

# A Brave New World of Services

In 2010, Australia began to roll out its national broadband network, intended to deliver fiber optics to more than 90 percent of homes. Fiber to the home (FTTH) will eventually become mainstream in most regions, and its increasing penetration has already begun to spur the next generations of services. A&S takes a peak into the future to see what FTTH holds in store.

BY GARY TANG

**T**elco operators and cable companies have been pushing fiber closer and closer to the living room; it is only a matter of time before the last mile is replaced by fiber. "With the support of fiber back haul, existing last-mile copper may be useful for another couple of decades, but it will all eventually be upgraded to fiber," said Neville Clifton, Chief Technologist and Director of Alarm New Zealand. This is partly because fiber is easier and more cost-effective to maintain. The other part of the story is that fiber displays several qualities that are simply not available in other broadband technologies.

Mainly two things limit current services: upload bandwidth and quality of service, said Hartwig

Tauber, Director General of the FTTH Council Europe. Although download speeds have increased over the years, upload speeds have generally had little improvement.

What this means is that the "information highway" hyped for the past two decades has been somewhat one-way.

Next-generation networks will eliminate these barriers and deliver the same speeds up- and downstream, with the same reliability and quality of service to each subscriber at a lower cost. "With fiber, it does not matter whether you are 10 kilometers away or 5 meters away — you will get the same service," said Benoit Felten, CEO of Diffraction Analysis. "This



allows for a truly universal network.”

Fiber will act as an enabler and provide the platform for a new round of innovation in online services. Today, there are few services that actually use the full capability of fiber. However, they are beginning to emerge, which is what the Australian government is essentially betting on. “Once we pass the tipping point, these services will emerge quite fast and therefore they will justify having such a state-of-the-art infrastructure in place,” Felten said.

There are at least three areas where fiber connectivity can be revolutionary: communication, home automation and cloud services.

## COMMUNICATION

FTTH will change the way people communicate. The increase in bandwidth allows for cheaper and clearer voice calls, but more importantly, it allows more reliable and higher-quality video calls. “Imagine living 100 or 200 kilometers away from your nearest friend or family,” Tauber said. “Being able to communicate with them on a daily basis will increase quality of life.”

Another promising application of high-quality video over high-speed broadband is video conferencing. Video conferencing reduces the need for traveling, which in turn reduces expenses for businesses. It can also increase productivity and knowledge sharing among a geographically scattered workforce. “Today, bandwidth bottlenecks limit the quality of the picture,” Tauber said. “Upload speeds of the broadband connections are still very slow if fiber connectivity is not available. This makes it impractical in some business settings.”

Education is another application where video conferencing can provide added value. There are already online tutors that make video calls rather than show up at the front door. Some individuals can even use their off-hours to teach English to children across the world, said Michael Render, President of RVA.

In South Korea, there is a pilot project where remotely controlled robots teach children English. Teachers are free to reside in their own nations, saving the South Korean government a significant amount of travel and accommodation expenses.

## HOME AUTOMATION

Home automation is a scenario where fiber connectivity can be valuable, since it enables much more elaborate and interesting services – this is a market where there is clearly a demand from end users and are very promising

factors of fiber, Felten said. “The main issue so far in the market is that the telco operators and the security companies don’t always work very well together.”

It is sometimes difficult for both parties to agree on their responsibilities to the customer and implement a win-win profit-sharing model. “However, it is inevitable that things will begin to move in that space because this is an area where customers are willing to pay,” Felten said.

At the moment, three applications of home automation that have great demand among consumers are security, energy saving and e-health.

Appliances within the home will need a reliable pathway to communicate with service providers. Whether it is remotely accessed video or smart metering, all services must be always available and highly reliable, said Dan Waugh, VP of System Integration at Connexion Technologies. “Fiber is the best way, as it is the most resilient and reliable technology currently available.”

## SECURITY

With video surveillance migrating to IP, FTTH creates greater value. Many networks already offer security services over fiber. The customer can see video feeds in real-time, creating the possibility to have a DIY system where the monitoring company is no longer essential.

It also allows greater automation of alarm systems. A person is not necessarily needed to monitor the video feed and see that something is going wrong. When intelligent sensors detect an anomaly and generate alarms, the customer or security company can remotely view the situation instead of dispatching personnel to inspect on-site. This also lowers the rate for false alarms, avoiding unnecessary calls to law enforcement agencies.

Furthermore, an advanced home monitoring system with multiple cameras for perimeter protection and indoor surveillance could take roughly 12 cameras. “According to Chelsea Render of Bosch Security Systems, a typical



▲ Neville Clifton, Chief Technologist and Director of Alarm New Zealand



▲ Hartwig Tauber, Director General of the FTTH Council Europe

security camera currently requires roughly one to two megabits per second (Mbps) for upstream transmission of high-quality video that is not capped or compressed. Assuming 12 cameras, an average of 18 Mbps upstream would be required for the video feed over IP. HD cameras will take this to even higher levels," said Render of RVA. "In the North American markets we track, only FTTH can provide this."

