MASTER SERVICES AGREEMENT
SERVICE DESCRIPTION

PART A – SITE AND PRICING DETAILS

Refer to Pricing Schedule

PART B - SERVICE DETAILS

One New Zealand's Private IP is our carrier grade Internet Protocol Virtual Private Networking (IP-VPN) service that provides high-speed wide area network and metropolitan area network connectivity between two or more premises in the same or different metropolitan areas.

IP MAN, IP WAN and Global WAN are our global carrier grade Internet Protocol Virtual Private Networking (VPN) services that provide high-speed wide area network (WAN) and metropolitan area network (MAN) connectivity between New Zealand and one or more locations outside of New Zealand.

Access to the Private IP Network may be made by a range of connecting services which may include, but is not limited to:

- Ethernet over optical fibre

- Digital Subscriber Line (DSL) services over copper lines

- Metro Access

- Metro Lite.

Not all access methods are available at all locations.

CUSTOMER INTERFACE REQUIREMENTS – FOR ALL CONNECTING SERVICES

Connecting Service	Interface
100 Mbps Ethernet	100BT RJ45 Full-Duplex IEEE 802.3 Ethernet interface No auto-negotiate or IEEE 802.3 Ethernet optical interface as advised by One New Zealand (dependent on distance from the exchange)
1Gbps Ethernet	1Gbps IEEE 802.3 Ethernet optical interface as advised by One New Zealand (dependent on distance from exchange)
DSL	IEEE 802.3 Ethernet Full Duplex and 10BT or 100BT speed as advised by you prior to the activation of service. No auto-negotiate.
Metro Access	100BT RJ45 Full-Duplex Ethernet interface or 1000BT RJ45 Full-Duplex depending on the speed of Metro Access Service taken. Presented as IEEE 802.3 or IEEE.802.1Q according to the mix of services taken.
Metro Lite	IEEE 802.3 Ethernet Full Duplex 100BT on Copper and IEEE 802.3 Ethernet Full Duplex 1000BT on fibre

Bandwidth Details – refer to either the Private IP Table or the Metro Lite Table in the Pricing Schedule.

PART C - SPECIFIC TERMS

1. **IN THIS SERVICE DESCRIPTION:**

    Copper means any service provided by One New Zealand over a copper access method

    DSL means digital subscriber line services provided by One New Zealand.

    Global WAN means a connection from New Zealand to one or more locations outside of New Zealand and Australia.

    IP MAN is an Australian IP Networking service that connects at least one Australian site to an exchange located in a Metropolitan Area using fibre connections;

    IP WAN is a global IP Networking service that connects at least one New Zealand Site to one or more locations outside of New Zealand.

    IP VPN is a generic term used to refer to IP MAN or IP WAN or Global WAN.

    MAN Bandwidth means the access and bandwidth of the specified access connection.

    Metro Access means the Metro Access Service as described in the Metro Access Service Description. The Metro Access Service uses various third party access networks to provide services within New Zealand. Some of the properties of the individual access networks vary, as does the availability and pricing.

    Metro Lite means the Metro Lite Service as described in the Metro Lite Service Description. The Metro Lite Service uses various third party access networks to provide services within New Zealand. Some of the properties of the individual access networks vary, as does the availability and pricing.

    Metropolitan Area means an area located within or around a major population centre.

    PE Router means a Provider Edge router which forms part of the IP network infrastructure used by us to deliver the Service.

    POP means a location that houses equipment used by One New Zealand in the delivery of your IP MAN, IP WAN or Global WAN Service.

    Port means a specific connection on a PE router.

    Private IP has the meaning set out in Part B of this Service Description.

    Private IP Bronze means a grade of service that includes the following One New Zealand network performance criteria:

    - Metro Access target service availability: designed to provide 99.2% availability (single DSL network access to/from the customer site) based upon a rolling 90-day measurement interval and excluding periods during which service has been suspended in accordance with the Agreement.

    Private IP Gold means a grade of service that includes the following One New Zealand network performance criteria:

    - Metro Access target service availability: designed to provide 99.95% availability (dual fibre-based network access to/from the customer site) based upon a rolling 90-day measurement interval and excluding periods during which Service has been suspended in accordance with the Agreement.

    Private IP Platinum means a grade of service that includes the following One New Zealand network performance criteria:

    - Metro Access target service availability: designed to provide 99.995% availability (dual fibre-based fully redundant network access to/from the customer site) based upon a rolling 90-day measurement interval and excluding periods during which Service has been suspended in accordance with the Agreement.

