

BT Wholesale Ethernet Direct Internet Access - Etherflow Internet

In strictest confidence

Annex 2A

October 2021

Change control

Version	Date	Author	Changes
1	September 2020	John Parsons	Etherflow Internet Direct Internet Access
2	February 2021	John Parsons	IP addressing updates
3	April 2021	John Parsons	Document Refresh and Vlan tagging update, service commissioning and order entry sections added.
4	May 2021	John Parsons	Clarification on Vlan addressing
5	October 2021	John Parsons	Further update prior to launch
6.	October 2021	John Parsons	Final Update – T2R update

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1 Wholesale Ethernet Direct Internet Access

1.1 BT Wholesale Ethernet Overview

BT Wholesale Ethernet (BTWE) is a national layer 2 Ethernet service available across the UK and Northern Ireland including Hull but with the exception of Isle of Man, and the Channel Isles, providing high quality connectivity services to UK communication providers and offers full UK coverage for short, medium, and long-distance data applications.

The network services provided have received government CESG (Communications & Electronics Security Group) authorisation through CAS-T certification. Recently Changed to ISO 27001

All services were verified and successful against the full Telecommunication Service Requirement version 1.1. For more details on our current CAS-T accreditation, please see the following:

<https://www.ncsc.gov.uk/commodity-service/network-services>

As part of the products development and progression, we are announcing the next phase of the service enhancement. From Autumn 2020 BT will be adding direct internet peering in the Wholesale Ethernet etherflow portfolio.

1.2 Key Features and availability

- A premium rate connection from our CPs (End Users) Etherway through the BT core network direct to BT expansive internet peering network.
- The service will initially launch on the Etherway Fibre service access, offering connectivity across a range of bandwidth options. 100MBS up to 10GBS
- The service is wires only to enable you, the service provider, to provision your own hardware of choice and offer further value to your customers.

The Wholesale Ethernet service already offers a component-based product consisting of a physical access (Etherway Access) and virtual paths (EVCs – Ethernet Virtual Connections) known as Etherflow Connected or Etherflow Dynamic. The new **Etherflow Internet** service will introduce a third EVC type, a point-to-point connection, from one of BT's core internet peering sites across the Wholesale Ethernet platform onto a new or existing Etherway Fibre Access.

An existing Wholesale Ethernet fibre access service will support the delivery of an **Etherflow Internet** connection alongside an existing etherflow connected service subject to having enough spare capacity in the access bandwidth. See section 4 for further Network details.

Etherflow Internet is supported on an Etherway Fibre access of bandwidths of between 100Mbit/s up to 10Gbit/s.

The service will enable CPs to connect the end user/ customers sites into the BT 21C core network using an Etherway Access and link those sites through directly to the internet as a layer 2 connection. The **Etherflow Internet (EVC)** bandwidths range from 30Mbit/s through to 10Gbit/s. (where network service allows)

NOTE: for system order reference; the point-to-point service Wholesale Ethernet Direct Internet Access service consists of one Etherway Access (retaining the ETHA reference) and one Internet based Etherflow between the BT internet peering node and the Etherway, this will have a unique Service Reference of ETHI

Access Phase 1 Autumn 2021

Etherway Fibre (EAD) 100Mbit/s up to 10Gbit/s.

End to end service

Etherflow Internet (EI) 30Mbit/s through to 10Gbit/s

Access Phase 2 Winter 2022

Will extend the **Etherflow Internet** range across alternative access services such as SoGEA, EEC and FTTP

1.3 Contract

Etherflow Internet is part of the Wholesale Ethernet product portfolio and as such can only be ordered by previously or newly established Wholesale Ethernet customers.

If you wish to consume and resell the Wholesale Ethernet Direct Internet Access service as a point-to-point internet-based service, you will have to sign up to the Wholesale Ethernet Terms and Conditions so please contact your Account Manager for more details.

2 General Connectivity

For detailed information on the BT Wholesale Ethernet product, please refer to main product handbook and SIN 476 (Suppliers Information Notes), which provides detailed technical information of Ethernet services, including the Layer 2 protocols. This can be found at: <https://www.btplc.com/sinet/>

This product handbook annex will concentrate on the new **Etherflow Internet** service that offers customers a Direct Internet Access service and its EVC variant Etherflow Internet (EI)

2.1 Service Connection Direct Internet Access options

Service type	Description
Point-to-Point service	This service uses either port or Vlan mapping on the Ethernet switch; you or BT can apply VLAN tags if required.
IP allocation	As a layer 3 internet-based service - 6 IP V4 or V6 markers will be allocated as standard with all new Etherflow Internet orders.

The **Etherflow Internet** service delivers an Internet based access service. Thus, essentially allowing you to deliver a direct premium rate bandwidth connection directly out to the internet, utilising BT's high-grade peering service and removing the need to connect and manage additional bandwidth and hardware in your network core.

This Direct Internet Access service differs from the existing Wholesale Ethernet product as it will only operate as a point-to-point service.

The **Etherflow Internet** service includes 6 IP V4 and V6 markers as standard, additional IP ranges are available (chargeable option)

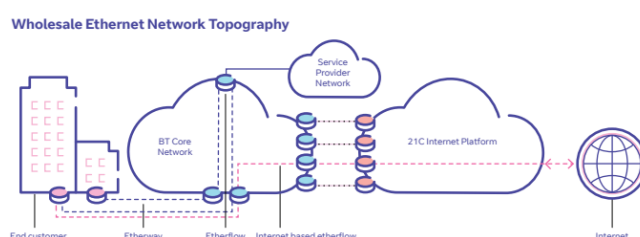
VLAN interface; from the BT peering network through our core network delivered to a physical connection an Etherway Fibre service. (Phase 1) other access options will follow.

