Sabbatical Report – "The Place of Loops in the NEN"

This paper proposes:

1. *That all schools be connected to ultra-fast broadband, preferably by fibre.*
2. *That this "sea change" in the provision of ICT be supported by a comprehensive, sector-wide education programme.*
3. *That the true benefit of current Government, sector, community and commercial initiatives can only be fully realised through the establishment of a National Education Network.*
4. *That loops be an integral part of the NEN providing essential local collaboration, service provision and support.*
5. *That the NEN be used to facilitate schools' access to centrally managed 'virtualised' services to ensure that teachers and learners enjoy an appropriate ICT environment.*

Background

The Government faces significant challenges in ensuring that all New Zealand's schools have access to ultra-fast broadband (UFB) and are able to make effective use of this exciting opportunity. The first is achieving effective UFB connectivity for all schools. At the same time the sector needs help to understand the significance of this new paradigm in ICT provision. Then there is the pressing need for a National Educational Network (NEN) to provide educational and technical services. To do this effectively the NEN must utilise the significant contribution of appropriately supported and resourced regional loops. Finally, by promoting the shift to virtualisation and managed services, the Government can ensure that all schools are providing ICT capabilities that support teaching and learning in the 21ST Century appropriately.

Informed by overseas experiences and with particular reference to the Nelson Marlborough Loop[1], this paper explores the role of loops in the National Education Network. It identifies a number of significant challenges that flow from these five imperatives and recommends strategies to address these.

Introduction

A loop is a group of schools that, through collaboration and in partnership with a provider of UFB, has created a logical education network to advance the use of ICT in their schools. Loops can be defined regionally or virtually as in the case of Schoolzone[2].

---

[1] http://www.theloop.school.nz/
[2] Note: Schoolzone is an example of a virtual aggregation. However, as it does not currently use UFBB it cannot be considered a full loop. This may change in the future. www.telecom.co.nz/content/0,8748,202796-202301,00.html

The primary driver of loops is the potential to improve teaching and learning through the greater confidence that teachers have in their enhanced ICT environment, the motivation that these new opportunity provide for students and the extensive opportunities that UFB connectivity and managed services can offer. [3]

Membership of a loop is an agreement to join an aggregated network and access its services and support. Aggregation generates benefits including economies of scale that ensure access to advanced yet affordable services and resources. There is also greater access to technical expertise and collective wisdom while partner schools retain ownership of the solutions.

While the loops have been constructed by different entities and in different ways, all loops provide key functions that facilitate the ICT capacity and capability of their member schools by providing some or all of the following services:

- Access to a logical broadband network
- Access to sophisticated infrastructure
- Managed services
- Technical support
- Professional support including professional development
- Leadership support around the use of ICT
- Advice and advocacy

A common backbone and shared services allow alignment of member schools' network specifications and equipment, and helps facilitate redundancy. Further alignment is achieved through collaborations that harness local school and community energy resulting in both real and intrinsic benefits.

As Government initiatives resolve existing challenges around connectivity, in-school infrastructure, inter-network federation and the provision of services at the national level, the role of existing loops will change. Given sufficient resources loops will then be able to offer a valuable wrap-around ICT support service encompassing NEN and KAREN access, virtual server facilities, managed services and professional and technical support. This entity will become the ICT focal point for the regions' schools and a strong advocate for them.

Broadband for schools

Giving schools high quality UFB, effective networks and appropriate support ushers in the next level of teaching, educational administration and ICT infrastructure management. As high quality connectivity intersects with the Web 2 focus on using ICT for participation and collaboration, exciting opportunities are appearing in both real and virtual classrooms. The extensive Virtual Learning Network (VLN) programme offers "classrooms without walls, where students and educators have the flexibility to connect with their classes 24 hours a day, 7 days a week"[4] and facilitates e-learning courses such as Aviation Studies[5] which utilises cutting edge 3D modelling software[6]. Such interaction is about to be significantly boosted through schools' access to the next generation of video conferencing, including from the desktop.

