betraying the position of German aircraft.

Modern IFF systems use a separate specialised transponder beacon which operates without radar and IFF systems are



Some samples of the halal products shipped during the trial shipment Carrying out final packaging of products in the container for shipment to China



▲ RFID reader reading the ehalal RFID tag on the carton box

now found on most powered aircraft, whether military or civilian.

The first true RFID device developed by Mario Cardullo was demonstrated to the New York Port Authority and other potential customers in 1971. It was a passive radio transponder with 16-bit memory for use in toll collection.

Most RFID tags today contain at least two parts. The first is an integrated circuit for storing and processing information, modulating and demodulating the radiofrequency (RF) signal and other specialised functions. The second is an antenna for transmitting and receiving the signal.

Low frequency tags (125 – 134.2 kHz and 140 – 148.5 kHz) and high frequency tags (13.56 Mhz) can be used worldwide without a licence. However ultra high frequency tags (868 – 928 MHz) require a licence, though different countries or regions designate different licensed or unlicensed frequency blocks within this band.

In Malaysia, SKMM has designated 919–923 MHz for unlicensed use (class assignment). Its 4 megahertz bandwidth can be split into 20 x 200 kHz channels or 8 x 500k Hz channels depending on requirements.

#### RFID Standardisation Industry Groups

There are various standardisation groups that work to ensure that RFID products are based on the appropriate protocols and can interoperate with one another.

EPC Information Services (EPCIS) is a global standard designed to enable data sharing related to Electronic Product Code (EPC) technology within and across enterprises. This standard allows participants in the EPCglobal Network to have a common view of the disposition of EPC-bearing objects within a business context.

Its coordinating body, EPCglobal was formed in October, 2003 as the successor organisation to the MIT Auto-ID Center, the original creator of the EPC technology. EPCglobal today manages the EPC network and standards, while its sister organisation, Auto-ID Labs, manages and funds research on the EPC technology.

The initial version of the EPCIS standard was ratified in April 2007. It defines standard interfaces to enable EPC-related data to be captured and subsequently to be queried using a set of service operations and an associated data model, typically involving the use of persistent databases, though application-to-application sharing can occur without persistent databases.

#### **Passive, Active and Assisted**

There are three types of RFID tags. The first are passive tags without a battery and powered by the incident RF signal which activates

them. These are the most affordable, with tag prices as low as 5 US cents each in 2011. In March 2010, a South Korean laboratory successfully created a printed chip using carbon nanotubes which would reduce the price of UHF RFID tags to as low as 3 US cents by late 2011.

Specialised passive tags for mounting on metal or which can withstand gamma ray sterilisation can cost as much as US\$5 a piece.

The second are active tags with an onboard battery which always transmits its signal. These are used to track containers, medical supplies or to monitor environmental conditions in data centres. Their price start from US\$5 each and can go as high as US\$100.

The third are battery assisted passive (BAP) tags which have small onboard batteries. They are activated by an incident RF signal. These tags cost between US\$3 and US\$10 and also have sensors for temperature and humidity.

The reduction in prices of RFID tags, increased reliability of 99.9% and a stable international standard around UHF passive tags are three key factors which have led to increased use of RFID.

#### Readers

RFID readers come in different shapes and sizes. Some are mounted in a stationary position, such as at toll gates, libraries and supermarket checkout counters, while others are portable and handheld, such as those used in inventory management, in hospitals, asset tracking, in container yards, libraries and so on.

Depending on security and privacy requirements, the range between a reader and an RFID tag can vary from below 30 cm up to as far as 100 metres.

A familiar example is the Touch 'n Go card, a passive RFID card used in Malaysia to pay for road use public transport. These cards must be held a few centimetres from the reader, which makes sense since this avoids the charging to other Touch 'n Go cards within the vicinity.

On the other hand, a gantry mounted RFID reader used in container yards would have a longer range, depending on the type of use, while long range, handheld readers could be used on farms to track RFID tagged animals.

#### **Uses of RFID**

The uses of RFID worldwide are countless and are becoming mandatory requirements in some cases.

Public listed companies in the United States are required to comply with strict accounting and reporting requirements. Executives who knowingly falsify reports can face up to 20 years imprisonment and a fine of up to US\$15 million. Public corporations are thus turning to RFID to help an accurate track of their key assets, inventory, trades,



▲ The working group inspecting the container before shipping. The author is third from left.



Container loaded into the truck to be transported by land to North Port

offices and even their personnel to be able to better comply with regulations.

The US based giant retailer Walmart and the United States Department of Defense (DoD) are two of the biggest users of RFID, and they have dealings with thousands of suppliers worldwide.

In January 2005 Walmart required its top 100 suppliers to put RFID labels on all cases and pallets shipped to it, with penalties for each item in default, which Walmart had to itself tag.

Results of a preliminary study by the Information Technology Research Institute at the University of Arkansas concluded that the use of RFID reduced out-of-stock situations by 21%, compared to stores not using the technology.

Walmart was able to reduce lossmaking out-of-stock situations by 30% for items which were selling at one unit per 10 days to 15 units per day.

RFID has a host of other uses. For example, pharmacies use them to keep track of the location and inventory of medicines, which saves time and money and helps them to identify counterfeit drugs, while pet owners use them to locate their cats and dogs.

Likewise, in 2005, Wynn Casino in Las Vegas placed RFID tags on its high-value chips to weed our counterfeits, speed up chip tallies, avoid counting mistakes by tellers and to track individual player's betting habits.

Unlike bar codes where each item must be read in line of sight and individually, reading RFID tags does not require line-of-sight and moreover they can be read en-mass, which



 Container loaded at North Port and waiting for arrival of ship

lets supermarket checkout counters read all items in a shopping cart at once, which saves time and labour, and it also allows for customer self-checkout.

Likewise, library book borrowers can checkout their RFID tagged books in a batch, rather than individually and their returns can be likewise easily logged as they drop them into the return hatch after library hours.

One of the oldest applications of RFID tagging is of animals on large farms and ranches, which has become crucial, especially since the outbreak of mad cow disease.

The Canadian Cattle Identification Agency (CCIA) began using RFID tags on each bull or cow to enable it to know the herd from which it came when a carcass is rejected by the meat packing plant. The state of Wisconsin in the US subsequently adopted CCIA's tags.

The US Department of Agriculture has been approving and providing RFID tags for farm animals as part of its National Animal Identification System.

One of the biggest uses of RFID is to pay for public transit – i.e. bus, mainline and metropolitan trains in cities across the developed and developing world. Malaysians are all too familiar with the Touch 'n Go card used to pay for both.

The Touch 'n Go Card is a contactless proximity card based on an embedded MIFARE (MIkron Fare Collection System) chip from NXP Semiconductors, which was spun off from Philips Electronics in 2006. While MIFARE is basically a proprietary technology, it is based on various levels of the ISO/IEC 14443



▲ The Director General of Jakim and Guangzhou Islamic President Hj Mustafa Ma and other officials at the ceremony held to mark the occasion.

Type A 13.56 MHz contactless smartcard standard, and hence is a version of RFID.

Mobile computers with built-in RFID readers are used for asset tracking and maintenance management, with the information accessible to management anywhere in the world through a web browser via the Internet.

When used in conjunction with RFID, the movement of software, assets or goods can be tracked. For example, in 2008, Emirates Airline began trials of RFID baggage tracking at London and Dubai Airports.

RFID also helps companies reduce labour costs, simplify their business processes and reduce inventory inaccuracies.

Transportation and logistics are two of the biggest users of RFID. For example the North American railroad industry has RFID tags placed on both sides of each item of rolling stock, including locomotives and carriages, so that it can identify each item by its owner, car number, type of equipment, number of axles and other details.

The Hong Kong International Airport individually attaches RFID tags to baggage carried along by its baggage handling system which improves efficiency and reduces lost baggage. In 2010, Qantas introduced the use of RFID cards and baggage tags in Australia's domestic airport terminals to speed up passenger check-ins and to track and recover baggage.

#### e-HALAL Track and Trace

Track and Trace using RFID is one of the Entry Point Projects (EPPs) under the Communications, Content and Infrastructure (CCI) New Key Economic Area (NKEA), one of the 12 NKEAs under Malaysia's Economic Transformation Programme (ETP) which seeks to transform Malaysia into a highvalue creating, high-income nation by 2020 and to make Malaysia one of the top five in the Asia Pacific region's container track and trace business. The ETP, NKEAs and EPPs are managed by the Performance Management and Delivery Unit (PEMANDU) under the Prime Minister's Department.

It is also one of the transport and logistics Digital Lifestyle solutions. The supporting infrastructure is being deployed nationwide between 2010 to 2012, serving Penang Port, North Port and West Port in Port Klang, the Port of Tanjung Pelepas, Johor Port, Kuantan Port, Kuching, Bintulu and Kota Kinabalu ports, as well as the Padang Besar and Bukit Kayu Hitam border entry points.

So far, Penang Port, North Port and Johor Port are served, with the rest of the above locations in the pipeline. There are also plans beyond 2012 to serve Free Commercial Zones, Free Trade Zones and Free Zones in Malaysia.

Between May and November 2010, SKMM worked with the Department of Islamic Development Malaysia (JAKIM) on the first RFID-based system, called e-HALAL, for tracking shipments of halal food from Malaysia to Guangzhou, China. It was officially launched on 23 November, 2010 by JAKIM director general, Datuk Wan Mohamad Sheikh Abdul Aziz.

The shipment of halal-certified food from the point of production to the customer requires that the food, its transportation, and the warehouses it is stored in must also be halal.

In this pilot project, the tracking began at the points of food production, where boxes of different kinds of goods were tagged with RFID EPC Gen2 passive tags which were made in Malaysia. The tracking continued as the food was transported to Kontena Nasional's warehouse which was certified as halal by JAKIM . At Kontena Nasional, the boxes are packed in its halal-certified container and sealed with an active RFID tag.

Online readings taken along the route to coordinate the readings of the passive tags with those of the active tags on the container and the tracking continued all the way as the goods were transported to North Port where there was a gantry RFID reader.

From there, the halal consignment was transported by sea to Hong Kong Port and then Panyu Port, Guangzhou in time for the Asian Games 2010. SKMM and JAKIM worked closely throughout with the Customs and Excise Departments, Hong Kong RFID Association, Guanghzou RFID Center and Panyu Port Authorities. At the same time, customers could check through a web portal where the goods were on the halal route. The e-HALAL track and trace project won fifth place in the RFID World China 2010 organised by the China RFID Industry.

On 19 April 2011, Malaysian Prime Minister, Dato' Seri Najib Tun Razak announced a new project to track exports of birds' nests to China using RFID as part of the NKEA projects. Other projects using RFID in Malaysia are in the power, health and government sectors.

The benefits of the adoption of RFID technology are improved productivity, decreased cycle time, reduced business risk, control of assets, improved security and service and increased revenue.

Over time, it is expected that RFID technology will be used in the vast majority of goods that move in and out of Malaysia and an integral component of Digital Lifestyle Malaysia.



## Cognitive Radio Technology: A SULYCEY

A team from the Wireless Communications Cluster, MIMOS Berhad, presents their findings on the current state of cognitive radio technology.

adio spectrum is a finite natural resource, while the demand for wireless communications is increasing at an exponential rate in recent years. The current fixed spectrum allocation has resulted in an artificial scarcity of radio resources. As a result of this scarcity, new technology innovation in the radio-networking field is needed to ensure that the demand for radio spectrum can be met efficiently. Cognitive radio with dynamic spectrum allocation offers the promise of being able to resolve this problem. This article provides a survey on recent trends and advances from different perspectives, including research activities, commercialisation, standardisation and regulatory aspects. We also highlight potential applications and outline open issues related to cognitive radio.