However, IP-based home alarm systems are highly dependent on the quality of service of the networks. "They need more reliable connections to transmit signals back to the home monitoring system," Waugh said.

Although FTTH typically has low network failure rates, fallback connections should still be considered, warned Render of RVA. "An alternative communication method could be wireless broadband, though this would require restricting the feed to key cameras or lowering video quality to accommodate the much lower upstream bandwidth capacity."

## ENERGY MANAGEMENT

A smart grid is a next-generation power grid that is intelligent enough to allow electricity to be efficiently monitored, distributed and consumed. Several regions around the world have already deployed smart grids.

Increasing use of alternative energy is one reason to deploy smart grids. While renewable energy is an answer towards a more sustainable society, nature is largely unpredictable. This creates instability in power generation and transmission, a critical service that must remain reliable at all times. With smart grids and smart appliances, power companies will be able to efficiently store and distribute energy.

The first step towards a smart grid is smart metering, where power companies and consumers can monitor the power consumption of a household. Most initial trials do not even have to use fiber. "They can use alternative connections like GSM networks to send the data of power consumption from end-customer to utility company," Tauber said. The general consensus is more consumers will be inclined to use energy more efficiently if it is convenient and provides apparent benefits.

The next step goes beyond smart metering. Household appliances can take advantage of the smart grid by performing tasks when electricity is cheaper. Power companies can also shut down less-significant appliances during peak times to ease demand and avoid disruptions in service. This is much more demanding for bandwidth,



▲ Benoit Felten, CEO of Diffraction Analysis



▲ Michael Render, President of RVA

Tauber said. "Here you are not occasionally transmitting metering data anymore. You need a reliable connection from and to the power company for real-time monitoring and controlling of millions of household appliances."

## E-HEALTH

E-health is a necessary development in nations with aging populations. Instead of relocating senior citizens to nursing homes, which can be expensive and uncomfortable, they can stay home where various health parameters can be monitored by an array of sensors. The monitored data can be reported to medical centers and notify relevant personnel if an anomaly is detected. This approach can improve quality of life for the elderly, as well as lower costs for public health care plans.

While high bandwidth is not necessary for e-health applications, high quality and secure connections are critical. Fiber networks are optimal solution because they provide better connections, higher security and can guarantee quality of service. With fiber connectivity, video conferencing can also be integrated. Infirm patients can consult with medical professionals from the comfort of their homes, Tauber said.

## CLOUD SERVICES

The recent migration of data and services into the cloud is reducing the need for local equipment. With cloud services, a user is no longer required to download, install or maintain hardware or software. Fewer devices mean fewer costs for both the consumer and provider.

In addition, cloud services provide an alternative method for off-site storage. It offers additional protection for video archives, while also providing homeowners the option to remotely monitor their homes, said Render of RVA. Combined with video streaming, one can access footage on-the-go from mobile devices or any computer. With fiber networks, this becomes streamlined and cost-effective.

Managed video as a service is another example of a

cloud-based service. However, the concept of MVaaS assumes a reliable, high-speed connection on both sides. This business model cannot work if data cannot be transferred quickly between devices.

## TELECOMMUTING

Once fiber gains significant penetration, it could revolutionize the way we work. Telecommuting removes geographic location as a necessity, so a business's workforce is no longer tied to a specific location. This not only improves quality of life for employees, it also paves the way for more sustainable living.

Businesses today are concentrated geographically. However, cities and metropolises are dense population centers that are not sustainable. Telecommuting can change this, Felten said. "It's very possible for someone to live in a remote village and be just as relevant to the business community as if they were living in the center of the biggest city in the country."

With fiber connectivity, one no longer needs to be at the office to have instantaneous access to IT resources. "Right now work is not an activity, it's a place," Felten said. "This is an inheritance from the industrial age where you had to be in a physical plant to produce something."

Telecommuting transcends borders, in the case of a Hollywood producer who returned to his home country of Sweden. "Instead of being locked up in a dark room working on films all day long, he can now do the same job in the comfort of his own home and country, where he is able to see family and friends on a daily basis," Tauber said. "With FTTH, he is able to upload his finished work very quickly."

## FUTURE-PROOF

"Fiber is future-proof in the sense that although we don't know what services will come yet, fiber is our best bet to support it as it comes along," Waugh said. Fiber is virtually unlimited in terms of bandwidth, agreed Render of RVA. "It will be able to scale as new exchange equipment is developed."

With fiber networks being deployed all over the world, many services that are currently limited or not available will be made possible in the not-so-distant future. "Fiber network infrastructure, and the data capacity it provides, is required to bring greater levels of efficiencies to the digital aspect of our lives," Clifton said. Without fiber, next-generation services cannot develop. 