

April 2009
Service Provider Guide

UBA Backhaul Service

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1 INTRODUCTION TO UBA BACKHAUL SERVICE SERVICE PROVIDER GUIDE

Who is it for?

UBA Backhaul Service is for Service Providers, carriers, system integrators and other wholesale customers. This Service Provider Guide will also act as the Technical User guide for the purposes of meeting the requirements of the UBA Backhaul STD Service Level Terms.

Who developed this document?

This documentation has been developed by Telecom Wholesale, Telecom New Zealand Limited ("Telecom").

Why this document has been developed?

UBA Backhaul is a regulated service provided in accordance with the UBA Backhaul Standard Terms Determination (STD).

This document has been developed to provide guidelines to Service Providers who wish to purchase UBA Backhaul Service to support the EUBA Service.

Those who wish to purchase Handover Links and/or Commercial Ethernet Backhaul services please refer to the relevant Service Provider guide available at http://www.telecomwholesale.co.nz/backhaul_services

Updates

This Service Provider Guide is subject to change from time to time. The latest version of this document can be found on Telecom's Wholesale website at www.telecomwholesale.co.nz/ubabackhaul

Relationship with Other Documents

This document outlines the operational functions of UBA Backhaul Service. This document does not constitute an offer by Telecom to provide UBA Backhaul Service.

Purpose

This document has been developed to meet the following requirements:

- > Provide details of UBA Backhaul Service and its components
- > Provide Service Providers with product, technical, and service related information, business rules and prerequisites
- > Provide possible options for use of UBA Backhaul Service

Intellectual Property

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2 OVERVIEW

UBA Backhaul Service is a Telecom Wholesale regulated product offering. It provides a Backhaul Service that allows Service Providers to transport their EUBA Service from any First Data Switch (FDS) to their own Access Seeker Nearest Available Point of Interconnect (ASNAPOI).

Delivered over Telecom's NGN Ethernet platform, the UBA Backhaul Service provides a high speed, layer 2 Ethernet transport service over the Telecom Multi-Service Core (MSC).

UBA Backhaul is an 'intermediate input' service which provides the layer 2 transport service component which Service Providers can combine with their EUBA Tail Service to provide End Users with a multi class ADSL2+ Tail throughout New Zealand.

UBA Backhaul is available nationally where Telecom has deployed its Ethernet footprint. Details of availability criteria and geographic availability are set out in Section 6. Geographic availability will change over time as the Ethernet network is progressively rolled out. Telecom will update Service Providers from time to time on the rollout of UBA Backhaul.

UBA Backhaul can be combined with Telecom's Ethernet Handover Link and/or Commercial Ethernet Backhaul service. This allows Service Providers to customise the end-user's end-to-end service as desired.

ASNAPOI - Access Seeker Nearest Available Point of Interconnect

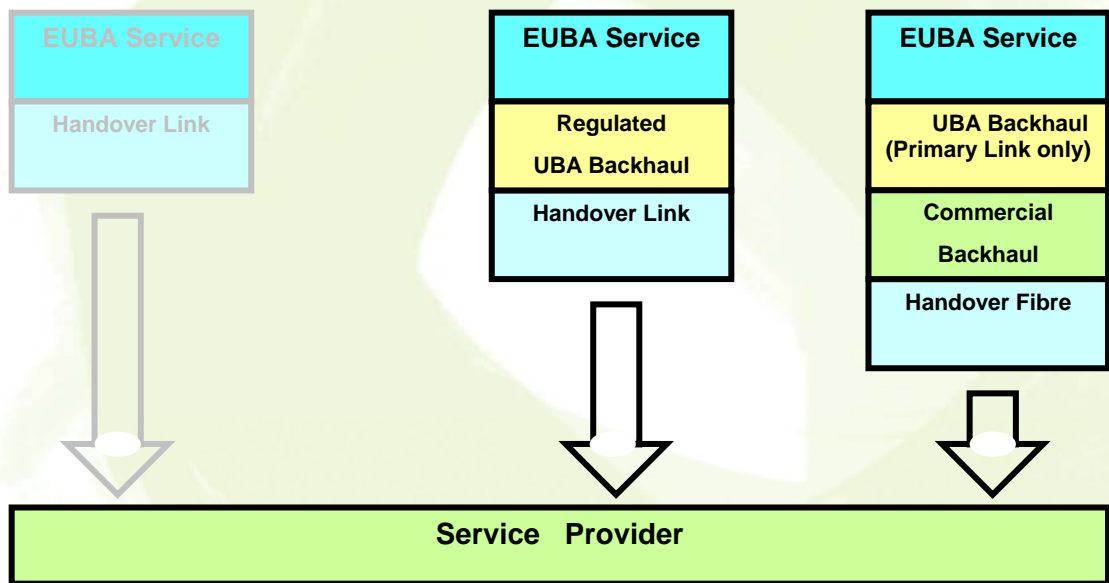
- › An ASNAPOI is the closest exchange to the FDS at which the Service Provider has a Handover Link.
- › Multiple FDS and Parent POI's can be connected to an ASNAPOI.
- › Where a Service Provider has Handover Links at multiple NAPOI's, Telecom will terminate the UBA Backhaul at the closest ASNAPOI to the Parent POI.

Parent POI - Parent Point of Interconnect

- › A Parent POI is the designated NAPOI for a FDS, there are currently 29 designated NAPOI's.
- › Multiple FDS's can be connected to a Parent POI.
- › A Parent POI may be designated as an ASNAPOI (in which case no secondary link is required)

FDS - First Data Switch

- › A FDS is the first data switch in Telecom's network that a EUBA Access Tail is connected to.
- › The FDS may be designated as a Parent POI (in which case no primary link is required) or as an ASNAPOI (in which case no UBA Backhaul is required).