#### Introduction

The wireless communications industry has enjoyed unprecedented growth and the number of mobile phone users has increased tremendously in the last decade. According to the International Telecommunications Union's (ITU) statistics, the total mobile phone subscribers worldwide was at 4.6 billion in 2009. This translates to 68% mobile phone penetration rate with an average of 7 mobile phone users for every 10 persons. This is a staggering number as compared to only 8% mobile phone penetration rate back in 1999. In the next few years, it is expected that the mobile phone industry will embark into a new frontier and move beyond connecting people. The Wireless World Research Forum (WWRF) has outlined a grand vision of "7 trillion wireless devices serving 7 billion people by 2020". This projection assumes that everyone will be served by wireless devices and the emergence of machine to machine communications will make all devices a part of the Internet.

Given the above scenario, it is evident that the demand for future wireless systems will go through an even more exciting era than the previous decade. However, this trend also poses a technological challenge due to the limited number of radio frequency or spectrum availability. Spectrum is the most fundamental asset, without which it is impossible to transmit audio, video or data between two wireless devices. The total spectrum available today has not changed since Marconi discovered wireless transmission back in 1896. Today the practice of fixed spectrum allocation, where spectrum is sold or allocated to service providers or agencies that have the sole ownership of the spectrum, is dominating the way spectrum is allocated. Once a frequency range or band is assigned to a particular system (for example, TV broadcasting), it cannot be used for the other services (for example, mobile cellular system).

The wireless industry stakeholders are now putting considerable effort to support trillions of wireless devices and future applications utilising a finite number of available spectrums. This requires a new paradigm in spectrum management, as the current fixed allocation is inefficient. Figure 1 illustrates the sparse spectrum usage with some frequency bands more heavily used than others in the 54 - 862MHz frequency range when the measurement was made in Kuala Lumpur in 2010. One of the promising solutions is to employ cognitive radio system, which makes use of an intelligent



Figure 1: Spectrum occupancy in Kuala Lumpur (Source: Omar, M.H., Hassan, S., and Shabli, A.H.M., "Feasibility Study of using IEEE 802.22 Wireless Regional Area Network (WRAN) in Malaysia," NETAPPS 2010, pp. 198 - 202). method to capitalise on available frequency bands. This is achieved by utilising sensing function to understand, decide and learn about its geographical environment, as well as dynamically adjusting its operational parameters and protocol to attain best possible performance. Cognitive radio system allows new or secondary devices to opportunistically access a portion of spectrum, which belongs to primary (licensed) users. To achieve this objective, cognitive radio terminals must be geared with enhanced spectrum management capabilities, including the detection of unused spectrum holes (spectrum sensing), the characterization of available bands (spectrum decision), the coordination with other cognitive devices in the access phase (spectrum sharing), and the capability to handover towards other spectrum holes when licensed users kick in or if a better spectrum opportunity becomes available (spectrum mobility).

#### **Research and Development**

Cognitive radio concept was first introduced by Mitola in 1999, which is an enhancement to the Software Defined Radio (SDR) concept that was introduced in early 1990's. Between 1999-2003, there were only 2 to 5 research publications related to cognitive radio published in the Institute of Electrical and Electronics Engineers' (IEEE) conferences and journals. Nevertheless, cognitive radio system has attracted much attention from the research community recently and the number of research papers has increased as shown in Figure 2. In the past 5 years, the number of publications has increased exponentially. It is interesting to note that on average there are 6.2 research papers published per day, with a total of 2267 research papers published in 2010. These research works were mainly conducted at universities and research institutes to address numerous technical challenges in cognitive radio system.

Many companies and organisations have recognized the potential of cognitive radio system and they are putting considerable efforts and financial investment towards the realisation of practical cognitive radio systems. Figure 3 shows the number of granted patents related to cognitive radio from 2000 to 2010. The number of patents has increased rapidly in the past 5 years, which is consistent with research publications shown in Figure 2. On average there are about 15.2 patents granted per month in 2010. Top patent assignees are shown in Figure 4, which include Nokia, Ericsson, LG Group, Siemens, Samsung and other major telecommunications equipment manufacturers.



▲ Figure 2: Number of research papers related to cognitive radio published in IEEE conference proceedings and journals.



Figure 3: Number of patents on cognitive radio (2000 – 2010).



▲ Figure 4: Top assignees and the accumulated number of patents on cognitive radio (2000 – 2010).

#### Test-Bed and Commercial Product

The design and implementation of test beds are crucial to demonstrate, not only theoretically but also practically, that a cognitive radio terminal can reliably perform sensing and adapt to changes in their environments. Since 2005, several universities and research institutes had put their resources and efforts in developing research test beds and platforms to validate the cognitive radio performance. A summary of these achievements is briefly described chronologically in Table 1.

Cognitive radio technology is still at its infancy. However, some commercial products with basic cognitive radio capabilities are now emerging in the marketplace and this is an encouraging development, even though these products may not have the full cognitive capability as described by Mitola just yet.

The following is our reviews of some of the companies such as IMEC, Adapt4, xG Technology and Cisco and their technologies. It is worth noting that basic cognitive radio techniques, such as dynamic frequency selection and transmit power control, are already available in some other unlicensed wireless devices.

IMEC is a research company and they have launched a cognitive baseband radio (COBRA) high performance architecture targeting 4G requirements at up to 1 Gbit/s throughput and multiple asynchronous concurrent streams. However, this project is working on a reconfigurable physical layer chip and it is still in wireless prototype stage. If IMEC is successful, their technology could be used in the future to build actual cognitive radio systems.

Adapt4, on the other hand, commercialises proprietary data transmission systems in the 217-220 MHz band, which can be used for surveillance and monitoring. Adapt4 claims to be the pioneer in implementing practical, cognitive radios. However, they offer low data rates (between 30 to 180 kbps of data throughput) and they do not specify how sensible and agile this detection process is.

The core of xG Technology is its capability in sensing for other systems that is in the same band and determining if interference has reached unacceptable levels, and in such cases, adapting by changing bands. This process can be carried out up to 33 times a second. The main practical problems a product of this kind has to deal with are the synchronisation issues and robustness of the detection scheme. Because the technology makes use of the characteristics of the physical layer and allow handover decisions to be made by fussing multiple samples and measurements, the system is able to avoid unnecessary band switches due to a temporary interference or degraded network conditions.

Cisco's CleanAir Technology allows the wireless nodes to build an interference map and reconfigure the network to optimise the performance. This technology is widely used in the unlicensed 802.11n networks. However, while the resulting systems are selfhealing and self-optimising, this process is probably not agile enough to be used with licensed bands.

#### **Standardisation Activities**

Development of standards is important for the development of new cognitive radio technologies as they encourage innovation in the industry and shorten the time to market. This will also ensure the interoperability of products from different companies. The standardisation process for cognitive radio can lower the development and production costs, and at the same time increase competition among the different manufacturers. This will benefit consumers In the end.

The standardisation initiatives can be divided into two main groups, based on IEEE 1900 and the ITU. The IEEE 1900 was initiated by the Standard Association Boards of IEEE Communications Society and IEEE Electromagnetic Compatibility Society. The study group and areas of study is illustrated in Table 2. The standardisation work at the ITU-R has two study groups, namely Study Group 1 and Study Group 8, and the area of study is shown in Table 3. It is expected that the standards being developed by these two groups will be of great interest to regulators as they struggle with critical issues on how to improve the efficiency in which spectrum is used while at the same time protecting incumbent users from interference.

Other organisations involved in standards activities include the SDR Forum, Object Management Group (OMG) and IEEE 802.22. The IEEE 802.22 was developed for Wireless Regional Area

Year	Test-bed / Platform	Description
2005	Virginia Tech Cognitive Radio System	This platform can sense and be aware of its environment condition such as interference, channel condition. The radio was designed with the needs of a Cognitive Engine (CE) to analyse the physical link, user demands, and regulatory regimes, and it must balance multiple objectives and constraints.
2005	BEE2 – Berkeley Emulation Engine	This platform contains five high-powered Virtex2 FPGAs and can connect up to 18 daughterboard. This cognitive radio platform requires only a low bandwidth connection to a supporting PC as all signal processing is performed on the platform.
2005	USRP – Universal Software Radio Peripheral, Ettus Research.	The original USRP is a very low cost software radio device. It connects to a host computer by USB 2.0 (480 Mb/s), and can send up to 16 MHz of RF bandwidth in either direction. It can accommodate up to 2 transceiver daughterboard, making it 2x2 MIMO capable out of the box.
2006	LYRTECH	LYRTECH is a single unit SDR solution. This board includes a general purpose processor and FPGA onboard to do all of the signal processing. While less expensive than the BEE2, this board is significantly more expensive than the USRP2.
2007	KUAR – Kansas University Agile Radio	The KUAR is specifically designed to address the needs of wireless networking and radio frequency (RF) research. It features a modular design consisting of separate power supply, digital processing, and RF sections. The KUAR is a platform that can be used for cognitive radio and Dynamic Spectrum Access (DSA) network research.
2007	Centre for Telecom. alue-Chain Research (CTVR), Dublin University	This platform has two main objectives. The first main objective of the reconfigurable core is to implement any and all of the required changes in the entire communication stack from the Application to Physical Layer (PHY). The second main objective of the core is to provide awareness information to the cognitive engine. This information may include both internal radio communication system awareness and external radio environment awareness.
2008	USRP 2 – Universal Software Radio Peripheral 2, Ettus Research	The USRP2 builds on the success of the original USRP, offering higher performance and increased flexibility. The USRP2 connects to the host computer via Gigabit Ethernet, allowing it to send up to 50 MHz of RF bandwidth in and out simultaneously. It contains a much larger FPGA which can even be used to operate the device in a standalone fashion, without a host computer.
2008	WARP – Wireless Open Access Research Platform, Rice University	WARP provides a scalable and configurable platform mainly designed to prototype wireless communication algorithms for educational and research oriented applications. Its programmability and flexibility make it easy to implement various physical and network layer protocols and standards.
2010	CORAL - Communications Research Centre (CRC), Canada	CRC has developed a commercial WiFi-based cognitive radio development platform. The system will be of interest to both researchers and wireless Internet service providers building multipoint relay and other types WiFi networks. The system can undertake radio interference sensing and autonomously adapt to the sensed interference.

▲ Table 1: Test-bed and Platform for Cognitive Radio

Study Group	Area	Description
IEEE1900.1	Terminology and concept	Provide accurate technical definitions and explanation of key concepts in the fields of spectrum management, policy defined radio, and related technologies. Produce a new standard entitled, Standard Definitions and Concept for Spectrum Management and Advanced Radio System Technologies.
IEEE1900.2	Interference and coexis- tence analysis	Study on potential coexistence of contrast interference between radio systems operating in the same band or between different frequency bands. Produce a document entitled "Recommendation Practice for Interference and Coexistence Analysis.
IEEE1900.3	Conformance analysis of SDR system	Study on technical guidelines for analysing SDR software modules to ensure compliance with regulatory and operational requirements. Produce a report, entitled "Conformance Evaluation of Software Defined Radio (SDR) Software modules".
1900 Study Group A	Dependency and evaluation of regulatory compliance	Study on dependability, evaluation, and multiple levels of access aspects of dynamic spectrum access (DSA).
1900 Study Group B	Coexistence support for reconfigurable, heterogeneous air interfaces	Study on system architecture for reconfigurable, heterogeneous air interfaces and networks.

▲ Table 2: Standardisation Activities on CR/SDR within IEEE 1900

Study Group	Area	Description
ITU-R Study Group 8	Technology Definition, Coexistence	Published two reports on SDR technology and application of SDR to IMT-200 and other land mobile systems. This study group also approved a study question on "Cognitive Radio Systems in the Mobile Service".
ITU-R Study Group 1	Spectrum Management	Study on spectrum management associated with cognitive radio and other advanced radio systems based on input from ITU-R Study Group 8. In other words, this group conducts a study on spectrum management in order to obtain the spectrum efficiency attributed to both SDR and cognitive radio systems.