    Private IP Silver means a grade of service that includes the following One New Zealand network performance criteria:

    - Metro Access target service availability: designed to provide 99.8% availability (single fibre-based network access to/from the customer site) based upon a rolling 90-day measurement interval and excluding periods during which service has been suspended in accordance with the Agreement.

    Transmission Bandwidth means the bandwidth of the connection between metropolitan areas.

Trans-Tasman Bandwidth means the bandwidth of the connection between the Australian IP MAN (excluding any required Transmission Bandwidth) network and the New Zealand Private IP Network.

1. 1   In cases where a single fibre network is based on a single spur or single point, only Private IP Silver can be provided. This means that no diverse or redundant options such as Private IP Gold or Private IP Platinum exist. Private IP Silver service levels will therefore apply.

Quality and Classes of Service

Classes of Service (Cos)

For each access you may select how the class of service is applied. Not all classes of service are available with all access types.

Each Network Performance Service Level applicable to the IP VPN Service Type is measured separately for each subscribed CoS.

Any Service Level measure which is expressed to be PoP-to-PoP is a carrier network level measurement. As such, the measure does not necessarily reflect the actual IP VPN performance at the individual IP VPN Service Type level.

The Service Levels Targets may not be measured and may not apply between Ports or Sites utilising the same PoP within the same country.

The classes of service that are available with each service are detailed below:

Service or Access	Scheme	Class of Service Availability
Ethernet New Zealand Private IP	B	Data Transfer, Interactive, Multimedia, Dynamic
Metro Access	A	Data Transfer, Interactive Lo, Interactive Hi, Voice, Video, Dynamic
Metro Lite	A	Data Transfer
Trans-Tasman Private IP	B	Data Transfer, Dynamic
Australian IP WAN	B	Data Transfer, Interactive, Multimedia, Dynamic
Global IP WAN	Global	Voice, Video, Critical Data, Interactive Data, Standard Data, Low Priority Data
Australian IP MAN	B	Data Transfer, Dynamic
Wireless Local Loop	B	Data Transfer
Digital Subscriber Line	B	Data Transfer, Interactive, Multimedia, Dynamic
Copper	B	Data Transfer

Each class refers to prioritisation of traffic for forwarding through the network with Multimedia and Voice having the highest priority and Data Transfer and the Low Priority Data the lowest priority.

Apart from prioritising of packets belonging to different classes of service, One New Zealand does not guarantee that a class of service is suitable for any particular purpose.

Global WAN Class of Service

The available classes of service (CoS) for each Global WAN Port are:

- **Voice** – optimised Network performance suitable for real-time applications that require rigorous timing control and performance metrics such as voice over IP and circuit emulation;

- **Video** – suitable for delay sensitive interactive video conferencing and streaming of audio/video applications or surveillance video;

- **Critical Data** – suitable for mission critical business applications and applications with flow-control capable transport layers and signalling traffic;

- **Interactive Data** – suitable for sporadic LAN-to-LAN traffic, or applications that favour throughput over delay and network management;

- **Standard Data** – suitable for transactional services and database access; and

- **Low Priority Data** – suitable for low-priority, sporadic applications such as email and web browsing.

Dynamic Class of Service

Dynamic class of service relies on the customer marking the DSCP bits in their IP packets in accordance with the table below. Each packet is transported across the network in accordance with the class of service marked in that packet.

Class Of Service Schemes			DiffServ	Precedence	
Global	**A**	**B**		**Binary**	**Decimal**
Low Priority Data	Best Effort	Best Effort	0-7	000	0
Standard Data	Data Transfer	Data Transfer	8-15	001	1
Interactive Data	Interactive Lo	Interactive	16-23	010	2
Critical Data	Interactive Hi		24-31	011	3
Video	Video	Multimedia	32-39	100	4
Voice	Voice		40-47	101	5
Reserved			48-55	110	6
Reserved			56-63	111	7

The B Scheme is used on parts of our networks that support 4 hardware queues for Class Of Service traffic. All schemes are interoperable.

Multiple VLANs per Port

VLAN trunking is only available on the following access methods:

- 100Mbps Ethernet over optical fibre

- 1Gbps over optical fibre

- Certain Metro Access services (refer to "Metro Access" Service Description as to whether or not available).

VLAN trunking is provided using IEEE 802.1Q and has the following characteristics:

- One New Zealand will specify the VLAN ids

- Class of Service is supported on an individual VLAN basis

- One New Zealand will discard and/or alter IEEE 802.1p bits provided by the Customer.

2. **SERVICE LEVELS**

All Service Levels are indicative of One New Zealand's goals for the performance of the relevant service.