Telecom's Ethernet Handover Links and commercial Ethernet P2P Backhaul services are also described in this Service Provider Guide.

Note: Telecom's Handover Link, and commercial Ethernet P2P Backhaul are separate services.

For more detail on each of these additional services please refer to www.telecomwholesale.co.nz or contact your Telecom Wholesale Account Manager.

3 SERVICE PROVIDER BENEFITS

3.1 Key Features

The key features included in the UBA Backhaul service are:

- › Standards-based Ethernet technology offering a generic transport component service.
- › Optical Ethernet interface presented to the Service Provider Handover Point
- › Delivered over the Telecom NGN Ethernet network
- › Delivers dedicated bandwidth
- › Range of transmission capacity options of 50Mb, 100Mb, 200Mb, and 1Gb
- › Utilises high capacity 1Gb bandwidth at Ethernet Handover to the Service Provider
- › Extensive coverage* that can be delivered over multiple Handover Points at different locations

* Refer to Appendix V of this guide for the current service coverage table.

3.2 The Key Benefits

The benefits of UBA Backhaul for the Service Provider are:

- › Ability to aggregate traffic from a number of DSLAMS at a First Data Switch on to a single Primary Link providing scalability opportunity.
- › Ability to aggregate multiple EUBA Service specific Primary links at the Parent POI and transport over a single Secondary Link to the ASNAPOI providing scalability opportunity.
- › Ability to purchase multiple secondary links between the same two points to allow for growth
- › Ability to select from a variety of transmission capacity options to cater for increasing customer demand i.e. 50Mb, 100Mb, 200Mb & 1Gb.
- › Ability to establish a total service relationship with the End User by extending the reach from the Service Provider's POP to the End User's Site.
- › Ethernet technology provides a standards-based transport service. Ethernet is a mature and well understood technology, is widely deployed and as such is easy to interface to.
- › UBA Backhaul provides a generic layer 2 Ethernet transmission "building block" capability that meets the requirements of Service Providers to effectively terminate the EUBA Service at their own Point to presence / ASNAPOI at a regulated price.
- › Flexibility for Service Providers. UBA Backhaul service circuits can be easily added, removed, upgraded or downgraded. UBA Backhaul easily adapts to the Service Provider's End User's changing needs.
- › UBA Backhaul Services are billed on a recurring monthly basis based on both VLAN bandwidth & Distance charge basis (no traffic volume charges apply).

4 HOW UBA BACKHAUL WORKS

4.1 Product description

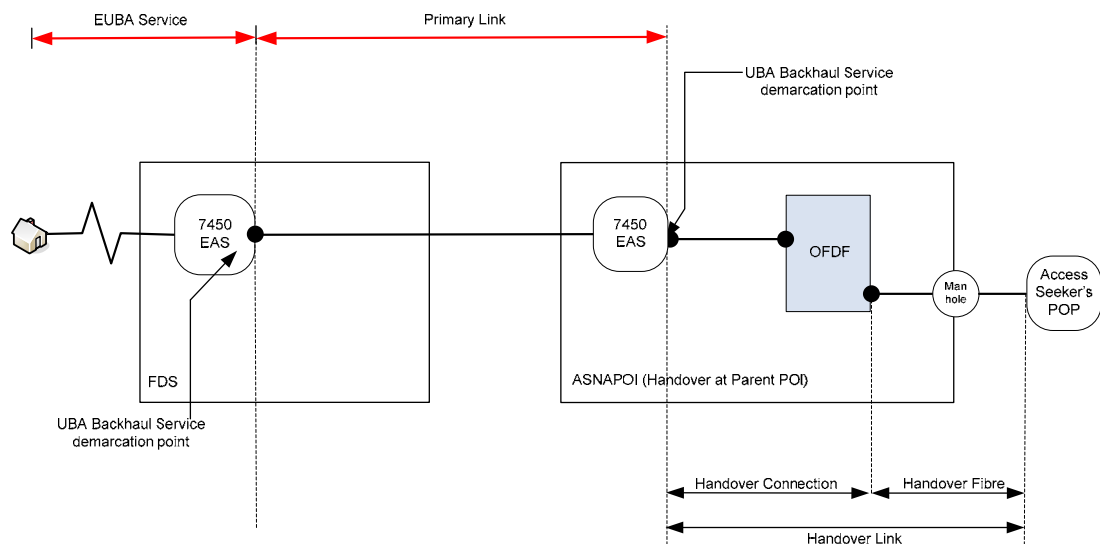
UBA Backhaul is a layer 2 Ethernet transport service delivering dedicated bandwidth over Telecom's Ethernet Access Platform.

Designed as an intermediate transport product, Service Providers can use UBA Backhaul as the linking component between the EUBA Service and centralised Point of Presence to create differentiated services to their End Users.

