



**ADDITIONAL TERMS FOR
CARRIER ETHERNET SERVICES
SCHEDULE 2E**



TABLE OF CONTENTS

1	SERVICE DESCRIPTION.....	3
2	DEFINITIONS.....	3
3	CARRIER ETHERNET SERVICES TERMS	4
4	SERVICE CREDITS	5
5	FAULT REPORTING AND MANAGEMENT	10
6	SERVICE LIMITS.....	11
7	OPTIONAL SERVICES	11

1 SERVICE DESCRIPTION

Carrier Ethernet Services provided by Interoute are offered between Interoute Demarcation Points on the Interoute Network and/or on the Customer Premises. The standard Service will be delivered either wholly or in part over restorable bandwidth which is able to restore traffic flows in an uncongested manner under single failure scenarios within the Interoute Network. Services ordered with the optional fixed routing feature do not make use of such restorable bandwidth. All Services offer protected and unprotected bandwidth options in order to accommodate different resiliency requirements. Interoute will use a variety of differing technologies and network platforms to deliver Services, and will ensure that all platforms and technologies used are able to support the Service ordered by the Customer.

2 DEFINITIONS

“Bring into Service Quality Check” means standard set of procedures that Interoute applies prior to handing over a Service to the Customer to ensure that complies with the SLAs and features of the particular service. The Customer will not receive any test report as part of this process;

“Burst” means the ability of a Customer to increase the rate of transmission of traffic above the CBR;

“Carrier Ethernet Service” will ensure reliable Ethernet frame delivery according to the specific service attributes and SLAs presented in this document between two or more Ports that will be made available to the Customer at each Interoute Demarcation Point. All the Ports made available to the Customer in order to connect to the Carrier Ethernet Service will be related by a single EVC;

“CBR” means Committed Base Rate, the constant rate specified in the Purchase Order up to which Interoute agrees to transmit the Customer’s Ethernet traffic;

“Customer MTU” means the maximum size measured in bytes of the payload area of the Customer Ethernet frame when this frame is transmitted in a native format without including any VLAN tag. The Customer MTU is specified in the Purchase Order and represents the maximum size of Ethernet frames that the Service will support;

“Ethernet” means the framing and formatting of data packets to meet the IEEE 802.3 standard;

“EVC” means the Ethernet Virtual Circuit which is the end to end path for Ethernet traffic that is carried on Interoute Network and/or carried by Third Party Access for the purposes of extending the reach of the service. The EVC is delineated by Interoute Demarcation Points;

“Fixed Monthly Charge” means the fixed recurring monthly service charge described in clause 3 of this Schedule, payable by the Customer as set out in the Purchase Order and in accordance with the payment terms of Schedule 1 or, where the Customer is invoiced yearly, 1/12th of the Fixed Annual Charge or where the Customer is invoiced quarterly, 1/3rd of the Fixed Quarterly Charge for applicable Circuit;

“Frame Delay Variation” means the average time difference between the lowest RTD and the highest RTD experienced by test frames sent and received between two defined points in the network. Whether there is a Frame Delay Variation Target and the points in the network where measurements will be taken from depends on the product choice;

“Frame Delivery” means the average ratio (as percentage) measured between test frames sent and test frames received between two defined points in the network. The Frame Delivery Service Target and the points in the network where measurements will be taken depend on the product choice;

“Interoute Circuit” means that part of the end-to-end EVC that is carried on the Interoute Network. The Interoute Circuit is delineated by the Customer facing Ports used at each end of the Interoute Nodes used by the EVC at each end of the Interoute Network;

“Interoute Demarcation Points” means the edge of the Carrier Ethernet Service and that signifies the physical boundary at which the Carrier Ethernet Service terminates. The Interoute Demarcation Point will either be the Interoute Minimum Point of Entry or the Customer defined location within each of the addresses set out in the Purchase Order;

“Interoute Minimum Point of Entry” means a Port within an Interoute Node where Interoute has the capability to present Carrier Ethernet Services;

“Interoute Network” means the network based on Interoute-owned network equipment and monitored and managed by Interoute for the purpose of transporting customer generated Ethernet traffic. This includes both core and metro nodes;

“Interoute Nodes” means a physical facility serving multiple customers comprising of Interoute owned telecommunications equipment;

“Network Distance” means the distance of the Interoute Circuit based on an agreed routing;

“Network Management System” means Interoute’s network integrated fault management system;

“Performance Testing” bespoke testing that Interoute may perform upon Customer request and according to the Customer specifications. Performance Testing is subject to additional charges and a test report will be handed over to the Customer;

“Port” means an Ethernet interface or a cabling distribution point where Ethernet equipment can be connected;

“Protected Service” means a Carrier Ethernet Service with an automated re-routing capability. This means that Interoute will endeavour to automatically re-route traffic around any failures but may employ different techniques and technologies to achieve this in different parts of the Interoute Network. Where the optional fixed routing feature has been selected the rerouting of the circuit will always be to a pre-defined fixed backup path that is diverse to the primary. When a Carrier Ethernet Service is identified as “Protected Service” in the Purchase Order, the Protected Service Availability shall apply in relation to that Carrier Ethernet Service.