▲ Table 3: Standardisation Activities on CR/SDR within ITU

Network (WRAN) using white spaces in the TV frequency spectrum. The development of the IEEE 802.22 WRAN standard is aimed at using cognitive radio techniques to allow sharing of geographically unused spectrum allocated to the Television Broadcast Service, on a non-interfering basis, to bring broadband access to hard-to-reach, low population density areas, typical of rural environments, and is therefore timely and has the potential for a wide applicability worldwide.

#### **Regulatory Activities**

The regulatory agencies involved in developing rules for cognitive radio are the Federal Communications Commission (FCC), US; the Office of Communications (OFCOM), UK; and the Electronic Communications Committee (ECC) of Conference of European Post and Telecommunications (CEPT). In this section, we will elaborate on regulatory activities related to cognitive radio technology.

In 2002, the FCC's Spectrum Policy Task Force Report reported that a considerable amount of spectrum is available when both space and time are considered. The FCC was interested on how radios capable of adapting spectrum use to the real-time conditions of the operating environment could help achieve more flexible, efficient, and comprehensive use of available spectrum while reducing the risk of harmful interference. The most important event in the development of cognitive radio happened in 2004, when the FCC issued a Notice of Proposed Rulemaking (NPRM) that raised the possibility of permitting unlicensed users to temporarily "borrow" spectrum from licensed holders as long as no excessive interference was seen by the primary user. In 2005 the FCC adopted its first "Report & Order" on cognitive radio and expressed its intent to continue to explore new and evolving applications of cognitive radio. This technology also emerged as a topic in various spectrum proceedings on Rural Wireless Policy, Secondary Markets,

Unlicensed Use in Television Bands, and others.

The FCC made it clear that it viewed cognitive radio as important in both "exclusive use" and "unlicensed" policy making contexts. Because FCC technical rules for most licensed services already afford licensees significant technical flexibility, the rules typically accommodate new technical approaches such as cognitive radio, without significant revisions. Nevertheless the FCC has sought out new ways to exploit cognitive radio's potential. For example, the technical considerations of real-time spectrum leasing scenarios such as "interruptible" spectrum markets were discussed as early as the cognitive radio proceeding itself, and were important in crafting the secondary markets "private commons" leasing technique and other new approaches. Such new techniques are backed by enforcement authority against licensees, should the need arise, giving the spectrum policy planner a degree of comfort.

In the UK, the OFCOM has also made significant progress in developing regulations for the digital dividend bands by issuing a consultation on February 16, 2009, and releasing a statement in July 2009. The detailed rules have yet to be released but indications are that TV bands devices will require either sensing or geolocation/database access. The OFCOM consultation targets two spectrum awareness schemes: spectrum sensing and the use of geolocation information. On spectrum sensing, OFCOM proposes a number of technical specifications, the usage of which will amount to a low degree of interference with a high degree of reliability. The proposed spectrum sensing requirements (assuming a 0dBi antenna) are for -114 dBm in an 8 MHz channel (DTT) and -126 dBm in a 200 kHz channel (wireless microphones) respectively. Furthermore, OFCOM proposes a transmission power cap of 13 dBm (adjacent channels) to 20 dBm, a maximum transmission time of 400 msec and a minimum pause time (after each transmission) of 100 msec. In the case where cognitive devices use geolocation information, a location accuracy of 100 metres, along with similar maximum transmission time and minimum pause time is proposed. Geolocation based cognitive radios need to follow the guidelines of the database regarding transmission power schemes.

The ECC has just begun working on cognitive radio in the TV bands within its newly created group SSE 43, which is tasked with defining the technical and operational requirements of operating in the TV white spaces. Draft ECC Report 159 has been released for public consultation. It is interesting to note that in the context of FCC deliberations, the draft ECC report also notes current doubts in regulatory circles with regards to the reliability of spectrum sensing in autonomous WSD deployment.

#### Potential Cognitive Radio Applications

We have deliberated on the fundamental knowledge of cognitive radio and its related research in the field of wireless communications. In this section, we are going to describe various applications of cognitive radio and its impact on the public and industry. Applications of cognitive radio can be categorised into 3 main areas, namely, smart grid networks, public safety networks and wireless medical networks.

There has been increasing interest in the transformation of the 20th century power grid into a smart grid as a way of addressing energy independence and sustainability. With smart grid, power is generated, delivered, consumed and billed by means of adding intelligence to the system. Such is the case that sufficient access to communications facilities is critical to the success of the system. As an example, home/building area networks (HANs) that connect smart meters with on-premise appliances can use WiFi or ZigBee for communications purposes. Today, some wireless meter readers in the US are currently using the 900MHz unlicensed band for communications purposes. However, since this band will soon become crowded due to the growth of unlicensed devices, potential uses in licence-exempt frequency bands such as between the 700 MHz - 1 GHz and the 2.4 GHz band, will potentially ease the matter. Cognitive radio's ability to dynamically and temporarily access the spectrum will be able to resolve the challenge of overcrowded spectrum.

In the area of public safety networks, the lack of radio interoperability is usually highlighted as one of the major problems following any large-scale public safety event. It would be difficult for the personnel from different supporting agencies to communicate with each other if they operate on different bands with multiple radios in each vehicle. To cope with this challenge, cognitive radio was identified as a solution to increase efficiency and effectiveness of spectrum usage. With cognitive radio, public safety users can use additional spectrum such as the licence-exempt TV White Space (TVWS) for daily operation. For example, the public safety community could roam on commercial networks in 700MHz band and potentially other bands, where public safety broadband wireless networks are not available or in a situation where there is currently an operating public safety network but more capacity is required to respond effectively to an emergency.

The medical body area networks (MBAN) is a promising solution for eliminating wires associated with medical equipments attached to patients. This could be achieved by manipulating sensors to reliably and inexpensively collect multiple parameters simultaneously and relay the monitoring information wirelessly so that medical workers can respond rapidly. In the medical body area networks, the quality of service is a key requirement for the systems and hence the importance of having a relatively clean and less crowded spectrum band. With some of the promising techniques that could be implemented through cognitive radio, coexistence with other technology can be done.

#### **Challenges and Open Issues**

Cognitive radio has a great potential to improve spectrum utilisation by enabling users to access the spectrum dynamically without disturbing licensed primary radio functions. The presence of user priority (primary and secondary) poses a unique design challenge that is not faced in designing conventional wireless systems. A key challenge in operating these radios as a network is to implement an efficient medium access control mechanism that can adaptively allocate transmission power and spectrum among cognitive radio users according to the surrounding environment. Most existing approaches address this issue via suboptimal heuristic approaches or centralised solutions, such as interference free approach or interference tolerance approach. Another key challenge in spectrum management, particularly in spectrum sharing, is allocation of an unprecedented amount of spectrum that could be used for unlicensed or shared services. Opportunistic communication with interference avoidance faces a multitude of challenges in the detection of sharing in multi-user cognitive radio systems.

In order to improve the spectrum efficiency, the researchers are proposing a variety of increasingly complex methods of implementing cognitive radio, which incorporates software defined radio, dynamic spectrum management and intelligence. The challenge is to understand whether such complexity is justified, and what benefits it brings to overcome the current regulatoryconstrained spectrum assignment process. It is foreseen that it should be possible to develop reduced-complexity strategies that will deliver much of the functionality of the proposed systems, enabling more rapid adoption, and wider use in systems where cognitive radio is currently not being considered due to prohibitive complexity.

In order to achieve successful deployment of cognitive radio, this system requires robust security mechanisms to resist misuse. The emergence of dynamic spectrum allocation and cognitive radio raises new security implications that have not been previously studied. These security implications can be divided into spectrum access related threats (spectrum sensing, spectrum sharing) and radio software related threats. In radio software related threats, radio software for cognitive radio has unique properties that distinguish it from conventional software. Due to intrinsic operating characteristics



of cognitive radios, software running on them is likely to be complex, employing modular architecture, is reconfigurable and able to run in real-time. Without proper software protection mechanisms in place, cognitive radio is vulnerable to a host of attacks.

Another big challenge in the implementation of cognitive radio is related to the architecture of the respective hardware and software. According to the existing operators, cognitive radio chooses the best available option based on performance for each application based on the different performance measuring parameters, which include frequency, power, antenna, transmitter bandwidth, modulation and coding schemes. This means that devices have to deal with different radio spectrum and baseband varieties at the same time, thus requiring a more robust, efficient and reconfigurable hardware and software architecture. Another challenge is the cross layer design for cognitive radio. The flexibility of cognitive radio has significant implications to the implementation of cross-layer algorithms, which adapt to changes in physical link quality, radio interference, radio node density, network topology or traffic demand. Spectrum handoff and mobility management will face some new challenges, which is requirement for a cross layer design, especially when it is required to provide quality of service at the same time.

#### **Cognitive Radio in Malaysia**

Realising the importance of cognitive radio as an emerging technology, the Malaysian Communications and Multimedia Commission (SKMM), the regulatory body for the converged multimedia and communications industry, has initiated the Spectrum Research Collaboration Programme (SRCP) to invite universities and companies to conduct collaborative research into various aspects of spectrum research and management, including cognitive radio. The overall objective of the SRCP is to improve the expertise in spectrum management in Malaysia. The key focus research themes under the SRCP are in the areas of emerging wireless technologies and spectrum management. In addition to that, the SRCP also focuses on the agenda items of the World Radiocommunications Conference (WRC). While the respective research institutions and companies hold the rights to the research works, SKMM reserves the right to utilise the findings from those research works in drafting future policies, formulating suitable guidelines, and responding to WRC questions.

MIMOS Berhad, an agency under the Ministry of Science, Technology and Innovation (MOSTI) has embarked on the research and development of cognitive radio. The output of such research works will be used in test beds as Proof of Concept (PoC) prior to technology commercialisation. Primarily those technologies will be used in enhancing MIMOS' own product range, which is the WiWi (WiFi and WiMAX/3G hybrid access point). At the same time, a number of local universities such as UTM, UKM, MMU, UTAR and IIUM have been focusing on the fundamental research of cognitive radio. This healthy environment will promote further cognitive radio research and development efforts in Malaysia.

#### Conclusions

Cognitive radio technology has been identified as the solution for a more efficient utilisation of the scarce spectrum resources in a smart and intelligent way. By adapting the frequency to the temporary unused licensed band, and changing the operating parameters to suit the environment variations, cognitive radio technology can provide future wireless devices with additional bandwidth, reliable communications, and versatility for the rapidly growing data application.

Throughout this survey, it is shown that from the publications and patents that were produced between 2005-2010, there is an increasing trend in research and development into this technology. Additionally, a number of development test beds and early commercial products are now available to prove the applicability of cognitive radio technology. Besides technological advancement, standardisation and regulation also play important roles to expedite commercial applications of cognitive radio, although there are still challenges ahead. In summary, cognitive radio is an emerging technology that promises to be a breakthrough in spectrum management that will benefit the consumers, companies and regulators alike.

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## The Digital Radio Market

Tom Mockridge of Motorola Solutions explores the complexities and the various options available as the radio industry goes digital.

t is unlikely to have escaped the notice of watchers of the private mobile radio (PMR) industry in Asia Pacific that there is something of a digital standards competition going on in the market. As the different technologies and industry players vie for their share of digital radio sales, there has been a proliferation of groups promoting different digital radio technologies, and a deluge of marketing material giving the virtues of different approaches.

It can be quite hard to get clarity through the noise created by all this activity and so it is important to have a guide to help you understand the key areas of debate.

First the basics; there are four widely promoted digital standards, three of which originate from ETSI in Europe, TETRA, DMR, dPMR and one standard, P25, developed by the TIA in the United States. There is also NXDN, a proprietary technology owned by Kenwood and Icom. Each technology is backed by its own trade association. All the protocols have their strengths and weaknesses and different market positions. Anyone considering the purchase of a radio system would be wise to understand the advantages and disadvantages of each solution with respect to their needs both short and long term. Regulators also need to understand where the market is going in order to create a regulatory environment in which the users decide which technologies are successful rather than regulatory decisions, provided broad regulatory goals such as open competition and spectrum efficiency are met.