---

[3] Supported by findings of Becta "Implementing managed services – benefits and considerations." March 2008
[4] VLN - http://www.virtuallearning.school.nz
[5] Aviation Studies - http://www.catlins.school.nz/aviation.htm

Enhanced ICT infrastructure guarantees reliability which in turn raises user confidence[7]. Providing unrestrained Internet access allows the operation of digital classrooms through teacher laptops, data shows and true broadband connectivity to the wider world. Teachers can have their whole class online together doing group research, accessing multicast video and using Internet-based programmes - all at speeds that hold juniors' attention. Students are highly motivated by these exciting opportunities.

ICT is now better able to support schools' vision for increasingly student-orientated pedagogies such as enquiry learning[8]. For example, ICT can be integrated seamlessly and authentically as a regular aspect of literacy and numeracy programmes and this learning be supported by online assessment such as E-asTTle[9] thereby serving the government's priority to raise standards.

Podcasting with pictures and video, blogging and digital reviews are breaking down the traditional classroom walls, as does providing remote access for staff and students. There are students working from home, sharing work with their family and joining international online collaborations. Schools are participating in joint projects both in NZ and internationally. Students are connecting to whanau overseas and blogging when travelling – all of which add to achieving the NZ Curriculum's vision of confident, connected, actively involved life-long learners.

Teachers are increasingly confident in their use of online ICT for professional development. They are strengthening their professional networks, collaborating to improve their understanding and actively seeking online learning experiences for their classes. There has also been significant growth in the number of teachers blogging with educational experts in discussion forums and using video conferencing to host ICT cluster meetings.

Fibre connectivity has also encouraged the establishment of local aggregations which provide a range of ICT services to their partner schools. The benefit that Nelson schools have derived from the Loop's central hosting programmes such as "Clickview"[10] provide a model that could be repeated for many other applications and services both regionally and nationally[11]. There is also a rise in collaboration as powerful user groups form around many of the technical aspects, services such as "Clickview", Student Management Systems (SMS's), Managed Learning Environments (MLE's) and other discrete applications.

Then there are the technical advances that UFB is offering service providers. These are making it possible to provide teachers and learners a raft of new learning experiences including multicasting, access to hosted Moodle (LMS) and to contemplate collaborations around internet radio and TV and web-based applications such as the Google Tools suite.

There is eager anticipation that UFB will see schools connected to KAREN and the NEN. There are also the significant benefits of aggregation and collaboration where groups of schools are looking to harness UFB connectivity to offer regional virtualisation of schools' ICT functions. Schools can then access opportunities such as VoIP, CCTV IP security camera solutions and web hosting as centrally managed services.

---

[6] http://www.nextspace.co.nz/
[7] Becta "Implementing managed services – benefits and considerations." March 2008
[8] Ministry of Education "New Zealand Curriculum" 2007 Pages 34-36
[9] http://e-asttle.tki.org.nz/
[10] http://www.clickview.co.nz
[11] CBA for Nelson Loop schools indicate savings in excess of 76% by centrally hosting "Clickview". Even greater savings were achieved on the software and licensing for the Loop's "Milestone" CCTV service.

There is also potential for significant gains in school administration efficiencies around finance, data management and reporting. While connectivity to fibre brings many demanding challenges for schools' ICT technicians there are also significant advantages. Enhanced connectivity enables much faster and more efficient management of networks as evidenced by the enthusiastic uptake of ICT network management tools for update services, upgrades and computer imaging.

Finally, when considering how schools will use this new high speed broadband connectivity we need to look beyond the impressive but still relatively limited scope of current practice and consider the exciting opportunities for collaboration and participation that will become the cornerstone of ICT-assisted learning in the Web 2 world.