The Service Levels relating to performance are:

(a) Network Availability of the Private IP Core Network; and

(b) Service Availability of the IP Service.

The definition of "Service Availability" is further demonstrated in Figure 1 below.

Connecting Service	Service Availability
Private IP Bronze (DSL) New Zealand	99.20%
Private IP (Metro Access) New Zealand	Varies depending on the type of Metro Access Service used. See Metro Access Service Description for details.
Private IP (Metro Lite) New Zealand	Varies depending on the type of Metro Lite Service used. See Metro Lite Service Description for details.
DSL - Australia	99.20%
Copper – New Zealand	99.75%
Ethernet Dual Fibre Connection Australia	99.95%
Ethernet Fully Redundant Connection Australia	99.98%
Global WAN connection	99.45%
Private IP Silver (Ethernet) New Zealand	99.80%
Private IP Gold (Ethernet) New Zealand	99.95%
Private IP Platinum (Ethernet) New Zealand	99.995%

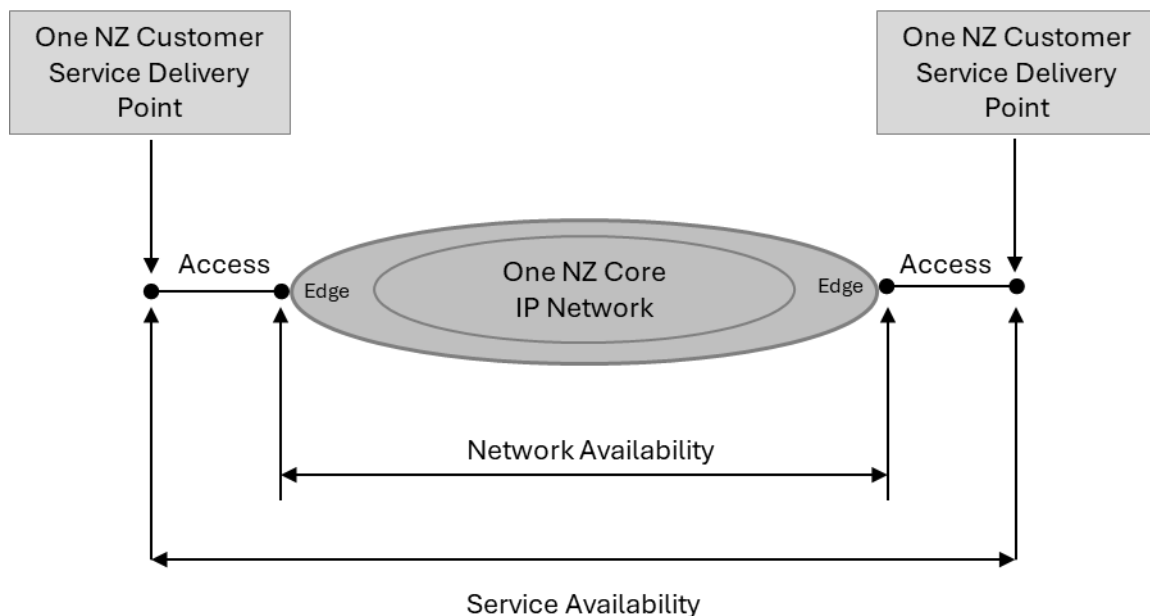(Based on a rolling 90 day measurement period)

Figure 1

- Service Availability is calculated using the formula below:

    Availability = ((HPY - OT) / HPY) x 100

    where:

HPY means the number of hours in the relevant measurement period.

OT means the number of hours for which the Private IP Service is unavailable.

The Network Performance Service Levels relating to quality of service for New Zealand and Australian based services are set out in the table below:

	Class of Service	Data Delivery Ratio (%)	Round Trip Transit Delay (maximum milliseconds)	Packet Delay Variation (maximum milliseconds)
IP MAN	Data Transfer	99.00%	40	10
	Dynamic	See paragraph "IP MAN Dynamic CoS"		
IP WAN	Multimedia	99.99%	100	10
	Interactive	99.90%	100	20
	Data Transfer	99.00%	200	40
	Dynamic	The above classes apply on a packet-by-packet basis		
Trans-Tasman IP Connectivity Auckland to Sydney	Data Transfer	99.00%	61	40
	Dynamic	See paragraph "Trans-Tasman Private IP Dynamic CoS"		
New Zealand Private IP (excluding Metro Access and Metro Lite)	Data Transfer	99.00%	60	40
	Dynamic - Multimedia - Interactive - Data Transfer	99.99% 99.90% 99.00%	20 40 60	10 20 40
New Zealand Private IP (Metro Access)	Data Transfer	Varies depending on the type of Metro Access Service used. Refer to Metro Access Data Sheet for details		
	Dynamic - Voice - Video - Interactive Hi - Interactive Lo - Data Transfer - Best Effort			
New Zealand Private IP (Metro Lite)	- Voice - Video - Interactive Hi - Interactive Lo - Data Transfer - Best Effort	Varies depending on the type of Metro Lite Service used. Refer to Metro Lite Data Sheet for details		

In respect of Round Trip Transit Delay and Packet Delay Variation, ingress/ egress queuing and blocking delays are not included as the effect of these parameters varies based on the bandwidth of the Customers Private IP access port connection and/or subscribed bandwidth.