The service can be delivered to either an existing Etherway Fibre (ETHA) or to a new Etherway Fibre ordered as part of a bundle via the existing order entry portal.

The **Etherflow Internet** is delivered as a premium service only. There are currently not any plans to offer a Standard Etherflow Internet EVC on the Etherway Fibre access (unlike that offered by the etherflow connected product)

Etherway Overbooking is not supported as the service is delivered direct from the BT network to the end customer's access.

Phase 1 will not support the service being delivered to or via a hub site or customers data centre.



2.2 Access

The access options deliver on several physical interfaces:

Delivery method	Access option
Etherway Fibre (Exc. Hull)	<ul style="list-style-type: none">• 100BaseT• 1000BaseT• 1000Base-SX• 1000Base-LX• 10000Base-LR• 10000Base-SR*
Etherway Hull Access 10Mbit/s, 100Mbit/s & 1Gbit/s fibre only	<ul style="list-style-type: none">• 10BaseT• 100BaseT• 1000Base-SX/LX

The CP or End User provides the suitable connecting cords between the NTE and their own equipment. For further details on connectivity methods and power please refer to the main Wholesale Ethernet Product Handbook.

2.3 Etherway Fibre Access (excluding Hull area)

The Direct Internet Access Service will be able to be offered through Wholesale Ethernet Etherway Fibre access services into Kingston Upon Hull.

The ethernet details are within the Wholesale Ethernet Product handbook.

2.4 10Gbit/s Access

For 10Gbit/s Etherway options the connectivity will currently only be available from the customer end user's premises to the nearest Core or Metro node.

2.5 Resilience and Diversity

Wholesale Ethernet now offers 6 resilience and diversity options for the Etherway Fibre.

This is due to reduce to five in Mid 2021 with the removal of the Etherway Protected service.

Full details can be found in the BT Wholesale Ethernet Product handbook Locate at <https://www.btwholesale.com/products-and-services/data/ethernet.html>

3 Etherflow Bandwidths

As previously stated, the Wholesale Ethernet etherflow bandwidths are limited to the rate purchased. **Etherflow Internet** is no different available at bandwidths between 30Mbit/s up to at 1Gbit/s at launch. Up to 10GBs service will follow shortly after.

Speeds above 1GB on the 10GB access will be available in 500Mbit/s increments.

Details on the construction and operational value of the EVC estate can be found within the main Wholesale Ethernet product handbook

The current process for ordering 'Large' bandwidth Etherflow employing a 'Ethernet Large Circuit Capacity Review Process', will be retained for the **Etherflow Internet** service, whereby all Etherflow greater than 300Mbit/s are reviewed by Network Capacity Planning teams to determine any issues with the provision of such a large Etherflow over an Etherway via a local node.

All **Etherflow Internet** connections will be premium class of service so are optimised to support delay-sensitive business voice and data applications across the BT core where low end-to-end delay with minimal packet loss is a requirement.

Class of service	Description
Premium (Ethernet -Internet)	This is an un-contended end to end service, suitable for time critical applications. Bandwidth offered will be in terms of Etherflow bandwidth, (where Committed Data Rate (CDR) = Peak Data Rate (PDR). Customer traffic above the Etherflow bandwidth will be policed out and discarded.

3.1 Etherflow Bandwidth Connectivity Options

The premium traffic class offered on the **Etherflow Internet** etherflow is an un-contended service and is configured so that the Committed Information Rate (CIR) is equal to the Peak Data Rate (PDR). All the traffic within the Service has equal priority and the full bandwidth rate can be utilised.

Premium CoS is only guaranteed across the BT network. On reaching the network egress point the service is no longer subject to BTs guarantees.

3.2 Port or Vlan Mapping

The **etherflow internet** service will be as stated point to point only, however depending on your network the EVC connectivity options can be built to meet your network requirements

Customers requesting a direct connection from the internet to the end customer site may be better to request a port based etherflow service. This will be delivered as part of the network configuration on to the access service.

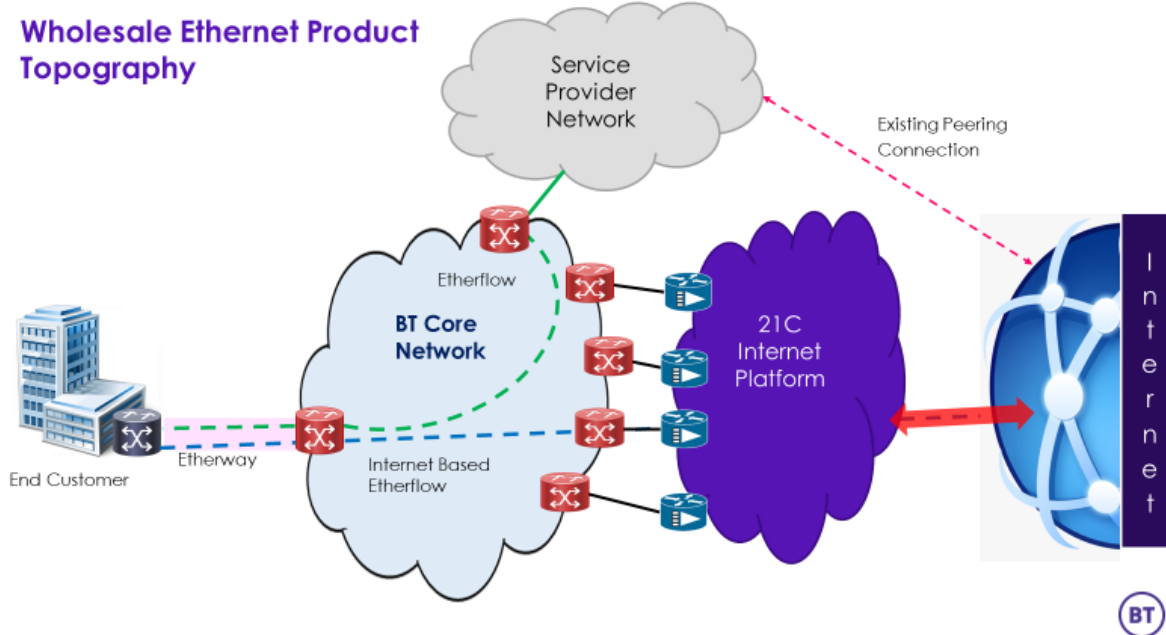
Existing and new Wholesale Ethernet customer who are looking to provide the ethernet peering etherflow as part of a mixed network Ethernet and Internet based connectivity service will have to configure the fibre access either existing or new as Vlan aware.

