Ultra Fast Broadband

MAKING THE RIGHT CHOICES

A guide for schools...

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Ultra Fast Broadband or UFB. You'll have heard a lot about it lately and how it offers better and faster internet speeds and online teaching opportunities. UFB is a big step up from ADSL services and will allow you to do lots of things in the classroom that you previously only dreamed of.

The online needs of a school and the educational environment are quite unique and so to get the most out of this opportunity, it's important that you are ready to be connected to UFB and are able to choose the right Retail Service Provider to provide your online solution. We've put together some simple information to help you understand how the UFB connection works and the things you should be looking for in a Retail Service Provider (RSP).

Are you ready for your UFB Installation?

It is a MoE priority to connect all New Zealand schools to UFB and they will be sending you information about your proposed connection.
If you haven't received this information yet, you can find out when your school is scheduled for connection by visiting:
http://ufbis.elearning.tki.org.nz/

Useful Tips:

- LFCs or fibre providers are: Chorus; NorthpowerFibre; Ultrafast Fibre Ltd; Enable Networks Ltd.

As the fibre is rolled out past your school, your LFC or fibre provider (for example, Chorus) will arrange for a fibre connection to link your school into the Ultra Fast Broadband network. This connection will run from the fibre in the street, to a point within your school. You can choose where to get the fibre installed within the school. Usually this will be located in a specified and secure server room, but it's up to each school to make this decision.

Currently some schools are receiving their fibre connection ahead of Ultra Fast Broadband internet services being available in their area. Either way, it's a good idea to prepare beforehand so that when your school's UFB connection happens – you are in a position to get the process moving as soon as possible. A key part of this will not only be defining your internet and telecommunications strategy, but also ensuring that you have chosen the right Retail Service Provider to make it all happen.

What's important to note is that even once the fibre drop is completed, this does not necessarily mean you are connected. You will need to either get confirmation from the Ministry of Education or get a RSP (Retail Service Provider) to check everything has been completed.

Choosing the right Retail Service Provider.

So what do we think you need to know about? There are four broad areas that you should consider. These are:

• The User Experience

This refers to how your staff and students will experience the service - how they would like to use it and what it will allow them to do. We discuss how contention ratios can affect internet speed and cover off collaboration and peering and features such as IP addressing, filtering and CIR.

• Flexibility

This section covers the need for customised solutions, the flexibility and choice of recommended IT partners to implement the solution, contract lengths and bandwidth decisions.

• Assurance

The need for specific educational experience by a Retail Service Provider as well as the reliability and accountability of technical support is discussed here.

• Management

Here we outline The Ministry of Education's recommendations around UFB, talk about data caps and pricing, and raise questions you should ask about BYOD and setting up wireless networks at your school.

The User Experience

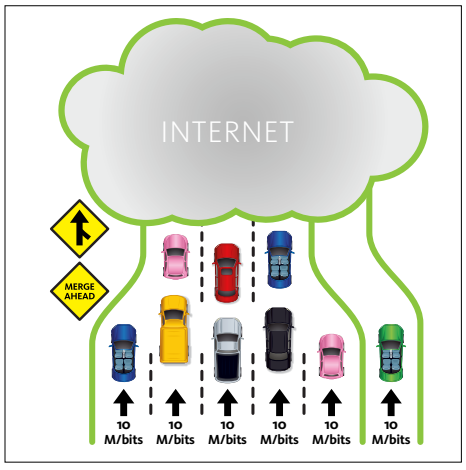
Your staff and students are the users. So this section is all about what sort of service your school will get. To make sure it's what you want, here are some of the things which could impact your staff and students' user experience.

Contention

Internet bandwidth is generally shared with other customers and at times the service could be faster or slower depending on how many other customers are online at the same time. How many people you share with is known as the contention ratio. For example if you have a contention ratio of 50:1, then you are sharing your connection with 50 other customers. This means that the bandwidth you purchase is the maximum speed you could achieve, but in reality your average speed will be lower than this.

To understand contention, imagine cars and a motorway as per the image below. Your contention ratio refers to how many cars share your off-ramp with you (50 cars to the 1 off-ramp). Obviously the more cars there are, the slower your access to information will be and the time of day (during peak times more people sharing your service are online at once) may also affect your speed.