1. *That all schools be connected to ultra-fast broadband, preferably by fibre.*

There is an absolute imperative that any plan for a National Education Network has connectivity *to all schools in New Zealand* as its raison d'être. This equity of access recognises that not only is ultra-fast broadband connectivity essential to all our regions but increasingly it is seen as a basic right especially with respect to educational opportunity. Technically this is now achievable and where ever possible connection should be by fibre. Where that is not possible the commitment to equity should see the utilisation of recent advances in wireless, satellite and ADSL to achieve universal high quality connectivity.

However, connecting a school to fibre does not necessarily ensure that educational benefits will automatically accrue. Without the essential moderation provided by the loops and the NEN any significant benefits of the enhanced connectivity are unlikely to be realised. While there may be small one-off gains, the advantages only become economic and sustainable when there is coordination and collaboration around a larger group of schools accessing both services and the support that working in the broadband environment requires.

The ICT environment has always required some form of middleware or "middle person" to facilitate implementation at the workplace/chalk face. Loops provide that local support and those technical services best delivered at this level. But, in arguing that loops are an exciting and essential development because they remove so much of the ICT hassle from schools ('**Fat Fast and Free** – from encumbrances' and **'two-click-access to the world'**), [12] loops are not the most effective way to deliver all aggregated services. Services such as Commodity Internet, email, videoconferencing and VoIP may well be best brokered at the national level and delivered by the NEN. The symbiotic relationship between these two key components of a successful ICT solution for New Zealand's schools is the predominant focus of this paper.

A second barrier to the successful uptake of UFB- enabled opportunities lies in the lack of confidence a large number of schools express in their ability to provide effective e-learning leadership and strategic planning. Clearly, it is important that this deficit is addressed because effective leadership of a school's ICT vision and strategic planning is fundamental to the ongoing success of any ICT initiatives.

---

[12] See section 4 – P11 of this report.

2. *That this "sea change" in the provision of ICT be supported by a comprehensive, sector-wide education programme.*

In responding to the 'Tomorrows Schools" context there needs to be significant work done in helping school leaders understand the broadband connectivity paradigm and its ramifications for ICT provision in their schools.

The generally poor state of schools' ICT capability reflects a major weakness of the last two decades in that an aspect as complicated as ICT infrastructure provision has been left to individual schools to address. Furthermore, increasing ICT complexity is seeing the deficit between what is needed by teachers and students and our schools' expertise and resources continue to widen exponentially, as does schools' vulnerability to the plethora of often dubious commercial advice they are subjected to.

So, while schools desperately need support in developing their capacity, infrastructure and connectivity they first need to understand this new thinking that treats ICT infrastructure and services as a utility to be accessed collaboratively rather than an individual school responsibility to be owned.

There needs to be a comprehensive education campaign that brings the sector up to speed with what is needed for schools to maximise the benefits of both UFB and the aggregation this will enable. This new knowledge and understanding will help develop greater ownership of this next phase of ICT provision.

There is considerable urgency in addressing this lack of institutional insight if the key Government priority of a coherent ICT infrastructure in a "fibre to the schools" ultra-fast broadband environment is to be achieved.

It is hoped that the Ministry of Education will play a greater role in promulgating this new thinking.

3. *That the true benefit of current Government, sector, community and commercial initiatives can only be fully realised through the establishment of a National Education Network.*

The lack of a National Education Network is a significant barrier limiting the benefit of considerable investment in both the emerging regional loops and in current Government activity around capacity (ICT PD), infrastructure (network upgrades) and connectivity (broadband rollout to schools). Furthermore, the Nelson Loop and other loop-type aggregations have reached the glass-ceiling imposed by the lack of a NEN.

If New Zealand was starting from scratch in a pre-MUSH[13], non-Tomorrow's Schools environment and with top sliced ICT budgets then a discreet NEN model would be achievable. The reality is an environment fashioned by five years of MUSH thinking endorsed by broadband initiatives. Schools have a significant degree of autonomy and will want a say in what happens, especially as they will be funding a portion of the costly internal improvements and support that NEN membership will require.