The VLAN Mapping range is 2- 4094 please ensure that your equipment can support this range if BT are proving the VLAN IDs. Alternatively, as the CP you can provide the Vlan Tag you require.

4 Network Configuration

For the purposes of clearly defining the uses of Wholesale Ethernet **Etherflow Internet** this section will review two scenarios for the provisioning of and overseeing the network connectivity of the services

4.1 Configuration Guidance – Etherflow Internet Point to Multipoint Networks.



Customers who wish to utilise the **etherflow internet** service have options as well on the use of Vlan Mapping and the Tags utilised.

The above diagram shows an existing Wholesale Ethernet customer running a Point to Multipoint topology (dotted green line) the hub site is connected to the service provider network via a layer 2 etherflow connected service and will be running Vlan tagging at the Hub site.

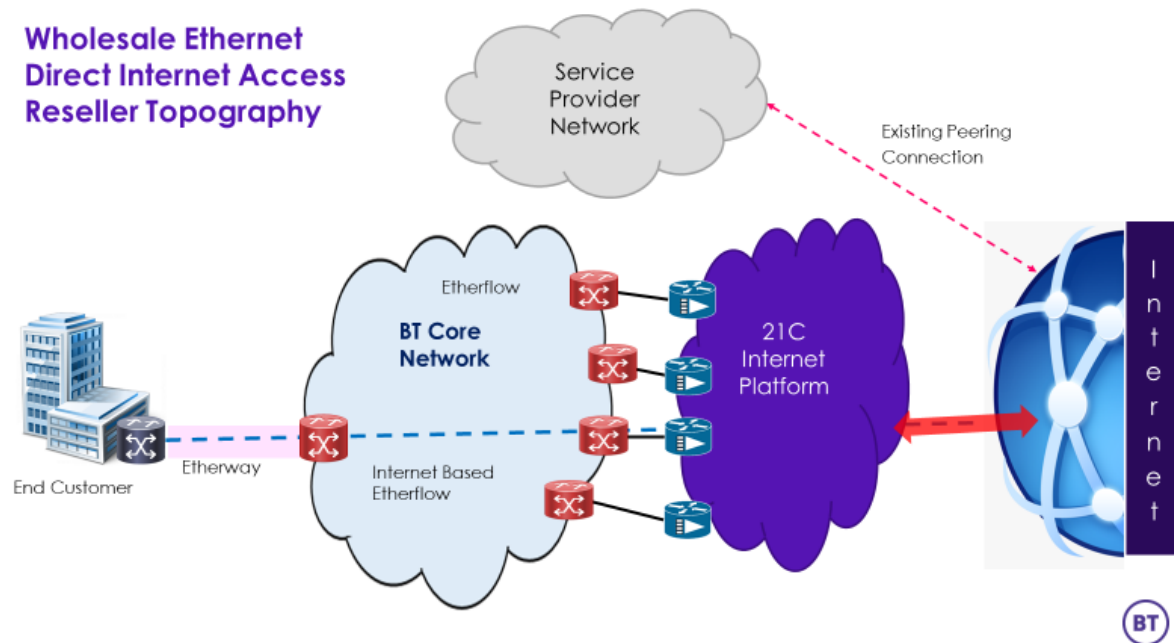
At the End Customer site, the service could be utilising either Port based or Vlan tagging options

However, if the CP wants to introduce a new etherflow internet connection (blue dotted line) in the above diagram to the bearer at the customer end. The network access at the end customer site must be configured for Vlan tagging to enable the addition of the secondary **Etherflow Internet** service.

NOTE:

- 1) If the end customer connection already exists as a port based etherflow connected site, the network will need to be re-configured to accepted Vlan Tagging traffic class.
- 2) if the access is newly provisioned and the wrong configuration is given in ordering the access bearer, the etherflow internet order will need to be cancelled and reissued.
- 3) CVLAN is not supported on the Wholesale Ethernet, Etherflow Internet service SVLAN is

4.2 Configuration Guidance – Etherflow Internet Point to Point service.



Customers who wish to utilise the **Etherflow Internet** ethernet service as a single connection type into new bearer have the option of how the bearer is configured for connectivity purposes.

The service can be either port based or Vlan aware, but this must be requested at the point of ordering the bearer and this cannot be changed during the order journey

NOTE: if the wrong configuration is given in ordering the access bearer the service the etherflow internet order will need to be cancelled and reissued.