“Round Trip Delay”, “RTD” means the average time it takes for test frames to travel forwards and backwards between two defined points in the network. The Round Trip Delay Service Target and the points in the network where measurements will be taken depend on the product choice;

“Service Availability” is defined in clause 4.2 below;

“Third Party Access”, “Third Party Access Circuits”, “Leased Lines”, “Private Circuits”, “Access Circuits” and **“Access”** mean third party extension circuits or cabling that are provisioned between the Customer’s premises and the nearest feasible Interoute Node;

“Unprotected Network Distance” means the total length of the unprotected sections of the EVC based on an agreed routing. For example, if the EVC between the Interoute POPs is protected but one of the Third Party Access Circuits is unprotected then the Unprotected Network Distance equals the length of the Third Party Access Circuit which is unprotected. If two unprotected Third Party Access Circuits are used then the Unprotected Network Distance is the sum of both Third Party Access Circuits;

“Unprotected Service” is the default service type and means a Carrier Ethernet Service that may be configured wholly or partly across an unprotected EVC route that has no means of switching to either an alternate route in order to maintain the service in the event of a Service interruption. When a Carrier Ethernet Service is identified as “Unprotected Service” in the Purchase Order, the Unprotected Service Availability shall apply in relation to that Carrier Ethernet Service.

Any other capitalised terms have the meaning set out in the Schedule 1.

3 CARRIER ETHERNET SERVICES TERMS

The following terms and conditions shall apply in addition to Schedule 1 when Interoute provides Carrier Ethernet Services to the Customer.

3.1 CHARGE

Charges payable by the Customer

Charges for the Carrier Ethernet Service shall comprise:

- a. a non-recurring Installation Charge;

and, unless otherwise stated in the Purchase Order:

- b. a recurring Fixed Monthly Charge based on the CBR; or
 - c. a recurring Fixed Monthly Charge based on the CBR plus additional Burst Charges (where applicable) billed on a per Mb (or part thereof) usage rate; or as specified in the relevant Purchase Order.
- 3.2 Unless otherwise agreed between the Parties in the Purchase Order, Charges for the Carrier Ethernet Service and any applicable cancellation charges will be invoiced in accordance with the terms specified in Schedule 1 for the amounts detailed in the Purchase Order or Change Order.
- 3.3 Interoute may charge for provisioning the Service beyond the Interoute Demarcation Points.
- 3.4 For services which include a Burst Charge in the Purchase Order, where applicable, the Charges for Burst traffic will be invoiced in arrears and are not included in the recurring fixed Monthly Charges; Burst capacity cannot exceed the physical port size set out in the Purchase Order.
- 3.5 Interoute reserves the right to apply a Charge if the Customer requests the Service to be tested and all the Service SLAs and features prove to be working within specification.
- 3.6 Interoute may charge the Customer to perform any testing prior to service handover which fall outside of scope of what is included in Interoute's standard Bring into Service Quality Check. A charge for bespoke testing will be indicated in the Purchase Order as Performance Testing.

4 SERVICE CREDITS

Subject to Clause 9 of Schedule 1, Interoute will provide the Customer with service credits, as set out below, for the failure to meet the following service levels:

- a. Service Installation
- b. Service Availability
- c. Time to Repair
- d. Frame Delivery
- e. Round Trip Delay (RTD)
- f. Frame Delay Variation

4.1. Service Installation

- a. Interoute will provide a Customer Committed Date for the installation of Services. If Interoute fails to meet the Customer Committed Date, the Customer will be entitled to a service credit in accordance with this clause.
- b. If only part of an order is delayed, valid credits will be payable only in respect of Circuits that are not delivered by the Customer Committed Date.
- c. Service credits will be calculated as follows:

For the standard Installation Service Credit

Number of full Working Days by which Interoute fails to meet Customer Committed Date for Service:	Service Credits as % of Installation Charge of affected Service:
1 to 5 days	10%
6 to 10 days	20%
11 to 20 days	30%
21 days	50%