What is clear are the benefits of digital. Compared to analogue, digital delivers:

- clarity of voice and better performance at the edge of coverage areas through error correction and signal processing;
- easier integration with IP based data applications and external tools such as GPS and;

the availability of novel features because of the possibility to manipulate bit streams in innovative ways.

Of the five technologies, TETRA and P25 can be considered in a separate category due to their maturity and dominance of the public safety market segments which have some specific characteristics such as very high levels of security and resilience. So they will not be the focus here.

It also has to be acknowledged that although the subject of much discussion, commercial digital products today only account for a relatively small proportion of the overall market. In Europe, for example, where commercial digital has made strong progress, digital accounts for at most a few percentage points of the installed licensed radio base and analogue sales still make up the significant majority of currently shipping products. In the Asia Pacific region, analogue is proving even more resilient. As PMR radios have great longevity (occasionally manufacturers get request for parts for products that are 15 years old!) a consequence of this is that analogue is still likely to make up over 50% of the installed base past 2018, even with an aggressive roll out of digital. In other words there will be co-existence of digital and analogue for many years to come. But this does not, of course, mean that we should not plan for the digital radio future - it is definitely on its way, but unlike the cellular industry, the switch will be more gradual.

#### DMR

Outside of the TETRA/P25 high tier predominantly public safety trunked market segments, DMR (Digital Mobile Radio) is the most widely adopted digital standard with deployments in over 100 countries and with over 1,000,000 radios sold by mid 2011. The DMR Association, the trade group for vendors backing the standard has announced several successful formal interoperability testing sessions. More testing is set to take place in future. Details of tests are published on the DMR Association web site. There are now five radio manufacturers (Selex Communications, Radio Activity, Motorola, Hytera and Vertex Standard) with DMR products in the market. Tait, Team Simoco, Kirisun and Sepura have all announced forthcoming DMR models in a mixture of conventional and trunked formats. German rail radio specialist Funkwerk Koelleda is committed to DMR as are other specialist radio infrastructure suppliers. In total at least 12 DMR manufacturers are expected to have products on the market by early 2012. In addition to the radio makers themselves, there are a host of test equipment makers, protocol stack suppliers and application providers working on DMR technology - creating in the business jargon, a very strong ecosystem around DMR.

This wide and deep backing of the PMR industry for DMR has resulted in a high digital commercial PMR market share. Industry analyst IMS Research published figures in 2010 predicting that the global take up of digital radios over the period 2010 to 2015



will be over 70% DMR with figures for current sales figures trending above that. The DMR Association suggests that DMR may, in fact, take a greater proportion of the market than suggested by IMS, given the large and growing supplier base.

The strength of DMR as the leading digital technology, combined with the longevity of analogue, means that for regulators the overwhelming demand into the foreseeable future will be for 12.5 kHz channels in the commercial PMR bands, as both DMR and nearly all current analogue radios require 12.5 kHz channels. Even 6.25 kHz capable FDMA equipment is regularly deployed in 12.5 kHz channels by choice. The common bandwidth requirement of analogue and DMR is no accident as DMR was designed from the start for a smooth transition from analogue and sharing the same channel characteristics enables this.

One of DMR's main advantages is that it is fully plug-and-play with respect to existing 12.5 kHz licences issues in jurisdictions around the world, while at the same time doubling the capacity of systems through the use of two-slot TDMA. TDMA splits the 12.5 kHz channel into two via the use of two rapidly alternating A and B timeslots. This gives a licence holder two simultaneous but independent communication paths, one using timeslot A and the second using timeslot B while maintaining exactly the same spectrum profile as a legacy 12.5 kHz analogue channel. Providing two talk paths in 12.5 kHz of bandwidth gives a spectral efficiency of 6.25 kHz per path. The simplicity of this change is shown diagrammatically in Fig. 1.

Maintaining the channel profile also enables a happy co-existence of legacy analogue and new digital radios as the spectrum needs of the two types of radio are identical. Of other digital standards, only P25 can claim a similar win. This can be very useful for licensed radio system operators who may want to migrate part of their fleets to digital now and leave part analogue until a later time. The fact that all DMR radios on the market today have both digital and analogue modes and are able to switch automatically between them depending on the incoming communication type, facilitates co-existence even further. For users who have replaced all analogue equipment with digital there may also be situations where contractors come to a site with legacy analogue equipment and want to use analogue compatible spectrum from the site owner. There are good examples of this with operators of entertainment venues who regularly have temporary crews at their facilities with older equipment.

DMR is also plug-and-play with respect to infrastructure; old analogue repeaters are simply removed and new digital or hybrid digital/analogue ones installed. When the new repeaters are lit up capacity is instantly doubled when digital mode is employed. No other equipment is needed as existing antenna and other ancillary equipment remain the same. This is not the case with FDMA technologies where adding a channel can require a whole host of additional infrastructure as is shown in Fig. 2.

![](_page_45_Picture_11.jpeg)

![](_page_46_Picture_0.jpeg)

![](_page_46_Figure_1.jpeg)

The end-to-end digital nature of DMR enables applications such as text messaging GPS and telemetry to be easily added onto radio devices and systems. As the DMR standard also supports the transmission of IP data over the air, this enables the easy development of standard applications. In a world which increasingly relies on data as well as voice communication, this ability to add a wide range of data applications to systems results in the greatest possible return on users' investment. In fact, one of the key drivers for users switching to digital is to add business enhancing data services and applications to radio systems which pay for the cost of the switch over.

The doubling of channel capacity that DMR implementations achieve is key to adding data applications. In order to maintain the existing voice service at the same level of

![](_page_46_Figure_4.jpeg)

quality it is necessary to have extra capacity for data traffic. This can be particularly important for applications such as Automatic Vehicle Location where a very large number of GPS messages can be generated by the system to keep locations continually updated. DMR implementations deliver the extra capacity required simply, cost effectively and cleanly.

For regulators the growth of data will mean that much of the PMR bandwidth freed up by using digital to squeeze voice down to 6.25 kHz per call efficiency will be eaten up. The digital dividend may be less than a simple calculation based on voice bandwidth requirements might suggest.

When only one channel is needed, however, DMR can be less spectrally efficient in current implementations than a 6.25 kHz FDMA based system and this may be a disadvantage in a low end system, but this only impacts a small percentage of the market. On the other hand two DMR manufacturers are supplying Simulcast DMR solutions which can deliver excellent spectral efficiency in multisite implementations.

Another criticism today for DMR is that repeaters are needed to co-ordinate timeslots to give two communication paths in a channel. This means in Direct Mode Operation, when there is no repeater for co-ordination, a 12.5 kHz channel can only give one path – less efficient than 6.25 kHz FDMA which uses a channel size of 6.25 kHz. In practice however, DMR is today being deployed at the top end of the market in more sophisticated systems where the repeaters needed for time slot co-ordination are in place so this is not an issue.

To fully address the spectrum efficiency of DMR in Direct Mode, the DMR Association is developing technology which enables DMR to deliver two independent calls in 12.5 kHz of spectrum even when a repeater is not used by having radios co-ordinate timeslots between themselves. One manufacturer has a proprietary implementation that already gives this type of functionality. An ETSI standard implementation is expected to be agreed in the very near future.

One of the biggest challenges with mobile devices has always been battery life. In the past, there have been limited options for increasing the talk time on a single battery charge. Two-slot TDMA, however, offers a good way forward. Since an individual call uses only one of the two timeslots, it requires only half of the transmitter's capacity. The transmitter is idle half of the time — that is, whenever it's the unused timeslot's "turn".

For example, in a typical duty cycle of 5 percent transmit, 5 percent receive, and 90 percent idle, the transmit time accounts for a high proportion of the drain on the radio's battery. By cutting the effective transmit time in half, two-slot TDMA can enable up to 40 percent improvement in talk time in comparison with analogue radios. (One manufacturer's published product literature gives a talk time of 9 hours operation for analogue mode but 13 hours for digital mode on the same radio). With overall battery consumption per call dramatically reduced longer usage time in the field between recharges is enabled. DMR digital devices can also include sleep and power-management technologies that increase battery life even further.

Even though many factors affect power consumption in an individual device, comparing published battery life figures for widely marketed DMR and FDMA digital radios shows the benefit of the TDMA approach over FDMA. For each hour of usage the TDMA radios show up to 34% less battery capacity is required than for the FDMA models. The best advice is to make sure you read the product literature and compare carefully the battery capacity and talk-time of the devices on offer.

Apart from the environmental reasons for not wasting energy, choosing a technology with lower energy use gives more flexibility in the future because as communications

![](_page_47_Picture_0.jpeg)

needs grow for users (for example greater data requirements) more battery capacity is needed and it is better to bet on the technology which is inherently more efficient and therefore has more room to play with.

As discussed above, DMR infrastructure is also simpler than that required for FDMA systems. This means that the energy requirements to run a site are lower for TDMA than for FDMA. These power efficient features give DMR users a leaner and greener radio network as well as one with the benefit of long battery life on the radios themselves.

In terms of control features the DMR standard allows for the ability to use one of the two time-slots for reverse-channel signalling – that is, instructions in the form of signalling being sent to the radio on the second time slot channel while the first channel is in a call. This capability can be used for priority call set up, remote control of the transmitting radio or emergency call pre-emption and gives excellent supervision functionality to the operator of a radio system. FDMA systems cannot deliver similar functionality because they are limited to one path only per spectrum channel.

Finally, the two slots of TDMA can also be used to support fully duplex, telephony like calls. No manufacturer has come to the market with such a product, but the possibility of these feature are very attractive for certain classes of user.

#### NXDN and dPMR

dPMR and NXDN both use 6.25 kHz FDMA as the underlying technology and the lead movers behind both are Kenwood and lcom, but the protocols are not the same or interoperable. These ultra-narrowband technologies both have their origins in a Japanese standard, digital Kan-i, which also uses FDMA in 6.25 kHz channels. Digital Kan-i is a low tier technology optimised for use without infrastructure in a spectrum scarce environment. The strengths and weaknesses of dPMR and NXDN as technologies can be traced back to these origins. Using 6.25 kHz channels provides for efficient use of spectrum where a user does not have any infrastructure or only needs one channel. In these cases a user only needs 6.25 kHz of bandwidth to set up a communication path. Also, the very narrow channel width means there is less noise in the channel which can provide greater range for a given transmit power as there is less background noise for the signal to contend with. There are many factors impacting radio range and it is very difficult in reality for one system, TDMA or FDMA to claim an absolute advantage in the high power licensed radio space.

When 6.25 kHz FDMA systems are used with high power and in multi-channel systems, separate infrastructure (repeaters/ base stations) is required for each channel and the problem of oscillator drift needs to be overcome. Drift is the phenomenon whereby all oscillators move off from the desired centre frequency over time. In ultra-narrowband high power systems this can lead to link degradation without the use of specialist equipment. Such equipment is available but adds cost to a system.

Critics of 6.25 kHz FDMA systems also argue that licensing regimes around the world are not always 6.25 kHz friendly. The licensing picture is certainly variable from country to country. Some jurisdictions have dedicated 6.25 kHz channels available, but many do not and some countries allow two 6.25 kHz channels to be operated in an existing 12.5 kHz licence, but others do not. So buyers should make sure they have a detailed understanding of what is possible in their territory.

One of the issues that regulators need to face with 6.25 kHz systems is whether to limit the power of repeaters used in 6.25 kHz channels to 50% of that available in 12.5 kHz channels in order to keep the total power used in a unit of spectrum the same. This cuts down on the possibility of increased interference. Ofcom, the regulator in the UK, for example, implemented such a policy.