4.3 Service Connection options

Service type	Description
Point-to-Point service	This service uses port mapping on the Ethernet switch; you do not need to apply VLAN tags.
Point-to-Multipoint service	This service uses a combination of Port and VLAN mapping on the Ethernet Switch. You control switching through the application of VLAN tags. The spoke site should be configured for VLAN mapping. The hub site must use VLAN mapping.
Etherflow Internet Services	Where the etherflow internet service is delivered as a single connection this can be requested as port based Where this service is being provided as a secondary access etherflow or where the Etherflow internet connection will likely be increased to offer more than one connection Vlan mapping should be requested.

Note: When ordering a new Etherway fibre access on the BT portal, Business Zone. Please consider the etherflow configuration when setting up the bearer - Is port based or Vlan mapping required.

5 Commercial

BT Wholesale Ethernet Direct Internet Access is available to Wholesale customers only.

Customers wishing to consume Wholesale Ethernet **Etherflow Internet** must sign up to the contract terms and conditions for BT Wholesale Ethernet.

Wholesale customers should address any queries regarding the Wholesale Ethernet terms and conditions, in the first instance, through their nominated Wholesale Account Manager.

Access to the Wholesale pricing tool is provided for quoting purposes. Access is only provided once a customer has signed the BT Wholesale Ethernet terms and conditions for service.

Access to the Wholesale pricing tool is via <https://www.btwholesale.com/pages/static/home.htm>

5.1 Wholesale Ethernet Direct Internet Access Pricing

The pricing model for Wholesale Ethernet Direct Internet Access as stated, consists of two components, an access service (Etherway) connected to BT Wholesale Ethernet core network and an Ethernet Virtual Connection (**Etherflow Internet**) connecting through the BT core network from the Etherway Fibre into the BT peering point.

The Etherway can be ordered independently from or as part of a bundle (new access) with the **Etherway Internet (EI)** If pricing an access, as part of your order, you will need to specify the access speed and interface type required at the end customers site and the Etherflow bandwidth required between the site and the BT peering point.

5.2 Etherway Access

Etherway (fibre) pricing is dependent on access speed required and distance from the BT Wholesale Ethernet Node. A distance related charge (main link) from the serving exchange of your site to the Wholesale Ethernet node, if the connection point is outside of the existing exchange area. Each local end (Etherway) will incur Connection and Annual Rental charges.

NOTE: Main link charges are calculated on a per km (rounded up) rental charge. Excess construction charges may at times be applicable to support provision of service.

All BT Wholesale Ethernet Etherway orders are subject to a minimum of 12-month term period from the date the service is delivered.

5.3 Etherflow Internet

An Etherflow Internet EVC can be provided on a new access as a bundled order or can be connected onto an existing Etherway Fibre access, subject to the access having enough spare bandwidth available for the connection.

Pricing for an Etherflow Internet (EI) is based upon an annual rental charge aligned to bandwidth required. The connection charges are currently waived.

5.4 Wholesale Etherway Hull Access

BT Wholesale Ethernet Etherway Hull Access connections have a fixed connection and annual rental charge. (Only a one-year term option is available)

5.5 BT Wholesale Etherway Internet Bandwidth Upgrades

Etherflow Internet – will support bandwidth upgrades subject to capacity existing on the Etherway. Pricing can be obtained from the pricing tool)

Each Etherflow will incur an Annual Rental charge. The connection charges are currently waived. New Etherflow Internet orders will have a minimum contract term of 1 year.

5.6 Discount Schemes

The only discount scheme available on Wholesale Ethernet customers is the Hub and Spoke discount scheme. The delivery of the Etherflow Internet service will not be applicable to this discount offer.

5.7 Pricing Tool

The current BT Wholesale Ethernet pricing tool has been updated to enable the additional pricing of the Wholesale Ethernet Internet service.

The pricing tool will enable both single and bulk quotes to be undertaken.

Access to the pricing tool see section 5.0.

5.8 IP requirements

The **Etherflow Internet** service will be provisioned with a /29 (6 usable IP addresses from a dual stack supporting IPV4 and IPV6) if more than six Ips are required the pricing for the additional IPs can be found in the pricing too.

The CP should request their bandwidth required and the volume of Ips required. Additional Ips are chargeable and cannot be guaranteed until order is confirmed.

6 Provision

6.1 Placing an Order

The preferred mode of submitting orders will be through BTW's online customer portal. Business Zone

For Wholesale to accept and progress the order, you must provide all the relevant information: customer details, fibre access and Ethernet Internet connection bandwidth requirements including existing connection IDs, to enable successful order placement and progression.

As a new connectivity internet-based service. BT can provide or we can allow you to provide the IP addressing for the access service. See section 8 for more details

You are responsible for ensuring accuracy of the details input on your order submission, errors in input could result in delay in the provision of the service.

Note: as the service provider you are responsible for keeping your end customer informed of order progress and arranging access and having obtained the end customers consent for any engineering access or installation work required in the delivery of the service.

We recommend that you put in a secondary contact point on any order submitted to wholesale

6.2 Service Order Types Supported

The following order types are supported:

- Provide*
- Amend
- Cancel
- Cease*.
- Modify

*Once submitted these order types can be amended, i.e. changes to in-flight orders, or cancelled. Please note that on partial cancels e.g. cancelling the diverse leg of a Diverse or Diverse Plus pair (perhaps owing to high Excess Construction Charges) can only be achieved if ALL components are still undelivered i.e. one Etherway leg has not yet been completed.

**Cancellation of Cease orders cannot be requested or cancelled less than 2 working days prior to the CRD, if an Etherway (ETHA service) cease order is to be cancelled within 2 working days of the CRD then an email request "MUST" be submitted to your respective Service Operations team.