---

[13] MUSH networks - "open access fibre networks" built in partnership with local and regional councils (municipalities), universities, schools and hospitals. Modelled on the Canadian experience, MUSH's were the cornerstone of the Labour Governments Broadband Challenge initiative.

Also, given the "Tomorrow's Schools" context and the emergence of school aggregations (first with rural distance learning collaborations, then "Schoolzone"[14] and more recently with the various loops) it would appear that any national-level solution needs to incorporate those initiatives that are providing services successfully. Furthermore, ignoring the ownership, enthusiasm and experience that has built up would fail to appreciate and capitalise on what has gone before.

While there has not been a systematic or coordinated approach to the establishment of loops, these aggregations have made a significant commitment to finding common approaches and ensuring that there is sufficient compatibility so that the possibility of an organic 'ground-up/ government down' national education network remains achievable.

However, it is neither realistic nor advisable for the loops to have to drive the next critical phase of national coordination. This is the role of the NEN.

Significant challenges ahead

Those charged with rolling out the NEN will face a series of very challenging technical issues such as the adoption of an agreed set of communication protocols for multicasting, VoIP, and video conferencing (both large group and desktop to desktop). Then there is the need for a national solution to Identity and Access Management (IAM) to ensure users can access other networks to share resources and services. Furthermore, effective data sharing, access and interoperability for MLE's demands effective IAM management.

Agreed routing protocols and IP schema are also essential. With the IP6 Internet addressing system looming the advent of the NEN would be the ideal opportunity to structure an appropriate national IP6 schema that manages this on behalf of all schools. Also, 'good practice' guidelines are required to ensure open and easy access to resources such as the National Library, Te Papa, National Film Library and Digistore using single sign-on (SSO) and IAM (*"The two click"* rule), and in considering other vexed issues such as screenrights.

There needs to be considerable discussion around how the NEN is going to provide national scale services such as Internet, email and VoIP. There is no doubt that both technically and economically there are significant benefits from National procurement and delivery [15] as long as there is a clear focus on the particular needs of education and schools which are often significantly different from other sectors.

All schools must be able to access the NEN, but stand alone connections are not practical or desirable because the routing devices and expertise required is beyond the typical school's resources. Rather, all schools in a geographic or virtual region of interest should be able to benefit from membership of regional aggregations for the essential moderation of services, collective support and intrinsics that loop-type environments facilitate.

The 'outliers' for whom regional loop membership is not feasible must also enjoy aggregated support. This could be provided by a virtual aggregation such as has been modelled by Schoolzone.[16] Trials in Otago are investigating the technical and financial parametres of an UFB-based virtual aggregation.[17]

---

[14] www.telecom.co.nz/content/0,8748,202796-202301,00.html
[15] http://cms.lgfl.net/web/lgfl/services and in the **Rural Broadband Initiative** Sept 2009 P.18

[16] www.telecom.co.nz/content/0,8748,202796-202301,00.html
[17] http://www.virtualeducation.net.nz/news/index.asp

Meeting the needs of the users

There will need to be an effective interface between the NEN's designers and their 'customers' i.e. loops, schools and service providers. The advantages that can be achieved technologically and financially with a top-down approach must be informed by "from-the-ground" moderation. This could be achieved through a NEN Advisory Group based on the current Superloop Group "brains trust" who as practitioners with access to a remarkable network of expertise have a great deal to contribute, or be the responsibility of a Becta-type group[18].   Given the complexity of this project those responsible should be modelling knowledge age learning[19] by pooling the expertise and experience of a wide range of people. Only then can there be confidence that the solutions will meet the needs of all the stakeholders.

Drawing on expertise and experience to generate "best practice" is a strength of the loops.   The independent Advisory Group will need the support of affiliated 'experts' who understand the emerging "ICT as a virtualised service/utility paradigm", have experience working in this specialised educational network area and who can contribute to the generation of good practice around NEN developments. This good practice would then be disseminated and adapted to the needs of each region's loop and its schools in planning strategically for the provision of ICT infrastructure and services. Different expertise will contribute at differing levels with the educational input becoming greater as the process moves closer to the 'chalk face'.