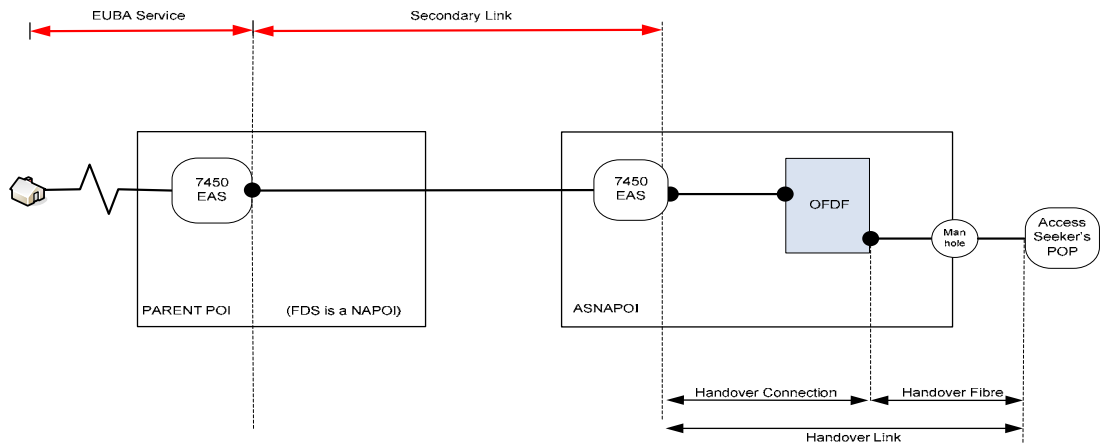
UBA Backhaul offers four transmission capacity options; 50Mb, 100Mb, 200Mb and 1Gb

The UBA Backhaul has two different and distinct backhaul types:

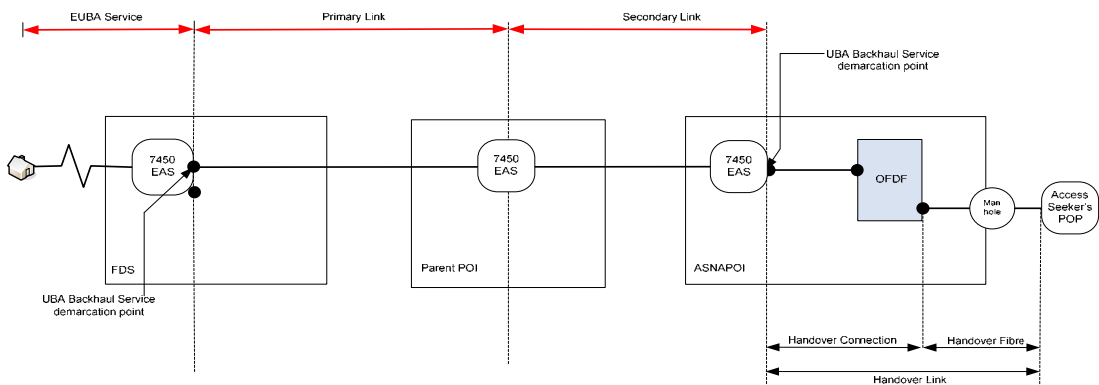
- 1) UBA Backhaul Primary Link - Providing transport between the First Data Switch (FDS) and a Parent POI. Where the Parent POI has a Service Provider's Handover point this Parent POI is deemed to be a ASNAPI and the service terminates here - see diagram.



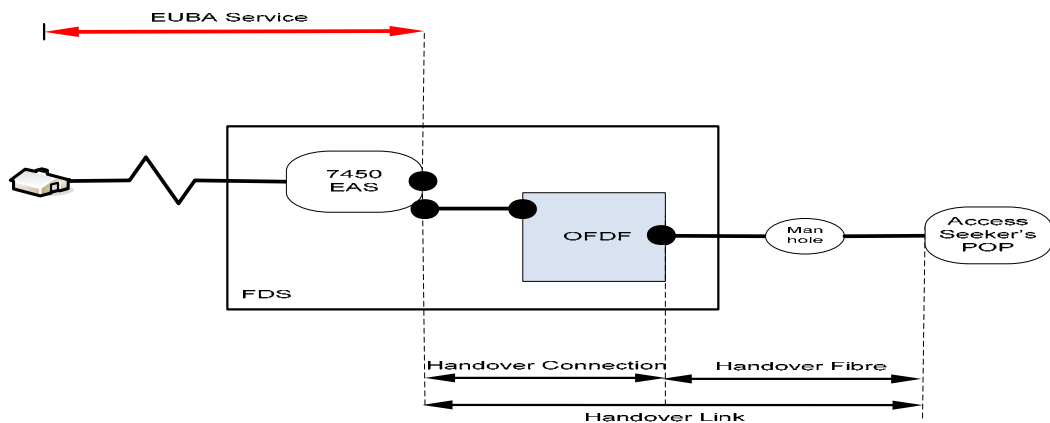
- 2) UBA Backhaul Secondary Link that provides connectivity between a Parent POI where the Service Provider does not have a Handover Link and a Parent POI where the Service Provider does have a Handover Link - see diagram. Where a Service Provider has multiple locations with Handover Links, the secondary link will terminate at the location which is closest to the Parent POI.



Depending on the Service Provider's location and the location of their End Users, two other combinations can be valid - most common of these is likely to be where both a Primary Link and a Secondary Link are required - see diagram. In this case the Secondary Link will carry both local traffic from Parent POI and backhauled traffic from the primary link.



Lastly, of course, there will be instances where backhaul is not required as the Service Provider's Point of Presence is at the same location as the terminated EUBA tails - see diagram



4.2 What It Does

A UBA Backhaul solution may consist of three components that work in differing ways - these are

- › Primary Link.
- › Secondary Link.
- › Secondary Handover Link.