Cease orders which have reached their CRD CANNOT be cancelled, any request to restore service must be via a new circuit (ETHA) order, the standard lead time will be as per the product offering– (35 Working Days subject to survey), no DSO or escalation will be accepted against such orders until the lead time for delivery has been met.

6.3 Order Progress

Order progress can be tracked via the online customer portal. When placing an order, you can choose your preferred medium of communication from a pick list. Information will be provided to you via the requested method at key milestone points known as Keep Customer Informed (KCI) points and at other times during the order journey, as and when relevant.

6.4 KCI Timeline for Wholesale Ethernet

Fibre Access

The Contractual Standard Lead Time (SLT) for an Etherway Fibre access and an Etherflow Internet bundled services is 35 working days subject to survey.

The Contractual SLT for an Etherflow Internet is 2 additional working day. (this may be reviewed later)

NOTE: Further details on the ordering process and the KCI's are available in the main Wholesale Ethernet Product handbook

6.5 Excess Construction Charges

Excess Construction Charges (ECC) may apply to Wholesale Ethernet orders where additional infrastructure is required to provide service.

Order via online portal:

Upon notification to you of any applicable ECCs, the circuit order will be suspended as follows:

- If the ECCs are £2,800.00 or greater, the order will be suspended until your acceptance of the ECCs is received by us.
- If the ECCs are less than £2,800.00, the circuit will be suspended if your acceptance has not been received by us within 5 working days of notification of the ECCs.

A quotation for ECCs is valid for 30 working days. Following receipt of your agreement to accept the ECCs, the Contractual Delivery Date (CDD) of the order will be re-calculated to consider any suspension period. If you have not confirmed acceptance of any ECCs within 30 working days of notification, then the circuit order may be cancelled by BTW.

- For larger customers and to improve the delivery process, it is possible to pre-authorise ECC limits, these can provide at time of order entry. See Best Practice Guide on how to provision.

6.6 Cancellation Charges

For Etherway Fibre all bandwidths up to and including 1Gbit/s will incur cancellation charges as set out below. Cancellation charges will be aligned to the prevailing 1-year connection charge price, i.e. even where a special offer may provide a discounted or free connection the full prevailing 1-year term price shall be used to calculate any cancellation charge.

*All days will be calculated as Working Days, i.e. ignoring weekends and public holidays. The full cost of any additional work, e.g. duct, which has been specifically incurred for the order by the time of the cancellation, will be recovered in addition to the cancellation charge.

Fibre Cancellation Policy	(% of Connection Charge) (Fibre)			
New Fibre Cancellation Policy	Day 1 to KCI1 + 1WD	KCI1 + 2WD to KCI1.1 + 1WD	KCI1.1+2WD to KCI1.2	Any time after (KCI2 + 5WD)
	Zero charge	Zero charge	50% of Connection charge (Excluding those cancelled due to ECC's)	100% of Connection charge (Excluding those cancelled due to ECC's)

6.7 Suspended Orders

Wholesale and/or its suppliers may cancel a suspended order when the order has been suspended for a period of more than 90 cumulative calendar days. If Wholesale cancels the order in accordance with this paragraph, you must pay the cancellation fees as specified in the tables in section 6.3.3, based on the product that was being ordered.

6.8 Provision Service Level Guarantee

Full details of the Provision Service Level Guarantee (SLG) can be found in Section 16 of the Schedule to the General terms of the Contract, which remains the authoritative document in all service level matters.

NOTE: Although we offer SLGs on provision order types. SLGs are not paid out on Modify orders.

6.9 Wholesale Ethernet Forecasting

The purpose of forecasting is to enable Wholesale to resource adequately to meet forthcoming order volumes for new provisions and to onward provide BTW's suppliers with forecasts and advance orders. In turn, this gives customers the confidence that Wholesale can provide service in a timely manner.

Orders for Wholesale Ethernet Direct Internet Access should be incorporated into the regular quarterly forecast.

The forecast must be submitted on the correct Forecasting Submission form which is located on <https://www.btwholesale.com> Customers should submit the completed form via their Account Team.

6.10 Provision Support

Any unresolved technical queries and other reports of provisioning difficulties should be directed in the first instance to the 21CN Data Services Team. Please refer to the Wholesale Ethernet CSP for contact details.

7 Maintenance

A within tariff maintenance package applies to Wholesale Ethernet services and provides the description and terms and conditions of the repair service offering fault repair work carried out during 24 hours per day, 7 days per week including public/bank holidays. Self-Diagnostics

You are required as with the other Wholesale Ethernet services obliged to carry out a self-diagnostic test prior to raising a fault with BT Wholesale.

A self-diagnostic capability is available via BTW's online customer portal from where you enter the Service Reference of the **Ethernet Internet** connection (the ETHI) and this will return a message to say if Wholesale is aware of a network fault. It will also initiate a check for any alarms occurring at the time.

The Loop Tool allows you (authorised users) to apply remote loops to the End User NTU of your Fibre Etherway (those based on EAD) so that faults can be simply identified to be within or beyond the BT domain. Test traffic can be generated within your own network and measured returning via the distant loop at the end user location. Loops can be applied to either Etherway end of a service, however care is required to ensure you do not apply a loop to a hub Etherway where multiple services are in operation as all will experience a break in service if looped. Whilst the BT portal provides guidance and warning to avoid looping an active hub Etherway the responsibility is on you to correctly apply the loop.

The loops can be applied for various time periods to allow short duration intrusive tests through to longer periods whereby soak tests for potential intermittent faults can be run.