![](_page_47_Picture_11.jpeg)

Turning to the availability of 6.25 kHz FDMA equipment itself, dPMR and to a lesser extent NXDN, are impacted by being the most recently developed protocols. There is today only one high power vendor of dPMR and only one vendor of low power dPMR for unlicensed use, ICOM in both cases. So, in market terms, it is still very early days for the standard. NXDN products are available around the world but from Kenwood and ICOM, as the only significant global suppliers. The debate about the relative range of 12.5 kHz TDMA and 6.25 kHz FDMA systems has an interesting historical precedent. TETRA is now clearly dominant in European Public Safety applications, but a competing technology, TETRAPOL, is also used in some countries. TETRAPOL is a 12.5 kHz FDMA system and in the early days of the digitisation of European public safety radios there were back and forth arguments that TETRAPOL delivered better range than TETRA as it used narrower bandwidth channels and so had a lower noise floor. In the end TETRA has prevailed in the market. The fact that TETRA was standards based and offered the market a range of devices and interoperability between manufacturers also had a significant impact.

So what does all this diversity mean? Well, mainly that those who seek a unified digital radio standard may be disappointed for some time to come. But in the world of PMR perhaps this is not a bad thing. At the moment users have a choice and will determine the future direction of the technology rather than having one imposed upon them. A trick for the buyer will be not to get left behind in an evolutionary cul-de-sac when the final technical direction, or directions, of the industry become clear.

Users will need to define what they need: What is essential and mandatory; what would be nice to have and what is irrelevant. Balancing nice to haves against each other and creating a scoring table. The needs definition should be broad – it should encompass functions and features, level of competition, need for many different terminals or a need to have one supplier responsible for all.

For regulators there will be a need to tread carefully to maintain neutrality which will require good knowledge of the technologies and their relative market positions, particularly during the early stages of migration.

One thing for certain is that in the next few years we can all watch this market mature to a digital future.

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![](_page_47_Picture_18.jpeg)

## Enhancing Property Value Through

Alex Lim of Leader Universal Holdings Bhd shows how property values go up and quality of life is enhanced when fibre optics take high speed broadband into homes. Broadband is a transmission capacity of more than 256 kbit/s

here's no better way to start this than to say that "Fibre is the way to go!" Of course, when one says 'Fibre', it refers to Fibre to the Home or technically known as FTTH. What started as a possibility for ultimate broadband speed is today the backbone to all things digital. In an era where people queue overnight to purchase the latest iPad and parents are saying good night to their kids from three thousand kilometres away, it cannot be denied that FTTH is no longer a luxury but a staple in our society that has long embraced the digital world.

On a micro level, individuals are using the digital platform to stay connected with friends and family, for entertainment, for work, education and everything else under the sky. On a macro level, FTTH is essential for nation building – it creates a knowledge community that will deliver economic prosperity. To question the need for FTTH is akin to asking if there is a need for a nation to progress and develop.

#### **Understanding Broadband.**

Now, what exactly is FTTH? Before we even get into that, let us first understand the

![](_page_49_Figure_5.jpeg)

meaning of bandwidth and broadband, two common terms that we come across daily. So, what exactly is bandwidth?

Bandwidth simply refers to the throughput capacity of a given communications network, or perhaps in layman's term the amount of data that can be carried from one point to another in a given time period. Hence, it's measured in bits per second (bps) or Kilo bps, Mega bps, Giga bps and etc. As for broadband, it is defined as a transmission capacity of more than 256 kbps. However, as the need for speed increases the term broadband has become a moving target. As the applications we use become more advanced, more bandwidth will be needed. For example, 144 Kbps may already be sufficient for Internet browsing but a minimum of 6 Mbps will be required for the viewing of high definition IPTV.

![](_page_49_Figure_9.jpeg)

![](_page_50_Figure_0.jpeg)

#### Access (Last Mile) Network Congestion

While our country's telecom operators have been actively upgrading their backbone network with fibre over the past decade, the wired access network or better known as the "last mile" remains connected with copper cables. Although very-highbitrate digital subscriber line (VDSL) technology that transmits data over the twisted copper pair continues to improve, the VDSL technology unfortunately has a very limited operating life span. Hence, the last mile is the bandwidth bottleneck for broadband services. Just to illustrate: Imagine driving on a four lane highway at a speed of 110 km per hour and exiting into a narrow single lane access road to your home. This is the exact situation we will face when the need for higher bandwidth to support our digital lifestyle and more advanced applications arises. As we stand today, this is the scenario we are facing.

Three trends are expected to generate higher bandwidth needs for individual users. The first trend is multitasking; as in performing multiple, simultaneous activities online. For example, a user may be browsing a web page while listening to the audio from an online music source or video service and uploading photos to Facebook in the background.

The second trend is passive networking, whereby a number of online applications work passively in the background, such as software updates, online backups, Internet personal video recorder (PVR) and ambient video, such as nanny-cams and security cams. According to Cisco System's estimate, the number of applications generating traffic per PC has increased from 11 to 18 over the last year.

Lastly, of course, there are likely to be multiple users sharing a single broadband connection in a typical household. A sound argument that more bandwidth is required each day to support the more advanced applications can be proven by something as common as entertainment. DVD purchase or rental firms like Netflix and Amazon have started offering movie downloads. Catch-up TV and on demand TV services are becoming increasingly common. These services can

#### Common Observations of US and Asia – Growth Areas

- 1. Real time entertainment
- 2. P2P file sharing
- 3. Real-time communication

#### **Observation of US – Growth Areas**

1. Social Networking

probably be supported on a broadband connection, assuming there is only one digital appliance in the house concerned. But what is the probability of that in a modern household that would typically have at least a computer and a television, if not more? With all these appliances being used, often at the same time, the multiplier effect will take the bandwidth requirement out of range for most households.

The solution to this comes in the form of FTTH.

#### Advantages of Using Fibre for the Last Mile or FTTH

We asked earlier what FTTH is. We could provide a technical explanation but an answer that would interest consumers more would be what FTTH can offer.

Firstly, fibre can support a very large bandwidth, starting from 10 Mbps up to almost no limit. Thus FTTH is often regarded as a "future-proof technology". This simply means the installation of a fibre connection is done directly to each home or user premise versus the conventional copper cables. Fibre cable itself is made of just plastic and glass, and both components are robust and degrade extremely slowly. While the active equipment on the ends of a link has a shorter lifespan of 6 to 7 years typically, fibre cable can last up to 30 years or more. With practically unlimited capacity, any bandwidth upgrades only require the replacement of the equipment on both ends of the network.

Also, as in passive FTTH network, there are no active components from the Central Office to the end user premise, hence minimizing the network maintenance cost and requirement. With less active equipment involved, FTTH networks consume less electricity (some studies state the figure at twenty times lesser than Hybrid Fibre Coaxial (HFC) or VDSL). In addition, maintenance costs are typically reduced because there is no active equipment in the field to maintain, and optical components give better reliability. According to a report by Verizon, US, its

![](_page_51_Figure_0.jpeg)

FiOS FTTH network showed a decline of 80 percent in network trouble report rates, and that customers were more satisfied with their service because it was more stable with less downtime.

#### **Bringing FTTH into Malaysian Homes**

#### An Overview of the Malaysian **Property Market**

The natural evolution of a technology requires that it becomes available to the general masses in an affordable way. It will happen in stages but it will ultimately work itself out through the value chain. To this extent, is it timely to bring FTTH into Malaysian homes? To answer that, let's take a look at the Malaysian Property Market.

The property market is in its maturing stage, although one must admit that it is

maturing faster than many economies in this region - growing in terms of quality and range of products, combined with modern technology. Rapid development and scarcity of prime land have led developers to build multi-dwelling units (MDU) or better known as condominiums and develop large townships or satellite towns. Although houses priced below RM 300,000 continue to be the most sought after; there is a continued demand for property priced beyond RM500,000 in prime locations that focus on certain lifestyle concepts such as security and green homes. All supplies are market driven, and what the consumer wants, is what the supplier provides.

#### **4 Cs Factor**

So what does a consumer look for in a property? Commonly referred to as the 4Cs, they are:

![](_page_51_Picture_9.jpeg)

#### 1) Convenience

Convenience is a key factor. Generally, home buyers purchase properties that are strategically located, whether it is close to their workplace, school, public transportation, highways or even shopping malls. Consumers also like the convenience of buying a property that comes equipped with broadband infrastructure or better still broadband ready. It will certainly save them the trouble of applying for a new line from the service provider and the hassle of installation work. In addition, study shows that an estimated one third of user time online is spent waiting, reducing the convenience and ease of use. Hence, FTTH will enhance the user's experience significantly through the delivery of convenience.

#### 2) Comfort

Another C would be comfort. People choose a home that is comfortable in terms of design, build up area (space), facilities and basic infrastructure. Imagine moving into a building that does not have enough voice and Internet ports because the neighbours who moved in earlier have taken up more copper pairs to support multiple Internet users in a single unit. With faster broadband connection via fibre, people tend to spend more time online in the comfort of their home. Many new value added services can be made possible such as e-learning, online gaming, e-booking and etc. Imagine the comfort of being able to stay at home on a rainy evening and still attending classes online, the peace of mind that parents have monitoring their children playing online games (Counter Strike) at home with their peers instead of going to some cyber (Internet) café. There are some things that money can't buy, but for everything else you can buy it online.

#### 3) Class

Next C stands for class. Snobbish as it may sound but unarguably a wise investment, some home owners buy a property to reflect their status. For example, owning a home in Mont Kiara, Bangsar or KLCC would certainly elevate your social status to the elite group (rich and famous). It is evident that many developers go out of their way to associate their development with certain names or postal codes to enhance their value, for example some small townships in Kepong are given names of Bandar Sri Damansara, Damansara Damai and Bandar Manjalara.

The same goes for properties that come with fibre. Studies in United States have shown that real estate price has risen between USD4,000 to USD14,000

by having FTTH infrastructures. And in Australia (Aurora FTTH case study) it was reported that developers who ignored the FTTH trend find themselves selling their properties at discounted prices. On the other hand, there are success stories in Taiwan where developers like Farglory who embarked on the "Digital Home" concept have found their properties selling like hot cakes.

#### 4) Capital (Returns)

The fourth C represents capital returns. There are many who invest in properties merely for rental income and capital gains. In other words this group of investors are seeking returns on their investment. Property investment is also considered a good hedge against inflation. Therefore, by deploying a last mile fibre network, your property is regarded as a high end technology enabled unit which will automatically see its value increase, whether in terms of rental or capital appreciation.

#### Direct Potential Benefits / Value for Communities and Nation

At a micro level, individuals and their families with FTTH facilities will enjoy a wide range of services as they cruise comfortably on the Internet highway. However, FTTH needs to go beyond the individual consumer; it needs to be available to the masses and acts as a catalyst for nation building. It builds communities with knowledge and provides citizens with an abundance of opportunities as the world becomes a borderless place.

A nation which embraces FTTH will have the following attributes. It will have a robust economy spurred by a knowledgeable workforce that is highly competitive. The culture will be one that promotes creativity, hence the ability to generate new ideas, new businesses and a high level of flexibility. There will be efficient delivery of public services that includes better healthcare, wide reaching education and affordable transportation for all levels of society, in the process reducing traffic congestion, carbon footprint and promoting greener living. Finally, there will be opportunities for communication with all levels of society in all parts of the nation for better understanding of needs.

Studies have shown that higher broadband adoption has been statistically linked to economies that performed better at both the micro and macro level. However, it must be qualified that evidence-research has yet to be done given the infancy of FTTH and the fact that it does not have the kind of far reaching impact it so deserves

![](_page_52_Figure_7.jpeg)

yet. There is no doubt though that such studies would be in the pipelines given that FTTH is now being discussed and hailed as the new kid on the block in the world of digital living.

All said, some far sighted analysts have tried to ascertain the impact of FTTH on the creation of new jobs and subsequently on the GDP of a country. A recent study conducted by several telecommunications experts showed that every 1,000 new broadband connections yields 80 new jobs, while each 10% increase in broadband penetration translates to a 1% increase in GDP. Further analysis also revealed that FTTH subscribers are net contributors to the Internet, uploading more content than they download. In other words, once users gain access to more bandwidth, they spend more time using existing services, as well as gaining the ability to use new services. Thus, in an economic cycle, more jobs translate to a more robust economy and this generates more opportunities for the real estate sector.