Primary Link

- › Will transport traffic from multiple DSLAM's from a First Data Switch
- › Will prioritise the Real Time traffic over the Best Efforts as it enters the Backhaul
- › Available in transmission capacity options of 50Mb/100Mb/200Mb/1Gb

Secondary Link

- › Can be used on its own or in conjunction with a Primary Link(s)
- › Will transport multiple Primary Links from different First Data Switches
- › Provides for QoS Management on locally aggregated DSLAM traffic
- › Will consider previously prioritised queues as correct and just forward

Secondary Handover Link

- › Primary links, that are not connected to a Secondary Link or commercial backhaul, can be aggregated into a Single Handover Link
- › Each Secondary Link will require a separate Secondary Handover Link
- › Available in transmission capacity of 1Gb only
- › Made up of two components - a Handover Connection and a Handover Fibre

4.3 VLAN Numbering

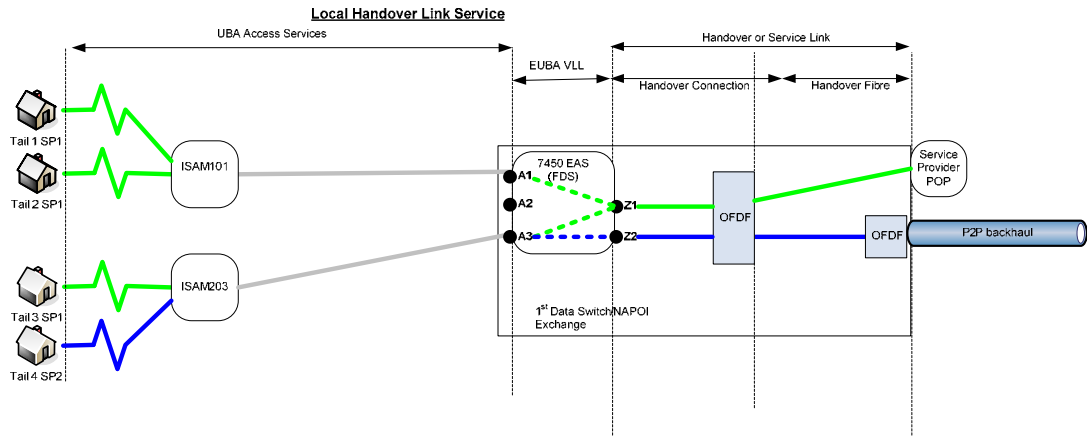
VLAN Numbering and management is more accurately a part of the EUBA tail process. However to provide a greater degree of clarity see below for a description and how it is managed.

UBA Backhaul utilises 802.1ad to encapsulate the Customer-VLAN (C-VID) within each access within an outer tag layer called the Service-VLAN ID (S-VID).

S-VID's will be unique per Handover Point.

The VLAN management scenarios as they pertain to the EUBA Service, UBA Backhaul and Handover Links is illustrated in the diagrams below.

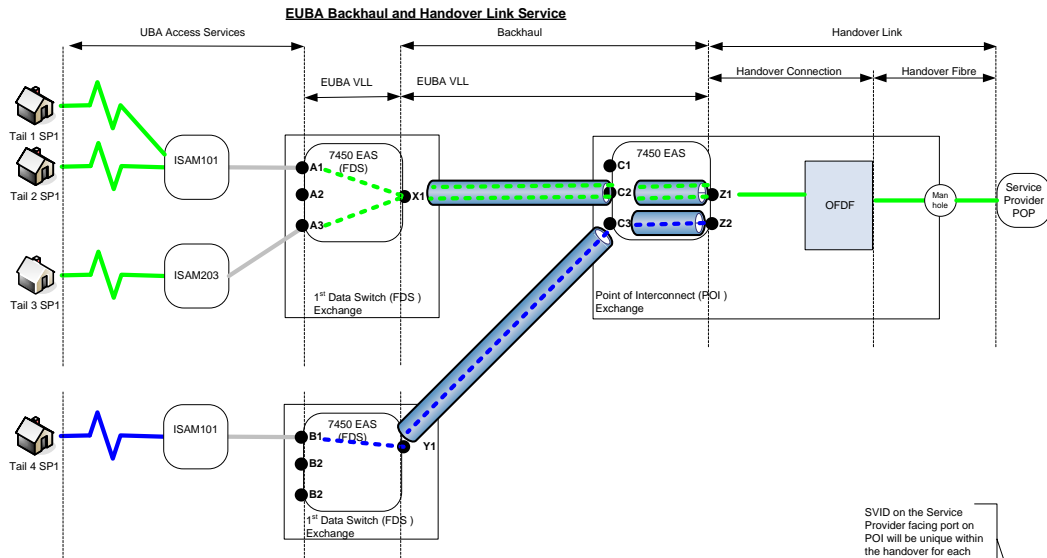
EUBA Service and Handover only



End User	Service Provider	ISAM	ISAM Facing Port	SP Facing Port	ISAM Facing SVID	SP Facing SVID
Tail 1 & Tail 2	SP 1	ISAM 101	A 1	Z 1	202	15
Tail 3	SP 1	ISAM 203	A 3	Z 1	202	16
Tail 4	SP 2	ISAM 203	A 3	Z 2	202	15

SVID on the Service Provider facing port will be unique within the handoverservice link for each ISAM being handed over

EUBA Service, UBA Backhaul and Handover link



End User	Service Provider	ISAM	ISAM Facing Port (FDS)	SP Facing Port (FDS)	ISAM Facing SVID (FDS)	SP Facing SVID (FDS)	ISAM Facing Port (POI)	SP Facing Port (POI)	ISAM Facing SVID (POI)	SP Facing SVID (POI)
Tail 1 & Tail 2	SP 1	ISAM 101	A 1	X 1	202	15	C 2	Z 1	15	2
Tail 3	SP 1	ISAM 203	A 3	X 1	202	16	C 2	Z 1	16	3
Tail 4	SP 1	ISAM 101	B 1	Y 1	202	15	C 3	Z 1	15	4

SVID on the Service Provider facing port on POI will be unique within the handover for each ISAM being handed over

SVID will be unique within a backhaul for each ISAM being backhauled

Diagrams are for illustrative purposes only.