There are many aspects of a NEN that require an interactive information flow from national policies to the chalk face, and back again. The services that the MOE already offer such as anti- virus software, licences and helpdesk support need to be expanded to include resources, expertise and guidelines for aggregated services.   This knowledge should flow down to the regional Loop level and on into the schools facilitated by enhanced professional development. The process also has to work effectively in the opposite direction. Classroom-driven demands must flow up the conduit to define the parameters of the services and support needed. The Nelson's teacher-driven "two click rule" is a good example of this bottom-up model of shaping services.

4. That loops be an integral part of the NEN providing essential local collaboration, service provision and support.

---

[18] **Becta is the UK government agency leading the national drive to ensure the effective and innovative use of technology throughout learning.   Becta http://www.becta.org.uk/**

Becta has four main roles: Strategic adviser to government, Coordinator of the e-strategy, Providing insight through analysis and research and Strategic delivery partner. The e-strategy has been segmented into four themes: strategic technologies, e-maturity, knowledge architecture and personalised content.

[19] Jane Gilbert 'Catching the Knowledge Wave' – *knowledge is a dynamic and fluid energy, a process not a product, produced in the interactions between people to do something new.* (paraphrased)

The Nelson Loop provides an informative case study. Thanks to the farsighted generosity of Network Tasman Limited[20], the Nelson Loop is a "fibre to the school" solution. Its importance is not just in brokering high speed fibre and wireless connectivity but rather in enabling schools to benefit from this connectivity through achieving aggregation and collaboration, and in moderating the delivery of services.

The Loop has built a technical framework way beyond what an individual school could hope to achieve and maintain. This collaboration also means maximising economies of scale, aggregated demand and serious negotiating power! For example, by pooling expertise and resources the Loop has been able to secure unbelievably fast, high quality connectivity at a very reasonable and fixed cost. Few schools in NZ are enjoying that, but all should.

Other services have also achieved significant savings for participating Loop schools. These include savings in excess of 76% when accessing the Loop's centrally hosted "Clickview" video archive service as opposed to implementing a stand-alone service, and even greater savings (up to 80%) on software and licensing for the "Milestone" CCTV service. Furthermore, the more schools connect to a service the greater the savings for all.

The Loop is achieving this through the advantages of aggregation, effective bargaining and by being able to offer suppliers benefits such as a consistent technical interface, a single billing point and shared expertise that reduces a vendor's training and support costs. The Loop also believes that for each of its services it reduces member schools capital costs and in-school based ICT support personnel requirements by at least 10% at the very least.

The essence of the Nelson Loop is captured in its mission statement *"Two click access to the world"*. When any teacher in any Loop school clicks on a desktop icon the service will work. Where the Loop adds most value is that many complex issues have had to be resolved for this seamlessness to occur. Achieving and maintaining that ubiquitous functionality is essential in any successfully networked environment.

Simply plugging a school into fibre doesn't give users instantaneous access to the services. Quite to the contrary, every service the Loop has provided has required considerable effort to resolve policies and protocols, organise routing, define technical specifications and provide user support before these begin improving teaching and learning or can contribute to an effective administrative and ICT infrastructure environment. Furthermore, it often takes two or three years for the service to mature.

The Nelson Loop is successful because it:

- Achieves aggregation of demand and expenditure
- Coordinates physical and human resources for the common good
- Shares the cost and management of sophisticated infrastructure and services
- Generates an inclusive rather than exclusive environment.
- Mitigates risks and ensures future proofing
- Achieves coherence and standardisation
- Facilitates equity of access and empowers users through local ownership
- Facilitates a growing coherence of vision, policy, planning and infrastructure – both within schools and amongst those who support schools

These result in both direct and intrinsic benefits for Loop members, those who support schools and those who offer services. Aspects relevant to the role of loops in supporting the NEN are outlined below:

