

NEAL Access™

Service Specifications

Effective 1 February 2007

Introduction

As a result of Government funding under the 'Broadband Challenge' initiative, Vector Communications (in partnership with North Shore City Council) is building an Urban Fibre Network (UFN) on Auckland's North Shore, which represents an extension of Vector Communications Metro Ethernet network. The physical construction of this network is due for completion by July 2007.

Vector Communications is proposing to offer secure 'virtual' (logical) networks operating over the UFN (physical network). One of these 'virtual' networks will serve to provide connectivity between North Shore schools, (the NEAL¹ network).

The scope of this documentation limited to services on the NEAL network.

Service Description

NEAL Access™ is offered to participating Auckland North Shore schools (sites) - the connecting of schools to NEAL. NEAL will link all schools into a single high performance network, with the option to source additional services independently as required from Service Providers connected to Vector Communications Metro Ethernet network eg, internet access.

For the purposes of clarity, the service is the provision of a bearer (access) network only - the linking of schools to a common fibre network, which in turn will enable schools to;

- Establish links to other connected schools (as required) at speeds up to 1 Gbps
- Establish commercial relationships with 3rd party Service Providers for the purposes of sourcing services eg, internet access. Schools can achieve this either individually or collectively as a group
- Potential to connect to other regional, national and global education and learning initiatives
- Achieve efficiencies from shared IT systems, resources and applications between schools

Therefore, schools will have as a minimum:

- A single contractual relationship with Vector Communications for bearer services
- A separate commercial contract with a Service Provider/s (as required), on an open-access basis² for other communications services

¹ North shore Education Access Loop

NB: This will represent an alternative experience for schools, whereby, schools today would commonly expect a Service Provider (ISP) to bundle access and service into a single commercial agreement.

NB: Bearer (access) and communications services offered by Vector Communications are unbundled, therefore a school who contracts for bearer (access) only services from Vector Communications can do so on the same terms as a school who may wish to purchase both bearer and communications services from Vector Communications. Vector Communications will not place any undue restriction on any permutation of services considered by schools from any combination of the Vector Communications, third-party service providers, and vendors of electronic content.

Vector Communications will provide a fibre connection between all (participating) schools, with the following core characteristics;

- A Layer 2 Ethernet service
- All schools will get a 1 Gbps physical connection, with a PIR³ of 1 Gbps
- All schools provisioned on a single common VLAN⁴ for access to all other schools
- Unlimited and un-metered connection between schools⁵ on NEAL
- To allow connectivity to 3rd party Service Providers (as required) on an open-access model

² Access to NEAL will be provided to any vendors of Communications Services on a fair and non-discriminatory basis, subject to technical and commercial criteria being met.

³ Peak Information Rate; the maximum speed at which Vector Communications commits to transfer IP data across NEAL between schools SDP's (Service Delivery Point)

⁴ IEEE-802.1Q Virtual Local Area Network

⁵ To within the parameters of the service defined – refer to PIR, access availability and frame delivery ratio

1. On-net (NEAL) services

The service will result in a network of connected schools, whilst also enabling other services (eg, from 3rd party Service Providers) as required.

Each participating school would have flexibility over how they wish to use the provided connection eg,

- Establish links to other designated points on the NEAL network (between mutually agreeing schools)⁶ for services;
 - Ability to collaborate, share and the development of school communities (knowledge and information sharing)
 - Improved school management (lower ICT costs, shared/pooled infrastructure resources and online course/student management services)
- Establish relationships with 3rd party Service Providers for additionally required services, eg;
 - Access to richer educational content
 - Internet services (bandwidth, web hosting etc)
 - Real-time/steaming video applications/tutorials
 - Community based learning programmes
 - Leverage innovative educational learning tools
 - Online development courses
 - Expert forums
 - Improved school management services
 - Voice (VoIP) services
 - Offsite data backup, server storage facilities

All schools connected under the ‘Broadband Challenge’ on NEAL are connected via a single common VLAN, with each school responsible for ensuring they have compatible/adequate equipment/hardware at the SDP. It is highly recommended that as a minimum, each school has a firewall connected between the SDP and their internal network to safeguard their private network infrastructure.

The single common VLAN dictates that all schools will share a core bandwidth of 1 Gbps (referred to as the peak information rate or PIR) and will have direct Layer 2 (IEEE-802.3 MAC) adjacency to other participants of the NEAL network.

All schools will contract with Vector Communications for their physical access to NEAL.

Additional/optional Vector Communications services⁷;

- Additional VLAN’s can be provided upon request to Vector Communications, should schools require additional private links with one or more nominated schools on NEAL. Depending on the complexity, additional services can normally be activated within two working days.
- Service configuration changes incur an additional one-off charge to recover the cost to Vector Communications.

⁶ Private IP addressing on the common VLAN is supported, but requires co-ordination with other participating schools

⁷ Charges may apply

1.1 Key Features

In summary, the features and associated benefits are;

Feature	Benefit
Access Bandwidth	Common VLAN, enabling the creation of a network of North Shore schools, with a PIR of 1 Gbps
Delivery/Reliability	<ul style="list-style-type: none"> ○ Active management of each schools connection to NEAL to ensure high reliability and network availability
Fixed monthly charge	Low (index-linked) charge for access network
Unlimited data usage	No data restrictions or overage/excess charges ⁸
Easy Integration	Ethernet interface into customer site, simplifying and minimizing the cost of integration
Customer Support	<ul style="list-style-type: none"> ○ 24/7 customer access (port) monitoring ○ 24/7 fault reporting ○ 9am - 5pm fault resolution

Vector Communications will operate and manage NEAL, and will physically connect each participating school on Auckland's North Shore. The design of the network will aim to ensure that each participating school experiences the best possible service.