4.4 Supported Applications

UBA Backhaul Service will support the EUBA service that in turn will support.

- > web browsing
- > audio streaming
- > file transfer
- > video streaming
- > email
- > voice over IP
- > video conferencing
- > Low latency / real-time applications.

The service performance is in part dependant on the configuration of the Service Provider equipment and/or networks. Therefore, Telecom does not guarantee that the resulting end-to-end service is suitable for such applications.

Traffic not containing the correct service attributes e.g. Encapsulation ID, rate, Ether Type, will be discarded.

4.5 Service Provider Interface

UBA Backhaul is handed over to the Service Provider as an Ethernet circuit on a fibre optic physical interface at 1Gbps (GigE).

The demarcation point between the Telecom UBA Backhaul and the Service Provider's network is the Handover Point designated for the Coverage Area.

The Handover Point is presented as a GigE 802.3 NNI interface.

The physical interface will be a single mode optical connector, delivered to the Service Provider's Optical Fibre Distribution Frame (OFDF).

For more information on interface options refer to Appendix IV.

4.6 Aggregation/Handover of traffic

Both primary and local traffic can be aggregated on to the same Handover or Secondary Link.

Secondary Links can not be aggregated and each will require a separate Secondary Handover Link.

5 UBA BACKHAUL STANDARD TERMS

UBA Backhaul is a regulated service provided in accordance with the UBA Backhaul Standard Terms Determination (STD).

UBA Backhaul is ordered via OO&T.

UBA Backhaul faults will be logged via OFM.

For comprehensive details of the UBA Backhaul Service Standard Terms please refer to the Commerce Commission Website at the link below

<http://www.comcom.govt.nz/IndustryRegulation/Telecommunications/StandardTermsDeterminations/UnbundledBitstreamBackhaulService/DecisionsList.aspx>

6 AVAILABILITY

6.1 Availability criteria

The following prerequisites must be in place prior to a Service Provider placing an order for an instance of UBA Backhaul:

- › The Service Provider must have established at least one Handover Point at a NAPOI (directly to a Handover Link or to a Commercial Backhaul) and have a Handover Link established to the Service Provider premises or co-located location. Details of Handover Points and Handover Links are available in the Handover Link Service Provider Guide.
- › The Service Provider must have a Help Desk to support fault pre-diagnosis to establish that the fault is not within its responsibility prior to reporting the fault to Telecom.

6.2 Geographic Availability

UBA Backhaul is available where Telecom has deployed appropriate Ethernet based technology which supports EUBA Service on the terms and conditions of the EUBA Service Provider Guide.

As UBA Backhaul is delivered over the Telecom NGN Ethernet network, service coverage will follow the Ethernet network rollout.

Please refer to Appendix V of this guide for service coverage, or use Telecom's online service availability tool found at <http://www.telecomwholesale.co.nz/ubabackhaul> for the most up-to-date list of UBA Backhaul capable Exchanges with associated EAS nodes (to facilitate handover to Service Provider).

Establishing multiple Handover Links throughout the country allows Service Providers the flexibility to extend their network only where they need and only pay for the UBA Backhaul required.

6.3 Handover Link

A Service Provider must have at least one Handover Point established and must have completed setup and testing of their Handover Link prior to ordering UBA Backhaul.

Handover Links are offered as a separate service. Orders can be placed through the Service Provider's Telecom Wholesale Account Manager or OO&T.

6.4 Ordering UBA Backhaul Service

Placing an UBA Backhaul Order

A Service Provider will forward an order to Wholesale Provisioning by using the UBA Backhaul Order Forms that are available in the OO&T system. The order will be processed and advised as per current wholesale processes - NB: see the OO&T User Guide.

The UBA Backhaul will be handed over to the Service Provider at the ASNAPOI via a Handover Link.

When ordering a UBA Backhaul, a Handover Link or Commercial Backhaul with sufficient available bandwidth to support the UBA Backhaul should be specified. The Service Provider is responsible for bandwidth capacity management and where capacity is not available traffic may be discarded.

Where a Primary and Secondary Link are ordered on the same form, at the same speed, the distances for the links will be combined and billed against the Secondary Link, the Primary Link will be zero rated. This provides a more cost effective solution for the Service Provider than billing the link distances individually. Where additional Primary Links are subsequently connected to a Secondary Link and the Service Provider wishes to change which Primary and Secondary Links are combined for billing they can submit a Network Change - Combined Billing Change order.

Where a Change Plan - Network remap is required, a migration plan must be attached which describes the sequence of moving services that are currently binding to the link. This is in conjunction with discussion with your Telecom Service Delivery Manager.

UBA Backhaul Request Types

Request types include:

New Connection

- > Primary Link only
- > Secondary Link only
- > Primary and Secondary Link

Change Plan

- > Bandwidth Change
- > Network Remap Primary Link
- > Network Remap Secondary Link
- > Network Remap EUBA destination (bulk transfer)
- > Network Combined Billing Change

Relinquish

- > Primary UBA Backhaul
- > Secondary UBA Backhaul
- > Combined Primary/Secondary UBA Backhaul

There is no reassignment of UBA Backhaul. As a prerequisite, the Service Provider must have established a Handover Link at, at least one location for the handover of UBA Backhaul traffic.

If a Service Provider requests a New Connection for:

- > A UBA Backhaul that cannot be delivered due to lack of service coverage,
- > A UBA Backhaul to a NAPOI which is not the closest to the Parent POI
- > A UBA Backhaul to a NAPOI which does not have a Handover Link or Commercial Backhaul

This request will be rejected with appropriate response - as per current processes for wholesale requests.