#### If Developers are Not Convinced by Now....

Besides being able to sell and price their properties higher, developers will also be able to enjoy the green building incentives. In order to widen the usage of green technology, the Malaysian Government has launched the green building index (GBI) on 21st May 2009, a green rating index on environment-friendly buildings. Buyers of buildings and residential properties awarded GBI certificate are eligible for tax and stamp duty exemption. FTTH deployment will deliver some points to the rating under the adoption of new technology criteria.

FTTH justification for Green Building status includes the fact that usage of fibre optic cables significantly reduces the carbon footprint as compared to the usage of copper cables. Also, the amount of energy needed to produce 1km of copper UTP cable (26 AWG) is between 130~250 times higher than the amount of energy to produce 1 km of fibre. The amount of power needed to deliver the same amount of bandwidth over the distance is also significantly less with fibre optical cables because of the reduction of intermediate active equipment and cooling system (air conditioning) needed.

Need we say more that Fibre; or rather FTTH is the way to go? **my** 

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## Smart Network Towards Better Quality Of Experience (QoE)

Dr. Timothy Senathirajah, Technology Strategy Director, Ericsson Malaysia, MTSFB GICT member and Co-Chair CCI-EPP9 Smart Network TWC, presents the case for implementing smart networks to meet growing needs of both wireless and fixed customers.

![](_page_54_Figure_0.jpeg)

ith amazing growth in the uptake of mobile broadband, operators now face the challenge of handling data traffic from multiple devices and applications. To stand out from the crowd, operators will need to offer a widespread, high-quality user experience and a range of differentiated services to attract different subscriber types.

Speed is no longer the only criteria for selection of a broadband package. Having a congested, 100 Mbps best effort link is useless. I would rather have a 4 Mbps link with Priority of Service. Give me the choice to use the Net for better video streaming capabilities over the weekend and better data transfer options during weekdays, depending on whether I am in the office, home or in the city. These types of differentiation not only allow subscribers to get the benefit of performance at the price that they can afford, it also allows the operators to dimension their network to support dynamic bandwidth on demand.

With the growth in cloud computing, not only are connectivity and affordability important, latency is critical. Latency, which is the end-to-end measurement of time delay, plays a critical role for time sensitive applications. For a gaming environment, the ability to control the character to evade or attack within a short period of time would determine if the user wins or loses the game. In terms of voice and video applications, longer latency can result in poor quality voice and image. This deters users from using the services. On the other hand, file transfers via FTP or email are more tolerant to longer or variable latency. In addition to this, for Emergency Services, the ability for a user to use the network services when required becomes important. The user has to be prioritised to gain access to the

services with the appropriate bandwidth and latency, even when there is congestion.

As in many other markets, mobile broadband and fixed line broadband services are about giving people exactly what they need and are willing to pay for - no more, no less. From guaranteed "no-limit" premium subscriptions, to "no-frills" subscriptions without guarantees. For example, there could be a Platinum Class Package as opposed to a Student Package. It is similar to the airline industry practice that provides different boarding priorities, seat/bed sizes and baggage allowances based on the category of purchased flight tickets.

#### Smart Network

Smart Network, if implemented properly, will allow these capabilities in both fixed and wireless networks. This has to be end-to-end and not just a device in the core network. The fixed line edge devices and radio access nodes must be capable of differentiating the traffic, prioritise them and schedule them appropriately.

As shown in the diagram below, in the 3GPP-based networks, the THP (Traffic Handling Priority) allows scheduling and transmission based on the dynamic priority of service. The Platinum User (THP1) receives the top priority service and when he/she has completed the transfer, the Gold User (THP2) receives their service before finally the Student (THP3) gets to use the service.

Due to the complexity of this end-to-end dynamic Priority-of-Service (PoS), we are fortunate that the Malaysian Government, under the guidance of PEMANDU and monitoring by SKMM and MTSFB, has initiated the Communications and Content Infrastructure's (CCI) Entry Point Project (EPP) 9 Smart Network Working Committee, which consists of both the Technical and Commercial teams to develop the guidelines, one on the capability and the other on the viability of these services. This EPP9 will be the enabler for the other EPPs under CCI. For example with the digitalisation and storage of the Content, Priority of Service is important for its retrieval. In addition to this, EPP9 can provide the underlying communications guidelines for the other 11 National Key Economic Areas (NKEA).

#### **The Drivers for Excellence**

Three major trends are driving the need for service excellence and making the delivery of high-quality user experience more important than ever before. The first of these trends is the dramatic growth in mobile broadband subscriptions, as the

Traffic Handling Priority (THP) in the RAN is critical for E2E QoE
 Due to this complexity, EPP 9 Smart Networks WCs are tasked to develop the Guidelines

- It is more than just the Core Network's PCRF/PCEF

![](_page_54_Figure_14.jpeg)

![](_page_55_Figure_0.jpeg)

Internet goes mobile. By 2015, it is estimated that there will be close to 3.5 billion mobile broadband subscriptions, the majority of which will be smartphone-based.

The second is the trend towards overthe-top (OTT) services and applications, and their accessibility on mobile devices. The massive growth in smartphone use, app stores and many other constantly connected devices has created a whole new ecosystem, in which thousands of new applications are launched at a much faster pace than we have seen so far. OTT applications do not exclude operators from the loop. At the very least, operators need to ensure that applications are delivered correctly over their networks. In many cases, they will also be involved in the charging process.

The third trend is the shift to cloudbased services and applications. By 2020, projections show that there will be over 50 billion connected devices, mostly interacting in a Machine-to-Machine (M2M) environment. These devices will store and access content and applications in data centres in the cloud, instead of locally. This further reiterates the need for having a smart network that will provide the appropriate Priority of Service (PoS) for the appropriate M2M devices.

We can see this becoming a reality as not only are the application providers moving to the cloud, Fixed and Wireless Service Providers are making the same shift. It brings about new terminology such as Application-as-a-Service, Platform-as-a-Service and Infrastructure-as-a-Service. The critical part of making the X-as-a-Service growth is the ubiquitous connectivity that is affordable, accessible and available.

As stated in the Differentiated Mobile Broadband White Paper\*, these three trends are driving several simultaneous changes that will in turn reshape the way broadband services are priced, delivered and consumed:

- Devices are shifting from being shared to personal – from mainly home or office PCs to personal laptops, smartphones and tablets.
- The number of devices such as laptops, smartphones and tablets– per user and per family is increasing.
- The number of devices connected through mobile networks is growing.
- People use different devices to access the same services at different times, creating demand for affordable connectivity for several personal devices.
- Network resources are moving away from being dedicated, such as cable, to being shared, such as mobile cellular and public WiFi.
- Applications that were once defined and tested in a controlled environment are now published at a rate of hundreds per day by many thousands of third-party developers.

- Power consumption, which was not an issue for fixed equipment plugged into a wall socket, is now a key factor for devices that are carried around for many hours at a time.
- Business processes and models are changing as greater numbers of users, devices and market segments increasingly rely on mobile connectivity.

In this changing environment, mobile operators have to compete and stand out through exceptional networks that deliver the best QoE to users. Delivering mobile broadband growth is about providing special services to fit all users and deliver maximum value from connectivity.

#### The Mobile Broadband Challenge

Operators are familiar with the diagram below. A small percentage of users (~5%) use most of the bandwidth (~80%) which has resulted in majority of the subscribers

![](_page_55_Figure_19.jpeg)

<sup>\*</sup> Differentiated Mobile Broadband, Ericsson White Paper 284 23-3147 (January 2011)

![](_page_56_Figure_0.jpeg)

![](_page_56_Figure_1.jpeg)

![](_page_56_Figure_2.jpeg)

unhappy with their available bandwidth and latency issues. One way to handle this challenge is to throttle the heavy users. However, this will result in disgruntled users as well, especially if they really need the bandwidth for their daily work. The better solution is to provide a dynamic bandwidth on demand, depending on the congestion and priority of the users.

On top of the flat-rate business model, it is important to include premium Internet (paid applications) and a range of applications charged on the basis of a range of factors, including time of day, peak data rate, location and other parameters. The ability for a user to pay a little extra in order to have a "Turbo" transmission will definitely benefit those who need to submit their term papers to their tutors, business meeting presentations to their managers or advertisements graphics to their customers for approval.

#### Managing Subscriber Experience and Expectations

Users want to pay for what they get, and get what they pay for. Operators need to design low-price connectivity services to attract low-end users, while providing sufficient incentives for more advanced users to buy higher-priced services. The next step is to monetise the different communication needs of various user segments. Operators need to create commercial packages that leverage the different capabilities in the network. This will both encourage mass-market uptake and make it possible to drive revenue growth when subscribers' usage patterns change.

Operators need ways to encourage uptake and usage of mobile broadband among all types of users, and to offer informed choices about how services are used and paid for – creating an opportunity to increase revenue as subscriber usage increases. For example, while premium subscribers will want to know that they are getting the best possible data rate at all times, basic subscribers may be happy to accept that they will have limited access to mobile broadband services at certain times of day, at certain locations, or even to specific sites or social communities.

#### Gaining End-to-End Control Over Services

Gaining end-to-end control over the mobile broadband service-delivery pipe will be important in driving mobile broadband. From a technical point of view, the challenge is to gain the required level of intelligence and control over services at every stage – all the way from the servers handling customer care and billing, through the core and radio networks, to end-user devices – to create and deliver differentiated services profitably.

Only with such control over the mobile broadband service pipe can operators truly make a distinction of their service packages and ensure this distinction is delivered for best use of network resources and best value for users.

![](_page_56_Figure_12.jpeg)

For wireless operators, they have a range of mobile broadband tools at their disposal that enable them to shift their network into a flexible, intelligent resource that can deliver just the right level of features for targetted subscribers and segments. It also requires a range of tools and services in everything from the network policy controller, through the Operational and Business Support Systems (OSS and BSS), to network planning and design, and integration and optimisation.

End-to-end QoS control requires the involvement and integration of capabilities in:

- Radio access and transport including new capacity-enhancing techniques and congestion-aware scheduling of air interface resources.
- Packet core including prioritisation of data packets, negotiation or modification of QoS parameters, and content optimisation and caching.
- BSS including flexible charging options, targetted offerings, real-time credit control and greater customer control and interaction (such as real-time notifications and selfservice).

By being well integrated, straightforward to deploy and easy to use, a toolbox of hardware- and software-based differing capabilities strengthens the link between operators' commercial and marketing strategies and objectives and the technical capabilities needed to deliver them. The toolbox supports revenue growth by creating packages that deliver different experiences to different subscribers according to what they are being charged, and helps operators identify more accurately where investment is needed in mobile broadband capacity, avoiding over-dimensioning and unnecessary expenditure.

The operators need to define:

- Features that they can highlight for example, by setting maximum bandwidth per user or per application, with per-user admission priority to the service, throughput per user at congestion, guaranteed bit rate per application, minimum bit rate per user, content optimisation or content caching.
- When to differentiate for example, based on fair-usage policy, time of day, location, terminal type, detected service or subscriber interaction.

Operators will be able to mix and match these parameters to define service packages and enforce them in the network to ensure that the real user experience meets expectations. Early examples of this kind of service differentiation are already starting to appear.

End-to-end QoS control in mobile broadband requires deep interaction among the policy controller, the core nodes and the radio network. Only with direct, real-time delegation of the policies from the policy controller to the scheduler in the base station can operators monitor and enforce QoS dynamically according to congestion, location and device type.

Deep packet inspection (DPI) is required to identify the service type for OTT services, to ensure that such services are included in the policy controller's domain. The DPI detects OTT services and notifies the policy

![](_page_57_Picture_13.jpeg)

For example, if the subscriber's package includes 100 MB of YouTube for RM30 per month, the DPI detects the YouTube traffic and informs the policy controller, which in turn maps the YouTube traffic to priority and configures the charging system so that the YouTube traffic is not deducted from the subscriber's monthly quota. This practice is known as "zero-rating" YouTube traffic.