NEAL Access™ is for school use only and can not be used for on-selling services or commercial gain.

1.2 Physical connection

The network, up to and including the Service Delivery Point (SDP), is owned and managed by Vector Communications. The physical connection into the network is via a copper UTP 10/100/1000 Base T port. Vector Communications will provide the physical and logical (Virtual LAN or VLAN) paths between other participant schools and Service Providers. Equipment required to connect to the network will be provided and installed by Vector Communications.

1.3 Service Delivery Point

The Service Delivery Point (SDP) is the point of interface between the network termination equipment supplied by Vector Communications and the school's internal network infrastructure.

- The SDP is the Ethernet port (facing the school's owned equipment) on the Optical Network Unit (ONU), provided and installed by Vector Communications
- The SDP represents the boundary (demarcation point) of responsibility between Vector Communications and participating schools

⁸ Applies to all communications between connected NEAL schools over NEAL. Other services (eg, from a 3rd party Service Provider) may have restrictions applied by the 3rd party provider

2. Off-net (NEAL) access

In addition to NEAL Access™, it is anticipated that schools will require access beyond the NEAL network, eg, for internet access.

For the purposes of clarity, NEAL Access™ DOES NOT include, eg;

- Management and configuration of customers' equipment unless as agreed in advance and subject to commercial terms
- Provision of internet access or web hosting services
- Management and provision of DNS requests
- Allocation of public IP addresses⁹

However, Vector Communications will facilitate and provide support wherever possible, e.g.

- Facilitation where necessary, to connect with local, regional, national and global education initiatives (eg, The Loop, KAREN)

NB: Where a school(s) requests a connection to an 3rd party Service Provider (connected on the Vector Communications ME Fibre Network), an additional service from Vector Communications will be required (NEAL Transport™) - this will be requested by the Service Provider

NB: Additional services from 3rd party Service Providers may impact on the maximum achievable speed of NEAL (to the SDP) for that particular school

NB: The school is responsible for procuring, configuring and maintaining the equipment necessary to use additional services

⁹ Public IP addressing is not required for this service

Key Responsibilities

1. Schools

Participating NEAL schools are responsible for;

- Any Vector Communications provided equipment that is present on your schools property (under the 'Site Access' agreement)
- Providing, configuring and managing sufficiently dimensioned equipment and software to enable your schools connection (on the school side of the SDP) to the NEAL network
- The sourcing and purchase of additional services from Service Providers

2. Vector Communications

Vector Communications will be responsible for;

- Connecting participating schools to the NEAL network
- Configuration and provision of a common VLAN for all participating schools
- Ongoing management of fibre connection up to the SDP (at the school)
- Moves, additions and changes to service (as requested)
- Ongoing management of NEAL and the UFN network
- Helpdesk - receive fault notifications and trouble shooting
- Provide facilitation and management of additional services (where requested)

NB: Connections on the Vector Communications fibre network that are as a result of schools procuring services via 3rd party providers will be managed under normal terms (ie, via the 3rd party Service Provider)

Service Attributes

The service provided by Vector Communications is a Layer 2 service, providing 1 Gbit/s Ethernet connections via optical fibre between participating sites. All participating schools will be provided an electrical interface (10/100/1000Base-T) for connection to the schools network environment. Under the base NEAL Access™ configuration, all schools will share a single common VLAN. However, separate logical connections (VLANs) can be provided to participants who wish to establish their own additional private connections externally.

Delivery Method	1 Gbps Ethernet <i>(via the Vector Communications ME Fibre Optic network)</i>
IP Addressing	Agnostic, IPv4 and IPv6 ¹⁰ fully supported (other layer 3 protocols supported include AppleTalk-DDC and IPX)
Access Availability to SDP	99.9%
Maximum Throughput ¹¹	1 Gbps (as PIR)
Latency (RTD) ¹²	<30ms
Frame Delivery Ratio	99%
Access Fault Reporting	24/7
Access Fault Resolution	Equipment: 8 business hours Fibre: 12 business hours
Network/Port monitoring	24/7
Customer Equipment Requirements	The use of a router (or other Layer-3 device is required to logically terminate NEAL Access ¹³ Each school is responsible for supplying, configuring and maintaining equipment beyond the SDP
Physical Medium	IEEE-802.3z 10/100/1000 Base-T (Cat.5 UTP / RJ-45)
Service Provider Port Bandwidth	10Mbps, 100 Mbps or 1 Gbps (No Auto-Negotiate)
Mode	Full Duplex <i>(No Auto-Negotiate, other modes not supported)</i>
Monthly Data Allocation	Unlimited within NEAL network
MAC Layer	IEEE 802.3 - 2002
MAC Address Limit	10 (maximises network security) ¹⁴
VLAN support	Yes ¹⁵

¹⁰ IPv6 may not be available/supported by selected ISP

¹¹ Between the SDP and Vector Communications Vector Communications ME fibre network

¹² Between school's SDP (access port) and the Vector Communications ME fibre network

¹³ It is not permitted to connect NEAL directly into a schools LAN environment

¹⁴ Maximum number of IEEE 802.3 MAC Addresses per SDP that can be presented to NEAL. If you require >10, please consult with Vector Communications.

¹⁵ Applies where a single port ONU has been provided by Vector Communications