Faults

Initial fault diagnosis must be conducted by the Service Provider to establish that the fault is not within its responsibility prior to reporting the fault to Telecom.

UBA Backhaul faults must be reported to Telecom via the OFM system. Where the OFM system is unavailable faults can be reported via the Service Provider's current Wholesale Service Restoration contact number.

The Service Provider is responsible for diagnosis and repair of any fault on the End User's premises and within its own network.

Telecom will diagnose and repair any faults on Telecom's Network between the hours of 7.00am and 7.00pm, seven days a week. Faults that are logged outside of these hours will be deemed to have been received at 7am the following day.

If there is no fault in the Telecom network, the Service Provider may be charged a No Fault Found fee as per the UBA Backhaul STD Price List.

Support Channel

UBA Backhaul will be available to Service Providers exclusively through Telecom Wholesale.

UBA Backhaul is not available as a Telecom Retail service.

Billing

UBA Backhaul will be billed in accordance with the UBA Backhaul STD.

Where the provision for electronic billing exists for a Service Provider, the billing details for UBA Backhaul will be presented on the Service Provider's electronic bill.

Handover Links, will be listed separately and billed as separate services.

Any billing enquires should be advised to the Service Provider's Telecom billing representative or their Telecom Wholesale Account Manager.

Pricing

The UBA Backhaul access service price components are:

- > Monthly rental based on speed and distance
- > Installation fee based on connection ends

UBA Backhaul will be charged as a recurring monthly access fee, to be paid in advance.

Installation charges will apply in respect of new UBA Backhaul requests. However these are dependent on the UBA Backhaul services already provisioned at locations.

Installation charges will be applied as a one-off fee and charged at the UBA Regulated Price List.

An UBA Backhaul pricing calculator is available for Service Providers on the UBA Backhaul product page - www.telecomwholesale.co.nz/ubabackhaul

For the complete detail on pricing, please refer to

<http://www.comcom.govt.nz//IndustryRegulation/Telecommunications/StandardTermsDeterminations/UnbundledBitstreamBackhaulService/ContentFiles/Documents/UBA%20Backhaul%20STD%20-%20Schedule%20-%20Price%20List%20-%20Public%20Version.pdf>

6.5 Pricing for Associated Services

Handover Links:

Additional charges for the Handover Link(s) for the handover of the UBA Backhaul traffic will be charged as per the UBA Regulated Price List. For more detail on Handover Link pricing refer to the Handover Link Service Provider Guide and the Handover Link Calculator in the DSPL Rate Card.

Commercial Backhaul:

Additional charges for the commercial P2P Backhaul Service will be charged as per the relevant commercial arrangement in force between the parties at the time.

6.6 Who to contact

Current Wholesale Customers

Please contact your Telecom Wholesale Account Manager if you have any queries about how we can provide UBA Backhaul to your company.

Prospective Wholesale Customers

If you are not currently a Service Provider of Telecom Wholesale, please contact us at wholesalequery@telecom.co.nz.

APPENDIX I GLOSSARY

TERM	DESCRIPTION
Access Tail	The logical point-to-point connection between the MC device at the End User site and the Service Provider facing port on the EAS node.
Coverage Area	A geographic region defined by network design which groups together a number of EAN exchanges which are served by a single EAS. A Coverage Area is also defined as a defined Ethernet catchment area within which a HSNS access tail circuit can be deployed.
CE	Customer Edge Customer edge device (typically a router supplied by the Service Provider) sited at the edge of the customer network at the End Users premise.
C-VID	Customer associated VLAN ID number. Is the VLAN ID (inner-tag) number associated with the End User customer site access.
EAS	Ethernet Aggregation Switch An Ethernet node which has been configured as an aggregation device. The EAS aggregates traffic from multiple HSNS access tail circuits within a common Coverage Area. An EAS site is associated with each Coverage Area.
Egress	The point where traffic is delivered to the End User from the Telecom supplied MC, as well as traffic delivered to the Service Provider from the port on the EAS
End User	A customer of a Service Provider who uses services, which have been provided to them by the Service Provider. This entity is billed by the Service Provider
Handover Link	A fibre connection between the Handover Point and the Service Provider's POP for the purpose of handing over traffic for unbundled services.
Handover Point	The location where aggregated HSNS access tail circuits in a Coverage Area are presented for transport to the Service Provider via a Handover Link.
IEEE 802.3	A collection of IEEE standards defining the physical layer and the media access control sub-layer of the data link layer of wired Ethernet. This is generally a LAN technology with some WAN applications. Physical connections are made between nodes and/or infrastructure devices (hubs, switches, routers) by various type of copper or fibre cable. 802.3 is a technology that can support the IEEE 802.1 network architecture.
Layer 2	Layer 2 is the 'data' level in OSI (Open Systems Interconnection) 7-layer model. In very basic terms: layer 1 is the physical cable connection; layer 2 adds transmission error detection, while layer 3 adds packet routing/error correction/congestion control. Layer 3 services offered by Telecom are referred to as "managed services" while Layer 2 is a non-managed service.
Layer 3	The Network Layer is the third layer of the OSI model. Layer 3 is responsible for end-to-end (source to destination) packet delivery, whereas layer 2 is responsible for node to node delivery. Layer 3 is typically associated with routing. Layer 3 services are often referred to as 'managed services'.
L2 MPLS VPN	A layer 2 MPLS VPN also known as a L2VPN is a point-to-point pseudo-wire service which defines methods to transport layer 2 packets across MPLS networks. It can be used to replace existing physical links.
MACs	Moves, Adds and Changes to a customer's existing installation. Also referred to as Change Requests.