Enforcing QoS in the base station provides the most efficient mechanism, as the base station schedules bottlenecked resources, deciding how to make the best use of limited and oversubscribed resources. The higher efficiency of this approach translates into a higher sustainable load, while maintaining the same QoE. Furthermore, it maximises overall capacity, which is one of the key operating targets of a radio scheduler.

#### **Use Cases**

One European operator offers tiered mobile broadband packages, with various quality of service (QoS) measures that kick in under certain circumstances. These include a fair-usage policy that is enforced with different combinations of maximum bandwidth and the de-prioritising of subscribers who have exceeded their monthly data-volume allowance.

Another European operator has introduced prioritisation for its mobile TV application to ensure that subscribers paying for this service enjoy a good-quality experience, regardless of the network load.

Similarly, another European operator prioritises users of a certain smartphone to preserve the user experience of these high-ARPU subscribers.

One operator in Indonesia offers an online portal service to its mobile broadband subscribers to check the balance of their data allowance. Subscribers have the option to boost or upgrade their package for a day, a week or a month – when they have exceeded their allowance and throughput has been throttled.

## Putting the Subscriber in Control

Another important aspect of end-to-end, all-around QoS is the real-time connection between the policy controller and the BSS systems, including charging and billing. This supports operators' ability to cross-sell and up-sell mobile broadband services,

![](_page_57_Picture_23.jpeg)

![](_page_58_Figure_0.jpeg)

while putting the subscriber in control. This creates a user experience that matches subscribers' personal preferences as well as the level of charging.

For example, operators can provide real-time notifications (via SMS or email) offering options to subscribers who have reached their data allowance, entered a new territory, or requested a service outside their existing package. Such users can be redirected to an operator portal where they can use various self-service options for topping up or extending their service plans, such as day passes or short-term roaming packages.

Prepaid mobile broadband users who have run out of credit can be offered a limited set of Internet sites and services, so they are not cut off completely and still have access to operator-defined services. Subscribers on basic plans could also be offered add-on packages for a small additional fee to access. For example, online video sites, social networking sites and music services – with the data used excluded from their basic allowance (another example of "zero rating"). This allows operators to address the lower-end subscriber segment that is often neglected in basic price plans.

With the right charging and billing system in place, operators will be able to offer group or family plans, in which the monthly data allowance is shared between members – perhaps with individual limits on data usage or access to certain services. This enables individuals and families to connect more and more devices in an affordable way. Such differentiated packaging helps operators to create revenue growth as usage increases. 3GPP networks offer a well-defined route to enhanced capacity by delivering higher data rates from the existing radio spectrum. This enables operators to make the most of their existing spectrum allocation, and to benefit from the aggregation gains brought by "fatter pipes" in the radio interface.

To succeed in the broader market, which comprises a wider variety of demands, expectations and wallets, it is now time to introduce differentiated services with pricing models to suit today's user.

#### SKMM and MTSFB's Smart Network Initiative

In Malaysia, we are fortunate that the Smart Network has been identified as one of the Entry Point Projects (EPP#9) under the ETP's Communications, Content and Infrastructure (CCI). SKMM (Mr. Amarjit Singh) and MTSFB (Dato' Ismail Osman) are the Co-Chairs of the Reference Committee (RC). Under the RC, there are two working committees covering technical and commercial aspects. Ericsson Malaysia Sdn Bhd (Dr Timothy Senathirajah) and Maxis Bhd (Ms. Rita Maria Warnoh) are the Co-Chairs for the Technical Working Committee. Celcom Axiata Bhd (Mr. Sargunan Seenivasan) and Time dot Com (En. Imran Zulkifli) are the Co-Chairs of the Commercial Working Committee.

The vision for the future is that the CCI NKEA aims at driving continued high growth in communications and enabling the paradigm shift from infrastructure to applications and content. We will raise the sector's GNI contribution from RM36 billion in 2009 to RM58 billion by 2020. This incremental increase is driven by 10 Entry Point Projects (EPP) including the EPP#9 on Smart Network that will deliver RM16.6 billion in incremental GNI and four business opportunities that will deliver RM11.7 billion in incremental GNI. In achieving this, an additional 43,000 jobs will be created.

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### Seminar on Opportunities for All in Broadband ICT

SKMM organised the seminar on '**Opportunities for All in Broadband ICT**', officiated by YB Minister of Information, Communications and Culture, Dato' Seri Utama Dr. Rais Yatim. The seminar took place at SKMM Auditorium over two days from 24 May 2011.

The event called for participants from the communications & multimedia related industries, especially Small and Medium Enterprises (SMEs) to explore areas of growth and opportunities in broadband ICT as a business as well as its uses in business, manufacturing and industry.

![](_page_59_Picture_4.jpeg)

![](_page_59_Picture_5.jpeg)

![](_page_59_Picture_6.jpeg)

### Signing Ceremonies for NKEA-CCI initiatives

The Minister of Information, Communications and Culture, Dato' Seri Utama Dr. Rais Yatim officiated at the signing ceremony for the Regional Network Consortium comprising 24 telecommunications companies with the objectives of lowering the wholesale cost of international and domestic bandwidth capacity (below) as well as the signing of an MoU between SKMM and the Department of Veterinary Services to develop, test and implement a new system and standards for detecting and tracking the delivery of swiftlet nests for the global market.

![](_page_59_Picture_9.jpeg)

![](_page_59_Picture_10.jpeg)

#### Pustaka 1 Malaysia National Level Launch

Dato' Seri Utama Dr. Rais Yatim, the Minister of Information, Communications and Culture, officially launched the Pustaka 1Malaysia (u-library) project on 31st March 2011 at the National Library in Kuala Lumpur. Also present to witness the launch were SKMM Chairman Tan Sri Khalid Ramli, Dato' Sri Kamaruddin Siaraf, Secretary General of the Ministry of Information, Communications and Culture and Dato' Raslin Abu Bakar, the Director-General of the National Library of Malaysia and more than 400 other guests. Pustaka 1Malaysia aspires to contribute towards an inclusive knowledge society by unlocking knowledge resources using innovative information delivery services.

The eight libraries connected through the portal are the National Library and 7 other libraries that make up the U-Pustaka Consortium. These libraries are the state libraries of Selangor, Negeri Sembilan, Pahang, Sarawak and Sabah, the Kuala Lumpur Library and the INTAN Library.

![](_page_60_Picture_5.jpeg)

### World IPv6 Day Celebration 2011

SKMM and the Malaysian Technical Standards Forum Berhad (MTFSB) collaborated with the Ministry of Information Communications and Culture in organising the World IPv6 Day as well as the Seminar on IPv6 Transition at the SKMM Auditorium on 8 June 2011. Themed 'V6 Connecting Everything', the event was officiated by YB. Dato' Joseph Salang, Deputy Minister of Information, Communications and Culture.

![](_page_60_Picture_8.jpeg)

![](_page_60_Picture_9.jpeg)

#### State Level Launch of Pustaka 1Malaysia

The Pahang State level launch of Pustaka 1Malaysia took place on 16 May 2011 in Kuantan.

![](_page_60_Picture_12.jpeg)

### Pustaka 1 Malaysia Seminar

A seminar on Pustaka 1Malaysia was held on 21 July 2011 at the Putrajaya International Convention Centre (PICC).

![](_page_60_Picture_15.jpeg)

#### **Interactive Map of Fixed Broadband**

**UK:** Ofcom recently launched the UK's first interactive map of fixed broadband, using actual data provided by communications providers about the UK's broadband infrastructure.

The online map allows users to zoom in and out of administrative authorities of the UK and provides a range of data to offer a picture of broadband provision in each area.

The map, available at http://maps. ofcom.org.uk/broadband/, was compiled using data provided by communications providers and covers 200 administrative authorities. Specifically it covers the following:

availability of superfast broadband;

- average broadband take-up (excluding superfast broadband connections);
- average actual speeds for ADSL and cable services (excluding superfast broadband) averaged across each area; and
- the percentage of homes with broadband currently not receiving 2Mbit/s speeds.

Each area has been ranked according to a score given for each of the above measures and colour coded with green ranking highest and red lowest. The four metrics have also been combined to produce an overall view of broadband in different parts of the UK.

![](_page_61_Picture_10.jpeg)

#### FCC Unveils Actions to Help Consumers Prevent and Identify 'Mystery Fees' on Phone Bills, Known as 'Cramming'

**United States:** The FCC recently proposed new rules to increase transparency and disclosure on phone bills, aiming to protect Americans from 'mystery fees' and 'cramming', which is the illegal placement of an unauthorized fee onto a consumer's monthly phone bill.

Examples of 'mystery fees' are for services like long-distance services, voicemail, or even diet plans or yoga classes that the consumer neither requested nor used. The FCC also issued a Cramming Tip Sheet to help consumers identify and resolve this type of mystery fee if they've been affected. Tips include carefully reading all forms and promotional materials – including the fine print – before signing up services; a careful review of phone bills every month and ensuring they know every company and service listed in the bill; and a thorough inspection of any small charges in phone bills. This was done after a recent expert survey showed that only five percent (5%) of consumers who were impacted by a particular cramming company were aware of the monthly charges. Based on the same survey and state data, the FCC believes an estimated 15 to 20 million American households a year potentially have these mystery fees on their monthly landline phone bills.

The FCC also acted against four companies for allegedly charging thousands of consumers for long distance service that they had not ordered cramming phone bills, proposing proposed penalties of \$11.7 million. The unlawful billing appears to have continued for months. According to the Enforcement Bureau, only one-tenth of one percent (0.1%) of consumers in two of the cases reviewed actually used the additional services for which they were being charged.

#### Thailand to Auction 3G Licences

**Thailand:** Thailand's telecommunications and broadcasting regulator plans to auction 3G licences in the first quarter of 2012 at the earliest after outstanding legal issues are resolved. An earlier planned auction of the 3G licences was halted by a Thai court after the top two dominant incumbent mobile service providers filed petitions challenging the authority of the Thailand's National Telecommunications Commission to allocate the 2.1-gigahertz frequency spectrum used for 3G services.

To resolve this issue, the government is now in the process of setting up the National Broadcasting and Telecommunications Commission, which will have the legal authority to conduct the licensing. The new regulatory body is expected to be set up in the last quarter of 2011.

Current mobile service providers have been using HSPA technologies over their allocated 850-900 megahertz frequencies which were assigned for 2G services in the meantime.

#### **UK Fixed-Line Broadband Information**

**UK:** Across the UK as a whole, 68 per cent of UK premises have a fixed broadband connection, and the average maximum speed is 7.5Mbps (excluding superfast broadband connections).

The City of Brighton & Hove has the highest take-up of fixed broadband services with 80 per cent. The City of Edinburgh has the fastest average maximum speeds, with 10.1Mbps.

Luton, in England, and Newtownabbey in Northern Ireland have the highest percentage of addresses served by a superfast broadband enabled exchange (100 per cent). Superfast broadband availability across Northern Ireland is very high, with 97 per cent of addresses served by a superfast broadband enabled exchange (although superfast services will not necessarily be available to all addresses). This follows the completion of major investment in superfast broadband by the Department of Enterprise Trade and Investment in Northern Ireland, in conjunction with BT. BT has announced plans to bring superfast broadband to 88 per cent of lines in the country by March 2012.

Fourteen per cent of customers who have fixed broadband connections (excluding superfast broadband connections) are currently receiving speeds of less than 2Mbit/s. Some of these customers could improve their speeds by making changes to their in-home telephone wiring and around 6 per cent have the option to switch to a higher speed cable and fibre based broadband service.

More rural areas tend to have lower speeds and a greater proportion of customers who receive speeds less than 2Mbit/s. This is primarily because copper telephone lines tend to be longer in these areas and broadband speeds delivered over these lines reduce with increasing line length. In addition, the low housing density also makes it more expensive to build new superfast cable and fibre-based networks in these areas.