If contention is a big issue and internet access crucial to your educational strategy then you might want to investigate a dedicated service. This is shown by the separate lane in the diagram below. This dedicated service means you get exactly the bandwidth you purchased and won't get the potential speed fluctations that come with a shared service. However be aware that this can be a very expensive option which may not fit within most budgets.



Useful Tips:

• Ask your potential RSP what their contention ratio is and see if it will be suitable for the needs of your school. Standard 50:1 ratios are usually fine for a home customer, but are not good enough for schools who need fast robust internet access, so you should be looking for a service that is significantly better than this.

• Plus check to see if they have a special internet service which has been created or designed for schools, or is this just the same service as that offered to residential and/or business users.

• Also if the price of the service seems too good to be true, then it probably is. Check the contention ratio and see if that is why it's so cheap.

Collaboration

More and more schools are using collaboration in a variety of ways to improve and enhance teaching and learning. Some schools are using collaboration to share assets such as resource material or teachers, some are running projects with other schools around the world and others are even running television stations collaboratively.

UFB is seen by many schools as an excellent opportunity to start collaboration programs and work together. However be aware that most RSP's are only providing Internet access which means collaboration efforts will be limited to the speed of the internet connection. This is not ideal as the internet speed can result in jitter and lag when trying to view content – which makes it hard to keep students' attention.

Peering

As mentioned previously, most Retail Service Providers will only provide schools with Internet access which of course means that you can only get content at the best speed their internet access provides.

However there are Retail Service Providers who have set up their network to enable schools to view content and educational services without having to use the public internet. These RSPs have worked with various providers to get them to add their rich content and educational services directly to their network (this is called peering). This way schools on their network won't have to use the public internet to obtain these services and instead will be able to use or view them at the top speed of their access connection. Not only is the quality and throughput of the connections dramatically improved, the overall bandwidth cost for schools is reduced.

Peering networks can also be used to access cloud solutions and other cost saving initiatives such as outsourcing their servers and online back up without having to use the public internet.

Useful Tips:

- Ask your potential RSP if they can offer your school collaboration with other schools, and if so who they are.
- Also find out who is peered to your potential RSP's networks. If they don't have the content providers that you need, ask if they will add them for you.

Features

There are lots of different service features available (or not) in the Retail Service Provider plans that are out there and while they may be offered as incentives, make sure you know what they are and whether you need them. We can't cover all offerings here, so instead we have focussed on the service features you're going to need - so make sure your RSP can offer these options:

Useful Tip:

• If you want to run mail servers, web servers and video conferencing ask a potential RSP whether they offer multiple IP addresses, as you will need more than one to enjoy these services

Useful Tip:

• If you want to use the free MOE filtering service make sure your Service Provider can work with Watchdog. Alternatively if you put a solution in place from your own IT partner, make sure the RSP can support that too..

• IP Addressing

IP addresses allow one computer to talk to another computer. IP addresses can be static or dynamic. You will need at least one static IP Address to be the identifier for your school to the outside world but your network strategy may require more than one IP address to run mail servers, web servers and video conferencing. Even if these are things you don't need right now, it's good to future-proof your system and ensure you are able to have these services down the line.

• Filtering

Filtering lets you control the sites that are accessed from your school. You definitely need to have a customisable filtering solution in place for your school and so ensure that your RSP can offer this. Watchdog are contracted by the Ministry of Education to offer free filtering for schools, but many other IT providers offer their own customised filtering services.

• CIR

CIR means the Committed Information Rate of the service – basically it's a guaranteed minimum speed that the service will run over. So when you see a CIR make sure you know what it applies to – is it a CIR for the Internet or is it a CIR on the underlying access link? All UFB connections for schools come with 10Mbit/s of CIR on the access. This does not guarantee you a speed on your internet, so you will need to ask about this specifically.

Flexibility

Schools are completely different to businesses and will need to have an online solution that is tailored to fit specific needs. So make sure the RSP you choose not only offers the things you need right now but has the capacity to offer you other items which you will need in the future.