IP MAN Dynamic CoS

- The Multimedia and Interactive Qualities of Service are not available for an IP MAN. However, if you obtain the Dynamic Class of Service, the Multimedia Quality of Service and Interactive Quality of Service values set out below will apply.

	Class of Service	Data Delivery Ratio (%)	Round Trip Transit Delay (maximum milliseconds)	Packet Delay Variation (maximum milliseconds)
IP MAN	Multimedia	99.99%	20	2
	Interactive	99.90%	20	5

In respect of Round Trip Transit Delay and Packet Delay Variation, ingress/ egress queuing and blocking delays are not included as the effect of these parameters varies based on the bandwidth of the customers Private IP access port connection and/or subscribed bandwidth.

Trans-Tasman Private IP Dynamic CoS

- The Multimedia and Interactive Qualities of Service are not available for a trans-Tasman Private IP service. However, if you obtain the Dynamic Class of Service, the Multimedia Quality of Service and Interactive Quality of Service values set out below will apply.

	Class of Service	Data Delivery Ratio (%)	Round Trip Transit Delay (maximum milliseconds)	Packet Delay Variation (maximum milliseconds)
Trans-Tasman Private IP	Multimedia	99.99%	39	10
	Interactive	99.90%	48	20

In respect of Round Trip Transit Delay and Packet Delay Variation, ingress/ egress queuing and blocking delays are not included as the effect of these parameters varies based on the bandwidth of the Customers Private IP access port connection and/or subscribed bandwidth.

(c) Data Delivery Ratio – measured on an exception basis

- The Data Delivery Ratio is a measure of the delivered committed traffic out of the Private IP Core Network against admitted committed traffic into the Private IP Core Network.

- One New Zealand measures the admitted committed traffic (packets) into the Private IP Core Network and the delivered committed traffic (packets) out of the Private IP Core Network over a monthly period. One New Zealand calculates a sample data delivery ratio based upon the results of each measurement using the following formula:

- Sample data delivery ratio (%) = (Delivered committed traffic (packets) out of the Private IP Core Network / Admitted committed traffic (packets) into the Private IP Core Network) x 100

- The Data Delivery Ratio is maximum sample data delivery ratio for the relevant measurement period.

    For example: if 3 samples were taken over the measurement period, the samples were 99.8%, 99.9% and 99.6%, then the Data Delivery Ratio would be 99.9%.

    Note: To measure Data Delivery Ratio specialist skills and equipment are required which will be undertaken by One New Zealand at your request. This testing cannot be measured retrospectively, is intrusive and will therefore interrupt your Private IP Service.

(d) Round Trip Transit Delay – measured on an exception basis

- The Round Trip Transit Delay is a measure of the time taken for a 64 byte IP packet to traverse any two given nodes within the Private IP Core Network.

- One New Zealand measures the time taken for a 64 byte IP packet to traverse any two given nodes within the Private IP Core Network. One New Zealand calculates a sample round trip transit delay based upon the results of each measurement using the following formula:

Sample round trip transit delay (ms) = SDPROP + DACK + DSPROP

where:

SDPROP = the total time taken for the destination node to receive an IP packet from the source node (propagation delay).

DACK = the total time taken for the destination node to generate an acknowledgement message (new IP packet) that it has received the IP packet from the source. Note that this delay also includes any delays for resequencing and resynchronisation required by the destination node.

DSPROP = the total time taken for the destination node to send the acknowledgment back to the source node (propagation delay).

Note: Ingress/egress queuing and blocking delays are not included as the effect of these parameters varies based on the bandwidth of your Ports.

- The Round Trip Transit Delay is the minimum sample round trip transit delay for the relevant measurement period.

For example: if 3 samples were taken over the measurement period, the samples were 115 ms, 110 ms and 120 ms, then the Round Trip Transit Delay would be 110 ms.

