

RAO2 / RO2

Service Description

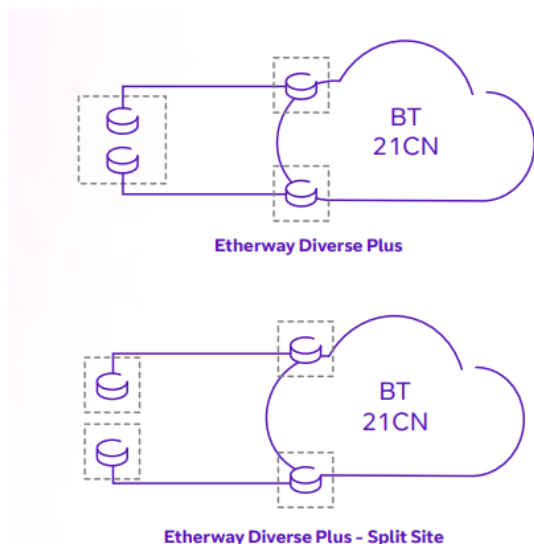
Resiliency Access Option 2 (RAO2) also known as RO2 is a leased line circuit that offers gold standard in internet resilience providing diversely routed fibre from the customer premises to the Internet Service Providers network.

Features

RAO2 includes two separate connections which are commissioned using path separation end to end. The service provides the customers with service continuity in the event of a fibre and/or hardware failure of one of the connections. Service is maintained via use of the other connection.

BT Wholesale has developed several solutions that can meet a company's resilience requirements, whatever they are. They provide different tiers of separation and diversity between two access circuits. In each case, both circuits can be used at the same time via two independent Etherflow connections.

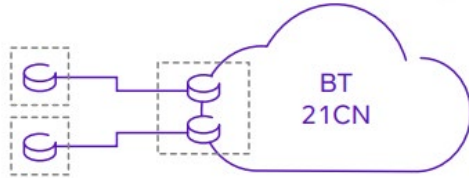
Diverse Plus – the recommended option for maximum resilience. Two circuits with separate local site routing, connected back to two different access nodes in the BT Wholesale network. From there, the routing and service is also resilient in the BT Wholesale network as standard. This creates a true end-to-end resilience solution. If a business has two different customer sites, you can even add site resilience through our Diverse Plus – Split Site option.



Diverse – Two circuits with separate local site routing but connected to a single access node in the BT Wholesale network. This might be necessary if a secondary node is unavailable, too far away or pricing is prohibitive. If a single access node is selected, BT Wholesale will do what they can to provide as much separation within that node between the two circuits in the Diverse package, via different switches, equipment and so on. If you have two customer sites available, it's possible to add site diversity and the equivalent 'Diverse – Split Site' solution would again route back to a single access node.



Etherway Diverse



Etherway Diverse - Split Site

Dual-diverse connections between different services

BT Wholesale can also create dual-diverse configurations, using the diversity and resilience options above but split between different solutions. For example, one access circuit could be used for a layer 2 Etherflow Connected service (E-Line) while the other circuit is used for a layer 3 DIA service. This is a great option for SDWAN networks, for instance.

Fault repair is BusinessCare Plus and operates 24 hours per day, 7 days per week including Bank and Public holidays with a repair time of 5 clock hours.

KCOM will create a private Closed User Group (CUG) for the Service, creating a private, Any-to-Any network offering guaranteed speeds with three layers of traffic classifications.

This is a wires only service. KCOM can provide router termination using Cisco equipment which is a separate managed service.

Charging Structure

RAO2		Connection Charge		Rental	
		Ex VAT	Inc. VAT	Ex VAT	Inc. VAT
RAO2 Primary	No Existing Network Connectivity	POA		POA	
	Existing Network Connectivity	POA			
RAO2 Secondary	No Existing Network Connectivity	POA		POA	
	Existing Network Connectivity	POA			
CUG Management & Support		POA		POA	

Customers on one-year contracts will be charged the full Connection Charge and Rental Charge if they cease a circuit within 12 months of the Operational Service Date.

Customers ceasing long-term contracts before completion will be charged the Rental difference between the committed contract term and the actual contract length Rental fee. An additional charge of 30% of the next 12 months rentals will also be charged or the rentals due to the contract end date, whichever is the lower.



Lead Times

The standard lead-time for delivery of the Service access is 40 Working Days, subject to survey and a suitable agreed roll-out plan. The installation date will be the Contractual Delivery Date (CDD) unless a later date has been specified in writing before commencement of installation.