The BT fault diagnostics portal provides reports on who and when loops were applied and removed on a circuit by circuit basis.

7.1 Raising a Fault

Your primary method of contacting the Data Services Team will be via the online portal. If the online portal is unavailable, you may contact the Data Services Team by calling **0800 032 3888 option 2**. The online portal (and if it is unavailable your nominated contacts) will be the only point of contact with Wholesale for the notification of all faults with the Service and fault resolution. Wholesale will not accept fault reports in respect of the Service directly from an End User. If an End User mistakenly contacts BTW, the End User will be advised to contact you. You agree to advise all End Users that all faults in the Service must be reported to yourselves and not to BTW.

- The 21CN Data Services Team will receive faults proven to Wholesale network from you
- The 21CN Data Services Team will be responsible for logging the fault details and handling of faults on the Wholesale network and will be responsible for fault clearance notification.

7.2 Repair Portal

The online portal should be used to raise faults into BTW, raise issues and view/track any reports on the system.

The online portal is available via <https://www.btwholesale.com> reports can be recorded via Business Zone and processes such as Loopback tests will be required to be completed prior to notifying BT of a fault.

Wholesale Ethernet Direct Internet Access has had the repair journey enhanced to support the identification and acknowledgement of its fault process.

With the introduction of the internet peering and IP addressing the fault process will look to ensure early identification and the correct response to all faults reported on the repair portal.

As the service provider you will be requested to provide more details on the type and location of the fault occurrence

Example can you contact the end router,

Have you got internet access?

Once the network testing has been completed and a fault is reported into BT, should you wish to provide any further supporting information e.g., trace documents etc.

Please send these in first instance to 21cn.private.wire.repair@bt.com quoting the fault reference number.

7.3 Performance

End-to-End Service Availability

Please refer to the main Wholesale Ethernet Product handbook for complete details

7.4 Repair Service Level Guarantee

Full details of the Repair Service Level Guarantee (SLG) can be found in the Schedule to General Terms of the Ethernet Contract, which remains the authoritative document in all service level matters.

7.5 Planned Engineering Works (PEW)

Planned Engineering Works is a known programme of network engineering work within BTW's control. Wholesale will inform you of any foreseen work it finds necessary to carry out within its own network which may affect the Wholesale Ethernet Direct Internet Access service or standards of performance as perceived by you. The request for deferment of a planned outage by you will be subject to negotiation and agreement with each case considered on its merits.

The PEW process can be located here: (Correct version as of November 2020, please check for latest versions on <https://www.btwholesale.com>).

Notification

BTW's notification contact points are identified in the Customer Service Plan (CSP). The method to be used and target timescales will be discussed and documented if required between the Customer Relationship Manager (CRM) and you.

8 IP Addressing

IP routing is the basic principle of enabling traffic to flow to and from the Internet onwards to the customer's Internet facing devices. The IP addressing is an essential building block as public IP addresses (IPv4 and IPv6) are required to ensure unique addresses are identified for each customer to ensure traffic is sent and received correctly. Public IP addresses are controlled under Internet Registry (IR) rules. BT has a relationship with the RIPE Regional Internet Registry (RIR) and is recognised by RIPE as a Local Internet Registry (LIR). This means that BT can allocate public IP addresses on behalf of RIPE for use by BT's end customers.

DIA supports both IPv4 and IPv6 standards in a dual stack capability and both will be allocated to the service. A standard default /29 will be added to the Etherflow Internet order as standard.

Additional IP's are available but are a chargeable option and are subject to approval see section 8.2 for further information. Pricing will available on the Wholesale Ethernet Pricing Tool

All new services ordered will automatically be provided with a dual stack service. This will future proof your service by providing you with the capability to implement your own IPv6 plans in line with your customers own timeframes without any change to their Internet Access service.

8.1 WAN IP Addressing

As the Wholesale Ethernet Internet service is wires only i.e., there is no BT managed CPE. The WAN IP addresses need to be allocated on the Direct Internet Access service to ensure the network access router and the customer CPE can connect to each other.

These IP addresses are not advertised out over the Internet like the LAN IP addresses and are allocated from BT's pool of IP addresses. Both IPv4 and IPv6 WAN addresses are allocated for customers deployed with an IPv6 enabled dual stack service. IPv4 only customers will have IPv4 WAN addresses only. Current default values for WAN IPs are a /30 or/31.

8.2 LAN IP Addressing

For IPv4 current design is to deploy a /29 IPv4 address block (subnet mask of 255.255.255.248) providing 6 IPv4 addresses. One is used for the Access Router Interface and another for the WAN interface on the CPE router. This is applied to all new customers connections. The IPv6 the standard design is to allocate a /56 IPv6 address block

Customers will require public registered IP addresses for their DIA service. It is envisaged that most customer orders for Direct Internet Access will take the IP addresses issued by BT these will not and are not transferable to another ISP, this is known as Provider Aggregable addressing.

8.3 Provider Independent Addresses

Customers who have their own public IP addresses known as Provider Independent Addresses (PIA) require a direct relationship with an official Internet Registry body and are wholly responsible for these IP addresses.

8.3.1 Provider Aggregable (PA)

PA IP Address Ordering BT use RIPE guidelines to ensure customers are allocated enough IP addresses for their needs (including the specification of exactly how many IP addresses are

required and what equipment will be configured with these addresses). As part of these guidelines' customers are required to justify the address space requested. It is important to ensure the customers IP requirements are an integral part of the sales journey.