Note: To measure Round Trip Transit Delay specialist skills and equipment are required which will be undertaken by One New Zealand at your request. This testing cannot be measured retrospectively, is intrusive and will therefore interrupt your Private IP Service.

(e) Packet Delay Variation – measured on an exception basis

- The Packet Delay Variation (or Jitter) is the deviation or displacement in phased timing (RTTD timing) within the Private IP Core Network.

- A sample packet delay variation is calculated using the following formula:

Sample packet delay variation (ms) = RTTDMAX - RTTDMIN

where:

RTTDMAX = the maximum measured RTTD time over a one hour period.

RTTDMIN = the minimum measured RTTD time over the same one hour period.

Note: Ingress/egress queuing and blocking delays are not included as the effect of these parameters varies based on the bandwidth of your Ports.

- The Packet Delay Variation is the minimum sample packet delay variation for the relevant measurement period.

For example: if 3 samples were taken over the measurement period, the samples were 22 ms, 26 ms and 27 ms, then the Packet Delay Variation would be 22 ms.

Note: To measure Packet Delay Variation specialist skills and equipment are required which will be undertaken by One New Zealand at your request. This testing cannot be measured retrospectively, is intrusive and will therefore interrupt your Private IP Service.

(f) Dynamic Quality of Service

- Where available, the Dynamic Quality of Service allows you to prioritise your traffic. The priorities are Multimedia Quality of Service, Interactive Quality of Service or Data Transfer Quality of Service.

- Any traffic that you have not prioritised will be prioritised by One New Zealand. One New Zealand may apply any Quality of Service to that traffic.

Global WAN Network Performance Service Levels

(g) Global WAN Packet Delivery Ratio (PDR)

- PDR means the ratio of the number of test IP packets received at a destination PE Router, compared with the number of test packets sent from an origin PE at 5 minute intervals in a month. PDR only applies to IP VPN Service Types where the Port is on a PE Router that is enabled with a performance monitoring device to measure traffic flow over the IPVPN Network, as identified on the PoP List.

- The PDR Service Level Targets are set out in the Table below.

(h) PDR Service Level Targets

Targets (%)					
Voice CoS	Video CoS	Critical Data CoS	Interactive Data CoS	Standard Data CoS	Low Priority Data CoS
99.995%	99.99%	99.95%	99.95%	99.95%	99.9%

(i) Global IP WAN Round Trip Delay (RTD)

- RTD is a PoP to PoP measure of the monthly average round trip delay performance for each IP VPN Service Type and is measured separately for each subscribed CoS.

- The number of locations at which IP VPN Service Types are provided makes it impractical to include the full list of the RTD Service Level Targets in this Service Description. The RTD Service Level Targets for your IP VPN Service Type will be provided to you on request.

(j) Global IP WAN Jitter

- The Jitter Service Level only applies to the Voice CoS.

- Jitter measures the average deviation in a month in the RTD for the Voice CoS. Jitter is measured PoP-to-PoP using sample test IP packets sent at 5 minute intervals between PE Routers enabled with a performance monitoring device to measure continual traffic flow over our IPVPN Network, as identified on PoP List.

- The monthly average Jitter target is

  (i) ≤ 35 milliseconds for South Africa

  (ii) ≤ 15 milliseconds for China and India; and

  (iii) ≤ 5 milliseconds for all other locations.

3. **TRANS-TASMAN SERVICE REBATES**

- The Services Centre Service Description covers:

(a) response times;

(b) restoration targets; and

(c) status reports.

- If, in respect of faults on the Trans-Tasman Private IP Service, an actual Resolution Time exceeds the relevant Resolution Time set out in the Service Centre Service Description, then you will be entitled to a rebate.

- Rebates are only payable in respect of faults with Trans-Tasman Private IP Service.

- Where a rebate is payable, it applies in lieu of any other rebate that would otherwise apply.

- The rebate is your sole remedy for One New Zealand's failure to meet a Resolution Time.

- To claim a rebate, you must provide the following details to a member of One New Zealand's fault account management team, or to a One New Zealand sales representative, within one month of the original fault report:

(d)   your name and address;

(e)   the relevant One New Zealand account number/national number/service number;

(f)   the relevant fault reference number; and

(g)   the reason for dissatisfaction.

- If there is a dispute about whether One New Zealand has failed to meet a Resolution Time, then One New Zealand's decision will be final.

- Rebates are calculated as set out in the table below:

Service Rebate	
Service Level	20% of the Monthly Service Charge per complete hour by which the actual Resolution Time exceeds the appropriate Resolution Time set out in the Service Centre Service Description.
	(The sum of the Service Rebates in a month for the Affected Private IP Service is capped at the Monthly Charge.)