Upgrades

Upgrades may be requested. A new minimum Contract period of 12 months will apply at the new bandwidth level.

Downgrades

Downgrade of bandwidth is not permitted during the first 12 months after installation. After the first 12 months, bandwidth downgrades are permitted subject to a reconnection fee. A new minimum Contract period of 12 months will apply at the new bandwidth level.

Cancellation Charges

This part outlines the termination costs associated with cancelling orders for private circuits before they have been delivered.

The delivery of a circuit is timed to meet a Contractual Delivery Date (CDD). The termination charges raised reflect the amount of work undertaken and are calculated on the number of working days between the date the customer requests cancellation and the CDD. The cancellation charge is expressed as a percentage of the appropriate circuit connection charge.

The full cost of any additional work, e.g. duct, that is separately identified on the contract and which has been specifically incurred for the order by the time of the cancellation, will be recovered in addition to the cancellation charge.

Customers should note that once delivered private circuits have a standard one year minimum term for which rental will be due. The cancellation charge scale applies to circuits normally provided within 40 working days.

Working Days Before Contractual Delivery Date (CDD)	% of Connection Charge
Circuits Normally Provided in 40 Working Days	
2 or less	90
3 - 21	75
22 - 29	60
30 - 35	30
36 or more	0

The full cost of any additional work (for example, duct) that is separately identified by KCOM for the Customer's order by the time of the cancellation, will be recovered in addition to the cancellation charge.

All days will be calculated as working days, i.e. ignoring weekends and public holidays.

The cancellation date must be given in writing by the customer.



Should a customer request amendments to the CDD and subsequently cancel the order, the cancellation charge will be calculated on the days between the date the customer notified KCOM of the first amendment and the original CDD.

Technical Summary

RAO2 provides an Any-to-Any Layer 2 service supporting multiple classes of service to give customer control over traffic prioritisation.

A maximum of 2000 MAC addresses are permitted per VPN - this defines the maximum number of directly connected Ethernet interfaces (many customers will connect via a router which aggregates equipment into single MAC address).

Media Access Control (MAC) Learning

The RAO2 service shall learn MAC addresses and each RAO2 is limited to learn a maximum of 2000 addresses. In order to manage the service some MAC addresses will be used by KCOM (one MAC address per access) and these MAC addresses will consume some of this space.

When MAC addresses have been learnt by the RAO2 service then they are used to direct the traffic. If the same MAC address is learnt via two different accesses then connectivity problems could arise. Again, using a different router to connect to each access of the RAO2 service will help prevent learning the same MAC address via two accesses.

Class of Service (CoS) and Performance

Class 1 – Real Time

The Class 1 traffic class is Top Priority CoS and is intended to support applications requiring low latency and jitter i.e. voice. This CoS can support up to 50% of a Customers total traffic and aims to provide a 3ms jitter performance and 10ms latency service level.

As a result the size of the Ethernet frames in this class is expected to be small (<350bytes). Customer should be aware of the potential impact to jitter if large Ethernet frames are queued along with the smaller frames. To prevent impact and maintain the performance of the real time applications Customers should avoid placing large Ethernet frames in this class. In this context a large frame is anything greater than 350 bytes, although the impact will be greater the longer the frame is.

Note that the service will not prevent large frames from being sent in the real time class, but customers may experience performance issues if large frames are present.

Class 2 – Assured

The Class 2 Assured class can support up to 75% of a Customers total traffic and is aimed at applications like Video Conferencing.

Class 3 – Best Effort

Class 3 is for non-time critical traffic. The service shall rate limit the amount of Multicast, Broadcast and Unknown traffic. By default this is limited to 500kbps and is treated as Class 3. Since many control protocols use multicast and broadcast frames the service shall queue the control traffic separately in Class 2 to ensure that it is not impacted by large amounts of Multicast, Broadcast and Unknown traffic.



Notes

The Customer can only use RAO2 and therefore cannot sublet to other organisations.

Prices will be available on application. All prices are subject to survey.

Definitions

Contractual Delivery Date means the date on which KCOM is to complete provision of the access circuit or such as maybe agreed in writing between KCOM and the Customer.

No Existing Network Connectivity means the customer has not got an existing contract for a fibre based service in the building that requires the RAO2 service.

Existing Network Connectivity means the existing customer has an existing fibre based circuit in the building and requires another circuit to be provisioned at the same entry point into the building. Two circuits ordered at the same time would result in the second circuit connection fee at the Existing Capacity connection fee.