Critical information that is mandatory on the DIA order is as follows:

- Technical contact details for the customer. The customer technical contact should be IP literate as they will be registered on the RIPE Database and used during the delivery process to interact with the DIA delivery teams.
- The nature of the customer's business e.g. ISP, Manufacturing, Retail, etc.
- The number of IP addresses required for the service. Do not ask for more IPv4 addresses than required and can justify for immediate use.
- An accurate description of what customer equipment the IP addresses will be configured on. E.G. like Firewall, Mail Server, Web Server are acceptable with added detail around the equipment manufacturer and model number required in the RIPE form. Descriptions such as 'general use' are not acceptable and will lead to delays in the delivery of the order.

8.3.2 IPv4 Provider Aggregable IP Addressing

The customer can request as many IPv4 addresses as they can justify for immediate use. BT will provide a 'standard allocation' of IP addresses for free as part of the service, which is a range suggested by RIPE to suit the needs of a wide range of customers. The standard allocation of IPv4 addresses provided for free as part of the service is a /29 (Subnet Mask 255.255.255.248) which provides 5 usable IPv4 addresses. If a customer needs more than the standard allocation of IPv4 addresses, then additional rental charges may apply and will be provided at the time of quoting/ordering the service. For requirements beyond the standard allocation the customer will be expected to provide detailed usage rationale also in line with RIPE requirements. IP addressing information for your service will be communicated during the delivery journey via one of the KCI (Keep Customer Informed) order update emails.

8.3.3 IPv6 Provider Aggregable IP Addressing

BT use RIPE guidelines for assigning customer IPv6 PA addresses from BT's allocation. The RIPE regulations provide a set design for IPv6 address allocation that allows BT to assign IPv6 addresses on a customer and site basis without the need to capture any additional information than the IPv4 justification provided at point of order.

IPv6 Address Allocation Details

A /48 address block is assigned to each customer. This supports each customer by allowing 256 /56 address blocks to be assigned per site. The customer level /48 address allocation is different to how IPv4 address allocation currently works. A customer will not be provided the /48 address allocation as a fully routable IPv6 address block as the service is ordered at a per site level, however if the customer has more than 1 site (FTIP) then the individual /56 address allocations for each site will be assigned from the customers larger /48 allocation.

Site A /56 IP address block provides support for up to 256 subnets (/64) each with 18,446,744,073,709,551,616 IPv6 Addresses As can be seen in the table above, IPv6 is very different to IPv4.

8.4 Provider Independent Addressing

Customers can request their own IP address blocks from a Regional Internet Registry (RIR) directly, (if a recognised Local Internet Registry). In Europe the RIR is RIPE <http://www.ripe.net/>

There are qualification criteria to be met before the RIR will allocate a customer PI addresses. To enable better control of PI Resources (PIR), RIPE has put in place mechanisms which requires BT to include the following conditions in its contracts with Customers who take PI Resources: -

- None of the PIR may be sub-assigned to a third party.
- The PIR will return by default to the RIPE Network Coordinating Centre if the customer cannot be contacted when required.
- The use of PIR is subject to RIPE policies as published on the RIPE web site and which may be amended from time to time.

Please discuss this with your account manager or specialist if you would like to use a PI range

8.4.1 Provider Independent Address Ordering

For efficient ordering of DIA services with PI addressing the following mandatory information is required during the ordering process:

- Technical contact details for the customer. The customer technical contact should be IP literate as they will be registered on the RIPE Database and used during the delivery process to interact with the DIA delivery teams.
- The nature of the customer's business e.g. ISP, Manufacturing, Retail, etc.
- Either the existing PI address range required to be routed or the indication that the customer wishes BT to apply for PA address space on their behalf
- The Internet Registry body who provided the PI addresses
- The ISP that provided the LIR sponsorship for the PI addresses
- Immediate and forecasted 3-month usage of the IP addresses (as per PA IP address ordering)

Additional RIPE forms will be sent to the account team/customer to fill out during the delivery process. The customer will also need to sign a contractual clause indicating their acceptance of responsibility for the PA address space. Failure to complete and return these will result in delays to the delivery of the DIA service.

The minimum IPv4 PI address assignment is a /24 subnet (Subnet mask of 255.255.255.0 with 256 IP addresses). This is the minimum routable PI address block for IPv4 to meet Internet routing rules.

The minimum IPv6 PI address assignment is a /48 subnet. This is the minimum routable PI address block for IPv6 to meet Internet routing rules

8.5 BT Internet Peering and Backbone

DIA is delivered using BT's high speed, highly resilient, core IP platform, which is used to support a range of services, including Direct Internet Access (Etherflow Internet) Internet Connect and BT's broadband services. DIA has dedicated Access routers and DNS servers designed, implemented, and managed to provide business grade Internet connectivity. So, although the 21C IPP provides

DIA and Broadband transit in the UK, the access into the 21C IPP is dedicated to DIA. Within 21C IPP DIA uses the core IP platform (AS2856), which is connected to multiple UK ISP peers and, via BT's European Internet backbone (AS5400), to tier 1 ISPs for onward global Internet connectivity. These highly resilient peering connections are carrying tens of Gigabits of traffic every second. The peering points and performance statistics of BT's Internet Backbone can be checked via the website www.bt.net.

The 21C IPP utilises OSPF and iBGP routing protocols internally to provide a highly stable, scalable, and secure IP routing platform that supports BT's Internet Connectivity not only for DIA customers but also for Broadband customers. This provides customers with direct connectivity to the largest Internet customer base in the UK. The DIA service teams proactively monitor the core network infrastructure against DoS (Denial of Service) attacks. One of the main DoS mitigation tools used is Arbor Network's Peakflow SP which enables DIA to monitor traffic flowing into and out of the core network. The tool allows DIA to proactively detect most traffic anomalies and DoS attacks. The attacks can then be managed by cleaning the traffic and blocking the source of the attacks using filters.