TERM	DESCRIPTION
MPLS	<p>Multiprotocol Label Switching</p> <p>MPLS is a data carrying mechanism that belongs to the family of packet-switched networks. MPLS operates at an OSI layer Model layer that is generally considered to lie between traditional definitions of layer 2 (data link layer) and layer 3 (network layer), and therefore is often referred to as a layer 2.5 protocol. MPLS can be used to carry many different types of traffic, including IP packets, as well as native ATM, SONET and Ethernet frames. MPLS can be used to create L2VPN and L3VPN solutions. A layer 2 MPLS VPN also known as a L2VPN is a point-to-point pseudo-wire service which defines methods to transport layer 2 packets across MPLS networks. It can be used to replace existing physical links.</p>
OFM	<p>Online Faults Management</p> <p>OFM is an online system used by Telecom Wholesale Service Providers for the logging and tracking of faults.</p>
OO&T	<p>Online Ordering & Tracking</p> <p>OO&T is an online system used by Telecom Wholesale Service Providers for logging service requests and tracking their progress.</p>
PE	<p>Provider Edge</p> <p>Provider edge router at the edge of the Service Provider network.</p>
POP	<p>Point of Presence</p> <p>Physical location of the Service Provider's network equipment.</p>
QinQ	<p>Que in Que</p> <p>A methodology of encapsulating IEEE802.1Q VLAN tags within 802.1Q . QinQ allows a Service Provider to expand the VLAN space by tagging the tagged packets thus producing a 'double tagged' frame. Uses C-VLAN and S-VLAN ID tags. Also referred to as 802.1ad.</p>
QoS	<p>Quality of Service</p> <p>QoS is the ability of a network to deliver a predetermined level of performance to an application or a class or group of applications.</p>
Service Provider	<p>An Access Seeker</p>
SLA	<p>Service Level Agreement</p> <p>A contract between a network service provider and a customer that specifies, usually in measurable terms, what services the network service provider will furnish.</p>
SDR	<p>Sustained Data Rate (Throughput)</p> <p>The maximum average data rate (in kilobits per sec) for a given packet size that can be sustained across an access circuit.</p>
S-VID	<p>Service Provider VLAN-ID number</p> <p>The VLAN ID (outer-tag) number that is associated with the Service Provider. S-VID is used with QinQ.</p>
Truck Roll	<p>Refers to an engineer or field service representative making a physical visit to a site to make alterations to the network or service.</p>
VLAN	<p>Virtual Local Area Network</p> <p>A logical group of network devices that appear to be in the same LAN, regardless of their physical location. With regard to HSNS; a VLAN will allow a certain portion of traffic to be isolated from the rest of the traffic in the access tail or in other VLANs within the same access tail.</p>
VLAN ID (VID)	<p>A 12 bit field specifying the VLAN to which a frame belongs.</p>

TERM	DESCRIPTION
VLL	<p>Virtual Leased Line</p> <p>VLL is a way to provide Ethernet-based point-to-point communication over MPLS/IP networks. In the industry, the technology is also referred to as Virtual Private Wire Service (VPWS) or EoMPLS (Ethernet over MPLS). VLL uses the pseudo-wire encapsulation for transporting Ethernet traffic over an MPLS tunnel across an IP/MPLS network.</p>
VoIP	<p>Voice over Internet Protocol</p> <p>Is the routing of voice conversations over the Internet or through any other IP-based network.</p>
VPN	<p>Virtual Private Network</p> <p>A VPN is a communications network tunnelled through another network, and typically dedicated for a specific network. Generally, a VPN has a topology more complex than a point-to-point connection.</p>
WSPL	<p>Wholesale Services Price List containing the charges for all Wholesale services.</p>
IEEE 802.3	<p>Is a collection of IEEE standards defining the physical layer and the media access control (MAC) sub-layer of the data link layer of wired Ethernet. This is generally a LAN technology with some WAN applications. Physical connections are made between nodes and/or infrastructure devices (hubs, switches, routers) by various type of copper or fibre cable. 802.3 is a technology that can support the IEEE 802.1 network architecture.</p>
802.1q	<p>Is an IEEE 802 standard that defines the mechanism that allows multiple bridged networks to transparently share the same physical network link without leakage of information between network's. It is also defines the meaning of the term virtual LAN (VLAN) which is an encapsulation protocol for VLAN tagging. Associated with Ether type value in the SNAP header which is set to hex 8100.</p>
802.1ad	<p>A form of double tagging or nested VLAN tagging commonly referred to as Queue in Queue (QinQ).</p> <p>It is used by Service Providers because it allows them to use VLANs internally while mixing traffic from clients that is already VLAN-tagged. This standard defines Ether type 88a8 for service provider 'outer-tags'.</p>

APPENDIX II SPECIFICATION

II.1 UBA BACKHAUL SERVICE DESCRIPTION

Please refer to Commerce Commission Website (www.comcom.govt.nz) for a copy of the Service Description.

APPENDIX III SERVICE LEVELS

III.1 UBA Backhaul Service Level Terms

Please refer to Commerce Commission Website for a copy of the final Service Level Terms.

For the purposes of clarity please see below as a synopsis of the Service level Terms.

Technical attributes of the UBA Backhaul Service are shown below.

Availability

Definition: UBA Backhaul is available for use by End Users and functioning in accordance with the Service Description.

Agreed Service Hours:

For UBA Backhaul the default service hours are 7am - 7pm x 7 days a week.