#### Ofcom Acts to Ensure Digital TV Will Work Alongside Next Generation Mobile Services

**UK:** Ofcom has released proposals to ensure that digital TV delivered through a roof top aerial can function alongside the next generation of mobile services to be rolled out from 2013. Ofcom plans to auction the 800 MHz spectrum for 4G mobile services next year. The 800 MHz spectrum is adjacent to the frequencies used for digital terrestrial television (DTT) broadcasting. Due to its proximity, in a small number of cases this could cause the signals from mobile base stations to interfere with set top boxes and digital televisions in the future. This could potentially affect up to 3% of DTT viewers if no measures were put in place to solve the problem.

Ofcom has proposed a number of ways to reduce this interference. In some cases viewers will have to fit a filter to their TV aerial. These filters block the signals that interfere with TV reception and should solve most of the interference cases. The UK telecoms regulator proposes that the majority of the costs should be borne by the future 800 MHz licensees.

In a very small number of cases – less than 0.1% of DTT viewers – filters may not solve the problem. Ofcom is considering a number of options to address the problem which may require some viewers to change platforms. Ofcom is carrying out more research into this issue and expects to publish a further consultation in the autumn.

#### Holland Passes New Telecommunications Act

**Holland:** The Lower House of the Dutch Parliament has passed the amended Telecommunications Act. The legislation passed on 22 June implements the revised EU telecoms framework, including provisions for improved services for disabled people, more transparency over pricing and an enhanced role for the European regulator Berec. The Dutch also added a number of their own amendments, including controversial stances on net neutrality, cookies and cable markets. The net neutrality rule prohibits operators from blocking or slowing data traffic for specific services, except in cases of network congestion or security risks, and the cookies regulation requires websites to get a user's permission before placing tracking cookies that collect personal data.

Other small additions to the bill include a requirement for operators to offer a competitive service with no call set-up fee and billing by the second as well as tighter rules to prevent end-users from losing Internet access.

### Singapore to Have PG-13 Rating

**Singapore:** The Media Development Authority (MDA) recently announced new content classification initiatives and outreach efforts. They are designed to give parents more and better quality information to make informed decisions about protecting their children from inappropriate content in the media.

Parents will now have clearer and consistent information tools made accessible to them, to guide their children's media habits. These initiatives include a new PG-13 rating for film, television and video which offers a finer demarcation of content suitability for parents of young teens; content rating symbols that are easy to recognise; and Internet filters that Internet Service Providers must now promote to subscribers at point of sale and upon contract renewal. Also available is a version of the film, video game and arts performance database containing rating decisions that the public can access through their handphones, by end of this year.

Said Mr Michael Yap, Deputy Chief Executive Officer, Media Development Authority, "We are creating a more conducive environment for parents to make informed media choices. Through these information tools we are introducing today, such as the revised classification system for film, television and video, we are now better able to support parents in guiding the young on safe and responsible use of the media."

![](_page_62_Picture_12.jpeg)

#### **Singapore to Implement Cross Carriage**

**Singapore:** Singapore's regulator, MDA will implement the crosscarriage measure from 1 August 2011. From that day, pay TV retailers who have acquired any exclusive content on or after 12 March 2010 must widen the distribution of such content by offering it to other subscribers through the set-top boxes of qualified pay TV retailers. The step is aimed at fostering a vibrant pay TV market to the benefit of consumers and industry.

MDA said in a press release that from the time the measure was announced in March 2010, the pay TV market has seen significant growth. To date, retailers have introduced over 20 new channels, and there are more channels available now on more than one platform. Besides the increased channel offerings, new pay TV retailers and services have entered the market, bringing more choice and innovative offerings to consumers.

The implementation of the measures comes after a third and final round of an extensive consultation process - with content providers, international industry associations, retailers and a consumer association -- over the past 15 months. The feedback received from all parties was instrumental in helping MDA fine-tune it for implementation.

In order to facilitate implementation, MDA made changes to the Media Market Conduct Code (Code) which seeks to promote fair market conduct and effective competition by laying out the ground rules for fair competition in the media market.

![](_page_63_Picture_1.jpeg)

![](_page_63_Picture_2.jpeg)

You might be living in the Klang Valley but always remember, the outdoors is never too far away in Malaysia. And one of the activities you might consider trying out is caving. Malaysia is one of the countries that are known to have large and fascinating caves. Some of the best ones are over in Sarawak where the large ones can be many times bigger than a stadium. Do make plans to visit our more famous caves such as the Mulu Caves in Sarawak but for an introduction, head out to those near the city.

One of the most famous caves of all is the Batu Caves. Just 13 kilometres away from city centre, you will find yourself in a sacred place for Hindus. They consist of three main caves and a number of smaller ones. The caves are made of limestone, 400 metres long and 100 metres high. Upon your arrival you will be greeted by lots of monkeys. Of course their aim is to go for your peanuts and bananas, which you can buy in shops before climbing up to the caves. You have to climb 272 steps, which will lead you to the religious Batu Caves. One cave there is set aside for caving activities. You won't miss it, it's halfway up the stairs.

Not falling behind is Gua Tempurung. The cave is located at Gopeng, 24 km south of Ipoh. Gopeng is accessible by the North-South highway, or by the old Ipoh-Kuala Lumpur trunk road. The cave is about 4 km off the main road, reached by a new access road. Reaching there, you can start exploring the caves as it offers a 1.6 km river passage that runs through the cave. The total cave length is more than 4.5 km and is fitted with walkways, stairs and electric lighting. There is a variety of tours of different lengths and degrees of difficulty. Gua Tempurung is one of the best caves in the Peninsula with a series of huge chambers and some fine formations.

Want to look for many caves in one area? Why not head over to Gunung Senyum at Pahang and you will definitely be smiling (pun intended). There are at least 20 caves that you can explore and some of these caves are archaeology sites too. You can bring out the Indiana Jones in you when you explore all these caves. There is even a burial cave called Makam Tok Long for those who wants more variety while exploring. Signboards list the caves and there are easy trails to explore the caves.

#### PRODUCTIVITY

#### **Stay Organised at Work**

There is no easy way to be successful if you are not organised. It takes long term planning and daily action to make it work. Having the right organisation skills will help you gain control of your goals and control your time management. Here are a few methods on how to stay organised at work:

#### Focus on the Important

Keep a clear head and always remember not to stray too far from your long term goals. Of course you can revise them when necessary. To further enhance this process, set daily goals that can help you achieve your goals. For a little motivation, you can always put inspirational photos (family pictures) nearby.

#### Make a List

This is not your shopping list but more like a goal list. Have daily, weekly, monthly and if possible, yearly to-do list of important tasks (such as achieving RM5,000 in savings). Remember to review your priorities so that you don't forget or lose sight of them.

#### Manage Your Time

You should schedule quiet time at work to carry out jobs that need more attention. Do your most challenging work when your energy is at its highest. Save less demanding work for other times. Procrastination may creep by but you can prevent this by focusing on the sense of accomplishment you'll feel when the job is done. Of course, you have to remember to set aside personal time too.

#### Make Use of Calendars and Planners

With all your to-do lists written down, you need to make sure that none of them clashes. It is better to write them down periodically than to rely on your memory. People tend to forget so this will be the best solution.

#### **Delegate Tasks**

Assign responsibilities to others if you do not have the expertise to complete the job.

This is better than pondering for hours trying to solve a problem that you are not good at. Always remember to provide feedback on assigned task so that people know what to expect.

#### Manage Your Mail

Start sorting incoming emails into categories by priorities or actions. That way, you know how much attention you need to give when reading your emails. Again, using your precious time on insignificant agenda may reduce productivity.

#### **Reduce Clutter**

Keep your desk organised. Only leave the most critical items you need daily on top of your desk. The rest go into your drawers. Obviously, don't push all the other stuff into your drawers but organise them as well so that you know where to find them. Toss out duplicate information and materials that will soon be outdated. Leave blank space on bookshelves for growth.

### FOOD

#### **Mamak Like Nowhere Else**

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Hearing the word mamak (a colloquial term for the Indian Muslims) will always remind you that you are a Malaysian. A true Malaysian would rather go to the mamak restaurant down the road and order their teh ais (iced tea) instead of spending a lot more at a fancy foreign coffee chain. For most people, it is simply the natural choice, with many citing the relatively affordable prices and the operating hours as the key factors.

Also, the specialties of each mamak restaurant are different and some offer food that you cannot find elsewhere. Although mamak shops are found everywhere and everyone has his or her own favourite, we're listing a few that represent a fair selection of good mamak restaurants in KL. One of the more famous one is located in SS2 called SS2 Murni. It has the most extensive menu among mamak restaurants and you can't find any fault in their selections. From typical mamak food to Western food, you know that each of the choices you make will never be wrong. If you still don't know what to offer, just look at other customers' table. You'll notice Roti Hawaii, Mee Raja and several others dominating on the tables. The ambience is good as they recently renovated and it is very clean.

If you happen to be around Wangsa Maju, try finding NZ Curry House. It is situated across Carrefour in Section 5 of Wangsa Maju. Parking is plenty and food is plenty too. Don't worry as cleanliness is top notch too. Other than that, the place also offers a lot of curry

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food, as the name implies. Go for their curry fish head but be aware that it might be a little pricey. Not only that, dishes like curry mutton, Roti Pisang and Roti Canai are great as well. If spicy is your game, then NZ Curry House is where you want to be.

Nasi Kandar Pelita first opened for business as a stall selling nasi kandar at a corner coffee shop at Taman Chai Leng, Perai, Penang. It soon grew to a chain where you can find it almost anywhere. The question now is: which branch is the best? Well, just head over to the branch near KLCC. So what do you order there? Well, for starters, their nasi kandar! Top that up with their Ayam Goreng Kampung and your tongue will thank you for it. The atmosphere is good and the price is reasonable..

#### HEALTH

#### **Massage to Reduce Stress**

It's time to unwind and get away from your everyday stress. Why not opt for massage? There are many health benefits associated with massage such as feeling relax, reducing stiff shoulders and many more.

#### Feet

For starters, you also know this as reflexology. There are hundreds of nerve endings on the feet and an entire massage modality was made just for it. Don't worry, the method is not complicated as you only need to focus on a few parts on your feet such as the heel and toes. Just start by making circular motions with your thumb and fingers over the sole of the foot, and use more pressure in areas such as the heel or ball of the foot. Remember to start slow and slowly apply pressure. That's it.

#### Hands

This is one of your body parts that you use the most. That said, you can expect a lot of stress in it even though you can't feel it. Begin your massage with your hand facing upwards. Press your thumb against the centre of the palm. Use your thumbs to rub the open palm, working up and down the tendons and making circular motions along the heel, or meaty portion of the hands.

#### Neck

Here is another area that holds more stress than you think. Just massage the back part of your neck as a lot of nerves and arteries are at the front of your neck. You can start by taking the heels of your hand and apply them to the side of your neck. After that, work them in a circular motion slowly and apply pressure. You can move from the upper neck to the lower neck from your preference.

#### Shoulder

Stiff shoulders is a common problem for people. It is best if one can learn to reduce the stiffness and thus lower your stress level as well. Start by stroking your right shoulder with your left hand. Begin at the base of your skull, stroke down the side of your neck, over your shoulder and down your arm to the elbow. Glide back to your neck and repeat at least three times. Then do the other side. Alternatively, you can loosely clench your left hand into a fist and gently pound your right shoulder. Keep your wrist flexible. This can be very invigorating if you are tired. Repeat on the other side.

#### Scalp

Surprised? This is one of the most overlooked places that hold stress. It is about time you massage it. Place your palms on your temples, with your fingers resting on your head, and slowly circle your palms ten times in one direction and ten times in the other. Also, in each of your hands clasp some strands of hair at the root, twist them around your fingers and gently pull.

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## Towards an Efficient and Modern Postal Industry

## NATIONAL POSTAL STRATEGY Towards an Efficient and Modern Postal Industry

#### National Postal Strategy

- Sustainable universal postal service
- Improve service quality
- Foster industry growth
- Improve productivity
- Enhance international development

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Suruhanjaya Komunikasi dan Multimedia Malaysia Malaysian Communications and Multimedia Commission