---

[20] www.**networktasman**.co.nz

a. **Collaborations add value to the schools' ICT environment.** User groups are forming around many of the technical aspects. There are also examples of specialist teacher user groups emerging to support applications such as KAMAR, Clickview and KnowledgeNet. This is leading to the growing confidence and experience of teachers, students and technicians. There is also increased interest in collaboration from local business and community groups.

b. **The Intrinsics arising from this collaborative environment.** Nelson Loop members benefit from sharing the cost and risk of technical decisions. Aggregation of expertise and resources enables a rise in innovation around educational opportunities for all Loop schools and students. The Loop also ensures that the expertise of educationalists balances commercial advice. Furthermore, projects beyond the reach of any one school are established.

c. **Support Services.** If plugging schools into the NEN is going to pay dividends then individual schools must have fibre-quality capacity (infrastructure, servers, expertise, capability and support) and yet many schools do not have the resources or expertise to build and sustain even rudimentary networks. The Nelson Loop has partially alleviated this by ensuring a greater quality and consistency of school networks. The pooling of ICT expertise has solved many of the problems schools were experiencing in managing the more complex demands of greater interactivity generated by the Web2 environment. Furthermore, schools' ICT support staff have been unskilled and the Loop has been very effective in re-enforcing consistent expectations of external ICT support.

d. *School Network support.* Another pressing demand that the Nelson Loop is facing is the need to provide basic technical support services for a number of schools completely at sea in terms of their hardware, network and support management. While the Loop tries to maintain a strict delineation between the Loop network and the schools' responsibility for its own internal infrastructure, if these schools are not assisted they cannot derive benefit from their loop connections. To resolve this, the Loop has had to instigate a subsidised "techie support" system that provides low end network maintenance. This service is already heavily subscribed and needs to be extended.

e. **Assisting Schools.** Schools have to take the initiative in accessing the range of opportunities now available, e.g. backups, CCTV, virtual services and web hosting. However the Loop has found that schools need considerable support with all but the most basic services. There is no reason to believe that this experience will not be repeated with the NEN.

f. **Support for smaller schools.** The Nelson experience has shown that smaller schools could not afford Loop membership or access the user-pays services provided if costs were recovered on a strict user pays basis. Effectively, because of their greater resources, expertise and structures, the larger schools are the anchor tenants of any network. They bear the majority of the costs of development and ongoing operation while smaller schools generate enthusiasm and broaden the variety of experience. The same imbalance will occur with the NEN and may be more easily managed at the loop layer.

g. **Loops as local advocates.** Any school aggregations receiving Government support will need to demonstrate a tangible commitment to supporting the NEN, including supporting its expectations and protocols. This will also require that loops and the NEN champion a "no school left behind" imperative not just in terms of connectivity but more importantly in terms of services and peer support. Because Loops are such important advocates for their regions' schools they have a role to

play in ensuring that every school achieves appropriate connectivity. In some cases the local loop may be the best entity to arrange or even provide this because they can negotiate a locally tailored solution, as demonstrated by the Nelson Loop's use of point-to-point radio where fibre is not yet affordable.

h. **Non-profit investment.** Because a number of the loops are supported by local business, community initiatives, trusts and the schools in non-profit ventures costs to users are reduced. This ability for loops to be a major force in winning support for its member schools should not be under estimated. In brokering community initiatives the current loops have proven particularly effective at raising funds, support and awareness. To be successful the NEN must harness this community energy and commitment already invested in loops.

i. **Collaborative environments.** Tomorrows Schools has tended to promote competition not collaboration. The Nelson Loop has challenged that by proving that collaboration is the way forward and that education sector can meet its obligation to help the less fortunate. *'School leaders with moral purpose seek to make a difference in the lives of students. They are concerned about closing the gap. They act with intention of making a positive difference in their own schools as well as improving the environment in other local schools. Sustained improvement of schools is not possible unless the whole system is moving forward.'* – Michael Fullan[21] Essentially, if a region's schools help each other and look after the less fortunate, everyone will benefit. Through the Nelson Loop schools are sharing expertise, sharing resources, helping each other, mitigating risk and enjoying the many benefits now accruing. However, it is difficult to see the same level of social responsibility being generated by a NEN unless this ethos is firmly embedded in its charter.