Solution Flexibility

Due to the unique environment of schools you need to ensure that the service you get from your RSP is as flexible as possible. You don't want to get caught out by a provider who selectively blocks ports or who can't connect or work with another service provider you want to use. Be wary of closed networks which prescribe services and speeds and control transactions for services.

Also make sure that their service is customisable to your needs and that they can make it as technical or simple as you need.

Useful Tip:

• You don't want your RSP to dictate the equipment you have to use. Make sure that there is flexibility so that you and/or your IT partner can choose what equipment would best suit your needs.

IT Partners and Implementation

You also need to ensure that the RSP you choose is flexible enough to fit with your IT and telecommunications strategy moving forward. This means that your RSP and your IT team/ partners will need to work together.

Useful Tips:

• If you have a current IT partner and want to continue working with them, make sure that any potential RSPs can work with them.

• If you don't have an IT partner, ask potential RSPs if they can recommend an IT partner who has experience in implementing solutions for schools.

UFB will allow you to do some great things for instance:

- New voice solutions such as IP Telephony, IP PABX or SIP
- Outsourcing servers or sharing server hardware, software and maintenance with other schools.
- Accessing cloud services for accounting, student management systems, data storage and much more.

But you will need an IT partner to implement these solutions – your RSP will merely provide the facility or capacity. Many if not all of these features or services will be offered by potential service providers but don't feel you have to rush in and make these decisions upfront. All of these items might be on your wishlist, but you need the option of choosing when you are ready to implement these changes.

Bandwidth Flexibility

There's so much information out there about high speed internet access that it's hard to assess how much bandwidth you may need when you start out. As technology changes and online demands at your school increase, it's important to be able to change your bandwidth to meet your growing needs. Your best option is to choose a service that is flexible and can upgrade your bandwidth to meet your changing requirements.

Useful Tip:

• Before you sign any contract with an RSP, check whether you can change your bandwidth during the term of the contract and if so, what the cost implications will be.

Assurance

What happens if things go wrong? Make sure you're not getting sold a lemon, by checking what experience your potential RSP has, and their procedures for account and fault management.

Experience

You need to make sure that your potential RSP is experienced in the education sector and has a clear understanding of the unique challenges and demands the school environment presents.

Reliability

If you're going to be using online education resources as a cornerstone of your teaching programme then you need to make sure that you have a service that works. When choosing an RSP, it's critical to find out how they will manage your account and what their fault response time is.

Accessible Technical Support

If things go wrong how accessible is the support you need to get up and running again? Some Service Providers run huge call centres and also deal with thousands of consumer customers too - will your school be lumped in with them if something goes wrong? Make sure that there is always someone who is accountable for your school and that your RSP understands schools and their requirements?

Useful Tips:

- Ask your RSP what specific experience they have in implementing these solutions in the education sector?
- Also check to see how many schools they have connected and how long they have been doing this for?
- It's always important to get feedback from the schools themselves so ask your potential RSP for case studies or schools they can reference.

Useful Tips:

- Find out if your RSP provides a key account manager who is responsible for your school and a point of contact whom you can call on if there are issues.
- When checking the credentials or reliability of an RSP, it's always a good idea to seek independent advice. A good resource would be your local broadband school support group...look for one in your area by going to: **www.superloop.org.nz**

It's a good exercise to try calling the help desks of some potential RSPs to check the following:

a) How long it takes them to answer.
b) Whether the person who answers has the technical knowledge and is empowered to fix your problems.

Management

Managing your UFB service is extremely important and so putting the right policies in place will be key to this.

The Ministry of Education

We're sure you already know about the Ministry of Education's Network for Learning (N4L). If not, this is what their website has to say:

> "The Network for Learning will be an online network for schools, which will run over the ultra-fast broadband infrastructure currently being rolled out across New Zealand. The Network for Learning, available progressively from 2013, will provide schools with affordable, safe, ultra-fast internet access as well as a range of online content and centrally-procured services."