9 Order Entry

As stated, orders will be raised on the Wholesale portal and all the fields requested will require answering

In addition to the standard layer 2 Wholesale Ethernet provisioning questions some additional questions have been added to support the provision of the IP Management allocation and details of the Service Provider CP utilising these number ranges.

These questions will require the order entry personnel to

1. CP name in which IP addresses will be/are registered.
2. CP's Company Legal Entity registration number. Field is mandatory and can be obtained from your account number at point of first order.
3. Full Legal Company Name - Free Text and will need to match Company Registration (this can/ may differ from point 1)
4. Nature of company business. This is mandatory and free text.

Also details on the size of the IP range needed

IP Usage Descriptions

NOTE:

If Vlan Mapping service is required as with the existing ethernet service (etherflow connected) you the CP can either provide the VLAN Tags required or you can allow BT to provide

Please ensure if you allow BT to provision the tagging you can utilise a full range up to and including Vlan tag 4094

10 Service Commissioning

The Etherflow Internet (Direct Internet Access) service will supply KCI's as part of its order progression and KCI information will depend whether a new access service (Etherway) has been requested at time of ordering or not.

The completion KCI7 will provide all the relevant details for router connection

ETHN ID – Network reference

ETHI ID ETHI reference

A end Vlan Setting If VLAN Mapping is requested this value must be entered into the router configuration

Bandwidth Speed requested

Traffic Class Premium

An End circuit Id ETHA reference (Etherway Fibre access reference)

A end Address

Etherway Type

Etherway Bandwidth

Segmentation type either port or Vlan Mapping

Other reference

The details on the IPV4 WAN subnet & IPV6 wan Subnet

Details of the

IPV4 addresses

IPV6 addresses

IP descriptions of usage i.e. firewall/ router etc.

NOTE:

Where port-based segmentation has been requested the segmentation details may not necessarily be required for the hardware configuration

If Vlan Mapping service is required as with the existing ethernet service (etherflow connected) you the CP can either provided the VLAN Tags required or you can allow BT to provide

Please ensure if you allow BT to provision the tagging you can utilise a full range up to and including Vlan tag 4094 (SVLAN)

If you are utilising Vlan tagging you will need to provide the Vlan Tag details within the router configuration to get the service to operate correctly.

11 Billing

Monthly or quarterly billing is available; you may choose the preferred option when setting up your billing account.

Connection is charged in arrears and Rental is charged in advance. For Quarterly billing, BT's billing cycle is April/July/October/January.

12 Further support and documentation

Various support documents, training guides, Podcasts and CBTs (Computer Based Training) packages can be found via the following links: These are not specific to Wholesale Ethernet Direct Internet Access / Etherflow Internet

<https://www.btwholesale.com/pages/static/products-services/wholesale-ethernet.htm#accProducts=5>

<https://www.btwholesale.com/pages/static/help-and-support/wholesale-ethernet/transformed-ethernet-ordering.htm>

Note: You will need to login to <https://www.btwholesale.com> to download any documents.

Training podcasts and supporting documentation can also be found via the following link:

<https://www.btwholesale.com/pages/static/help-and-support/training.htm>

A good source of reference for IPv6 is the RIPE site:

<http://www.ripe.net/internet-coordination/ipv6>

13 Glossary of Terms

Abbreviation or term	Explanation
21CN	21st Century Network
BTW	BT Wholesale and Ventures
CDD	Contractual Delivery Date
CDR	Committed Data Rate
Component	A single Ethernet Asset e.g. Etherway or Etherflow
CoS	Class of Service
CP	Communications Provider
CPD	Customer Promised Date
CPE	Customer Premises Equipment
CRD	Customer Required by Date. Used for notifying & managing the delivery date of component/s (Etherway and Etherflow)
CRF	Customer Requirement Form
CSP	Customer Service Plan
DIA	Direct Internet Access
DSO	Director Service Office
EI	Etherflow Internet
EMP	Equivalence Management Platform, a strategic Openreach system for managing order and fault transactions
ESB	Ethernet Service Bandwidth
EVC	Ethernet Virtual Connection
FE	Fast Ethernet
FTTC	Fibre To The Cabinet – An asynchronous access option under the GEA umbrella based upon combined fibre and copper delivery utilising VDSL2 technology
FTTP	Fibre To The Premise –An asynchronous access option under the GEA umbrella based upon fibre direct from the exchange to end user site
GEA	Generic Ethernet Access. A term used to define Openreach FTTC & FTTP products
KCI	Keeping Customers Informed – Customer reporting process for provision and repair progression.
LAN	Local Area Networks
Legacy	The current Openreach system for order and fault transactions, due to be phased out in 2018
LIR	Local Internet Registry
MAC	Media Access Control
MI	Momentary Interruptions
MPLS	Multi-Protocol Label Switching
NTE	Network Termination Equipment
Online portal	BTW's Portal –provides order placement, tracking, fault reporting & tracking directly with you
PDR	Peak Data Rate
PEW	Planned Engineering Works
PIA	Provider Independent Addressing
QoS	Quality of Service
RIR	Regional Internet Registry
RTD	Round Trip Delay
SLA	Service Level Agreement
SLG	Service Level Guarantee
SM	Wholesale Service Manager

SVLAN Service Virtual Local Area Network

VLAN Virtual Local Area Network

VPN Virtual Private Network

WAN Wide Area Networks