j. **New knowledge in action.** Looking at the big picture, the Loop is a leading example of the guiding principles of wikinomics[22] (openness, peering, sharing and acting globally) – using mass collaboration/peer production to achieve a successful outcome. The Loop users are 'prosumers' (proactive consumers) shaping 'their' product.

k.

The development of the Loop is also a perfect example of 'new knowledge' in action.[23] No one person knew how to build this new type of educational network. There were no models to follow. Instead the Loop assembled eclectic expertise who then "nutted it out". This will need to be a strong feature in the development of the NEN.

One of the greatest contributions of the loops is that they have raised expectations exponentially in respect to the speed of connectivity and the quality of service that all schools should now receive. Now both a national architecture and backbone connection (a National Education Network), and local aggregations/loops are necessary for an ICT solution that ensures that *all schools* can take full advantage of the educational possibilities offered by the rollout of ultra fast broadband.

Regional aggregation, service moderation and support for schools will be an essential component of the NEN environment, at least in the foreseeable future and until the reality of a comprehensive set of national services is fully realised. Loops will have a vital role to play in providing important local

---

[21] Michael Fullan – "The Moral Imperative of School Leadership"
[22] 'Wikinomics: how the smartest companies create value in the age of mass collaboration' - Don Tapscott.

[23] Jane Gilbert 'Catching the Knowledge Wave'

support[24] - and because the NZ context demands a strong element of regional self-determination in the use of ICT.

5. *That the NEN be used to facilitate schools' access to centrally managed 'virtualised' services to ensure that teachers and learners enjoy an appropriate ICT environment.*

What individuals schools do in terms of ICT should no longer be discretionary. ICT capability is now a key to effective learning and effective schools. Providing substandard ICT without adequate connectivity to the wider world should not be tolerated any more than substandard teaching or archaic administrative systems.

To help ensure effective ICT provision schools must be encouraged to aggregate to share costs, expertise and mitigate risk because very few schools have the resources to provide their teachers and learners with a robust ICT infrastructure appropriate to the Web2 participatory environment. Furthermore, the exponential increase in ICT complexity required for the next "ubiquitous connectivity" phase means there is no future in individual schools providing their own in-school server systems or in continuing to access ICT services as standalone units. This makes the shift to virtualisation and the accessing managed services inevitable.

Internally, schools need a high quality fibre infrastructure augmented by wireless that is connected to ultra high-speed broadband so that teachers and students can access sophisticated managed services efficiently and cost-effectively. Increasingly, such services will be delivered off-site from 'virtualised' data centres and from the 'cloud'. Achieving "cloud" capacity will provide exciting new options in terms of online services, resources and software. More importantly it will make access to sophisticated ICT infrastructure achievable and for all schools. In the longer term this is only affordable way the Government can meet its obligation to fund appropriate levels of ICT infrastructure for schools.

In conclusion

New Zealand teachers and learners deserve an appropriately considered and funded National Education Network. With the advent of loops and the roll out of UFB there are the vehicles to achieve this. There are also significant local developments and excellent overseas models that can inform these deliberations.

Each loop has been initiated by key people putting their heads together at a serendipitous moment to meet an unavoidable imperative. For the NEN this is that moment and there must be effective opportunities for the key people to be working work together.

New Zealand has lead the world in terms of the professional development provided to support ICT in classrooms but for far too long the infrastructure and services have not been capable of delivering the vision.

---

[24] Detailed in Appendix I

Now is the opportunity to right that imbalance and set our young people on the path to effective participation in our digital future.

Charles Newton

September 2009

Feedback to c.newton@iconz.co.nz