Service Restoration

Definition: The elapsed time during Agreed Service Hours between call reception and the customer being notified that the service is restored to the defined levels as a result of a site visit.

Throughput

Definition: Throughput is the maximum Sustained Data Rate (SDR) achievable through a UBA Backhaul between the port on the 7450 (facing the Core Network) to the Handover Point (facing the Service Provider), and includes all transmission overheads and headers as well as customer data.

Latency:

Definition: The absolute time (in milliseconds) from the time the first bit of an Ethernet frame enters the End User side of the ingress port of the Telecom network to the time the first bit of the same Ethernet frame exists the egress port on the Handover Point facing the Service Provider (or visa versa).

TECHNICAL ATTRIBUTE	ATTRIBUTE DEFINITION	SERVICE TARGET
Latency (one-way)	For a Link that comprises a Primary Link only or a Secondary Link only, evaluated over an interval of 15 minutes for all classes. For a Link that comprises a Primary Link and a Secondary Link, evaluated over an interval of 15 minutes for all classes.	< 5mS < 25mS (milliseconds)

APPENDIX IV INTERFACE OPTIONS

(This section should be read in conjunction with the Handover Link Service Provider Guide.)

Handover Point Delivery

The Handover Point is presented as a GigE 802.3 NNI interface via an optical fibre interface on the Telecom OFDF.

The Ether type at the Handover Point facing the service provider is 88a8 (802.1ad).

The Service Provider is responsible for rate shaping traffic entering the Handover Point. Any traffic exceeding the allocated VLAN bandwidth will be discarded by Telecom at the Handover Point.

The optical Handover Point is delivered over single mode fibre. The interface parameters are specified as follows:

FC-PC, SC-APC, SC, LC

Traffic not containing the correct service attributes e.g. Encapsulation ID, Rate, Ether type will be discarded.

Service Provider Requirements

- › A Gig Ethernet optical interface to support the GigE port carrying EUBA traffic.
- › Service Provider egress traffic should be paced below the SDR of the aggregated traffic to prevent packet discard.
- › 802.1ad and 802.3 will be used for the Interconnection at the Handover Point.

A connection to a Handover Point in the Coverage Area of the Service Provider where UBA Backhaul is required to be terminated.

PARAMETER	SPECIFICATION
Connector Type	Choice of: FC-PC, SC-APC, SC, LC
Fibre Type	Single-Mode Fibre
Standard	IEEE 802.3z
Interface Protocol	Gigabit Ethernet
Bandwidth	GigE: A capacity of 1000 Mbps for Layer 1 transmission.
Optical Parameters: Average Receive Power	-18.8dBm (minimum) +0.7dBm (maximum)
Centre Wavelength	1310nm 1000BASE-LX
Coupled Transmit Power	-8.2dBm (minimum) -3.7dBm (maximum)
VLAN ID Numbering	CVID - Service Specific - assigned by Telecom SVID - Service Specific - assigned by Telecom

APPENDIX V EAS EQUIPPED EXCHANGE LIST

Code	FDS	Parent POI
AL	ALEXANDRA	CROMWELL
AR	ASHBURTON	CHRISTCHURCH
BM	BLENHEIM	WELLINGTON
CH	CHRISTCHURCH	CHRISTCHURCH
CMW	CROMWELL	CROMWELL
CPC	COURTNEY PLACE	WELLINGTON
DN	DUNEDIN	DUNEDIN
FN	FEATHERSTON	NAENAE
GLF	GLENFIELD	GLENFIELD
GM	GREYMOUTH	GREYMOUTH
HN	HAMILTON	HAMILTON
HBN	HASTINGS	NAPIER
HW	HAWERA	NEW PLYMOUTH
HSN	HENDERSON	HENDERSON
HCK	HOWICK	HOWICK
IN	INVERCARGILL	INVERCARGILL
KK	KAIKOURA	CHRISTCHURCH
KC	KERIKERI	KERIKERI
LVN	LEVIN	LEVIN
LMS	LUMSDEN	INVERCARGILL
MS	MASTERTON	NAENAE
MDR	MAYORAL DRIVE	MAYORAL DRIVE
MIR	MIRAMAR	WELLINGTON
MAB	MT ALBERT	MT ALBERT
MMN	MT MAUNGANUI	TAURANGA
NAE	NAENAE	NAENAE
NA	NAPIER	NAPIER
NN	NELSON	NELSON
NU	NEW PLYMOUTH	NEW PLYMOUTH
OU	OAMARU	TIMARU
PM	PALMERSTON NORTH	PALMERSTON NORTH
PAK	PAPAKURA	PAPAKURA
POP	PAPATOETOE	PAPATOETOE
PRM	PARAPARAUMU	PORIRUA
PRO	PORIRUA	PORIRUA
QST	QUEENSTOWN	CROMWELL
RNF	RANFURLY	CROMWELL
RR	RANGIORA	RICCARTON
RDB	RED BEACH	TORBAY

RUE	REMUERA	REMUERA
RIC	RICCARTON	RICCARTON
ROL	ROLLESTON	RICCARTON
RO	ROTORUA	ROTORUA
RXB	ROXBURGH	CROMWELL
TPO	TAUPO	ROTORUA
TG	TAURANGA	TAURANGA
TU	TIMARU	TIMARU
TBY	TORBAY	TORBAY
UP	UPPER HUTT	NAENAE
WNK	WANAKA	CROMWELL
WG	WANGANUI	PALMERSTON NORTH
WN	WELLINGTON	WELLINGTON
WHK	WHAKATANE	TAURANGA
WR	WHANGAREI	WHANGAREI