N4L could be a good solution for schools. However with UFB already being rolled out and a vendor yet to be appointed for the N4L project, it may be sometime before it is widely available. Some schools don't want to wait, they want to start connecting to each other now and enjoy the benefits of their new UFB connections. The Ministry has recognised that this is an issue for schools and that they need to sign up with other providers in the meantime. Their recommendations on choosing a Service Provider can be found **here**. They also recommend that schools do not sign up for longer than two years so they can consider N4L once it becomes available to them.

Data Caps

Lots of schools have data caps and worry each month that they might exceed it and end up with a very large and unexpected bill. Data caps are a volume-based charging method. That means you pay X amount for so many Gbit/s of data and if you exceed that you will be penalised with additional charges (so watch out for cheap plans with data caps).

Other companies use flat rate charging. This means you can download as much data as you can each month. The only limit will be how fast you can download the data - this will be dictated by the capacity you have purchased.

Bandwidth and bandwidth pricing is an area where there can be a lot of confusion. Most RSPs will refer to bandwidth as a single number, as if national (New Zealand) and international rates were the same.

Most schools would not want their national (local) bandwidth determined by the international rate they choose. Local bandwidth should be a minimum of 100Mb and preferably 1000Mb to enable all national access to operate at a maximum speed. Only after this should schools determine the speed they require for international traffic. Small schools can probably manage with 10Mb. But larger schools would need a minimum of 50Mb or more.

Useful Tips:

- Ask your RSP whether their bandwidth pricing is based on the national or international rate? Also make sure they differentiate between national and international bandwidth speeds – so you can choose what your school needs.
- Make sure there are no hidden charges and you know exactly how much you're going to be charged each month.

BYOD

Bring Your Own Device (BYOD) is making big waves in schools around the world. The major challenges of BYOD are having adequate bandwidth in the school to meet the learning needs of students, and to ensure that the number of devices connected to the network do not impact bandwidth performance. This is especially true when students are accessing multimedia resources.

Schools need to establish guidelines and policies in order to ensure high bandwidth performance over time. It is likely that the impact of BYOD on your network is only going to increase in the future and so it is important that you develop a clear strategy upfront. This way the impact of BYOD can be given due consideration when designing a robust online solution.

Some of the questions that arise about usage that impact network performance with BYOD include:

- **How much bandwidth should students be allowed to consume?**
- **Should students have individual limits on bandwidth?**
- **What will happen to students who violate the rules (for instance will this student's access be limited/ denied for a number of days?).**
- **How many devices do you think will be deployed? Can the network support this number?**
- **Should some sites be restricted to certain people or certain times of the day?**
- **Where will you access your content from? Using video stream platforms in lieu of directly accessing sites such as YouTube can reduce the strain on bandwidth (at peak hours, YouTube can consume 50% to 70% of available bandwidth to schools).**

Wireless Network Deployment

When talking about BYOD, we also have to cover wireless deployment as this is usually necessary for the successful implementation of BYOD.

To be successful and ensure that the school has full coverage, the wireless network needs to be properly designed which usually means getting a professional involved. This could be your existing IT partner, or one recommended by your potential RSP.

Whoever is appointed to install your wireless network will need to establish the best locations for distribution access points (this will make sure you get coverage throughout your school/campus). They will also need to address security issues around your network – for instance, what measures will they install to ensure the network won't be hacked and how will you authenticate users?

Useful Tips:

- Does your IT Partner have any experience in implementing wireless solutions in a school environment? Have they any schools they can reference?

- Other schools will often be the best source of information. Talk to schools who have implemented wireless networks to gain the benefits of their experience.

Finally...

UFB and the implementation of real online capability will fundamentally impact the way schools deliver their educational content moving forward. But before this happens, there are some difficult decisions to be made which involve highly technical and complex areas.

This guide is not definitive and we realise that you may have many more questions about some or all of these areas. If you want more information on getting your school connected to UFB then visit the Ministry of Education elearning website for more information:

http://www.elearning.tki.org.nz/Ministry-initiatives/Getting-connected2/Connecting-your-school-to-ultra-fast-broadband/Fibre-connection

Through our EduNet service, Vector Communications has been providing ultra fast solutions in the education sector for several years. Along the way we have learnt quite a bit about what schools need and how they like to work. We are more than happy to share this information with you or provide any additional advice, so please feel free to contact us using the 0800 number or email below.

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