4.2. Service Availability

4.2.1. General

- a. An EVC is “Unavailable” when Ethernet frames cannot be transmitted over the EVC in one or both directions.
- b. A standard Carrier Ethernet Service shall be deemed to be unavailable when Ethernet frames cannot be transmitted over the EVC in either or both directions for more than two minutes.
- c. A Carrier Ethernet Service with the optional fixed routing feature shall be deemed to be unavailable when Ethernet frames cannot be transmitted over the EVC in either or both directions for more than 0.1 seconds.
- d. The following equation will be used to calculate Service Availability. References to hours are to the number of hours (rounded to nearest hour) in the applicable Monthly Review Period:

$\frac{(\text{Total hours per month} - \text{Total hours unavailable per month})}{\text{Total hours per month}}$	x 100
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4.2.2. Protected Service Availability

- a. Interoute will use reasonable endeavours to ensure that all Protected Services are available for 99.95% of the time.
- b. Where Service Availability falls below 99.95% during any Monthly Review Period, the Customer will be entitled to service credits on the applicable Circuit’s Monthly Charge as follows:

Service Availability for Protected Services during Monthly Review Period (Protected)	Credits as % of applicable Monthly Charge
<99.95% to 99.5%	5%
99.49% to 99.0%	10%
98.99% to 98.0%	15%
<98%	30%

4.2.3. Unprotected Service Availability

- a. The monthly target Service Availability (A) for Unprotected Services having an Unprotected Network Distance (d) of less than or equal to 1000km, will be 99.5%. For Unprotected Services where the Unprotected Network Distance (d) (rounded to the nearest 100km) is greater than 1000km the following equation will derive the monthly target Service Availability:

$$A=100-(d/2000)$$

- b. For example where the Unprotected Network Distance is 2000km the target Service Availability will be 99%.
- c. Where Service Availability falls below the target Service Availability during any Monthly Review Period, the Customer will be entitled to service credits on the applicable Circuit's Monthly Charge as follows:

Service Availability for Unprotected Services during monthly review period.	Credits as % of applicable Monthly Charge
A% to A - 0.5%	2%
<A% - 0.5% and > or = A - 1.5%	5%
<A% - 1.5% and > or = A - 3.5%	10%
< A - 3.5%	20%

4.3. Time to Repair Target

- a. In the event that a Circuit is unavailable, Interoute will use all reasonable endeavours to restore service within the Time to Repair target of four (4) hours on Protected Services and eight (8) hours on Unprotected Services, provided access to the affected Premise is available.
- b. Faults are considered to be repaired in the event of either a full or temporary repair being implemented, thus allowing continuity of Service.
- c. Where Interoute fails to meet the Time to Repair target, the Customer will be entitled to service credits on the applicable Circuit's Monthly Charge as follows:

Full Working Hours past Time to Repair Target	Service Credits as % of applicable Monthly Charge
1	2%
2	5%
3	10%
4 +	15%

- d. Where the fault arises from any Third Party Access, Interoute shall use all reasonable endeavours in supporting the third party to manage the resolution of the fault within the Time to Repair target.

4.4. Frame Delivery

- a. For Customers purchasing a Carrier Ethernet Service with the optional fixed routing feature the target Frame Delivery is >99.9% as shown in the test report as the average Frame Delivery result using 1518 byte Ethernet frames. The measurement will be taken over the Interoute Circuit. Interoute may need to bring the Carrier Ethernet Service in question out of service to be able to perform a test and this time will be excluded from any availability calculation.
- b. Where average Frame Delivery measured using 1518 byte Ethernet frames for a Carrier Ethernet Service with the optional fixed routing feature between the applicable measurement points falls below 99.9% after a testing exercise, the Customer will be entitled to Service credits as set out under paragraph e) below.

- c. For Customers purchasing a standard Carrier Ethernet Service (without the optional fixed routing feature) target Frame Delivery is >99.9% as calculated and averaged between the two Interoute Ethernet Core Nodes which are located the closest to the two ends of the Interoute Circuit during a Monthly Review Period . Average Percentage Frame Delivery is calculated monthly using the following formula:

Tav=	$\sum R_i$	X100
	$\sum S_i$	

Where:

- Tav the average Percentage Frame Delivery.
- R_i the total number of test packets received by each applicable Core Ethernet Node from the alternate applicable Core Ethernet Node; and
- S_i the total number of test packets sent from each applicable originating Core Ethernet Node to the alternate applicable Core Ethernet Node.

- d. For standard Carrier Ethernet Services (without the optional fixed routing feature), Frame Delivery will be measured on a per Interoute Core Ethernet Node basis with the results reported for every fifteen (15) minute period on the Interoute hub. Where average Frame Delivery falls below the applicable target Frame Delivery percentage stated during any Monthly Review Period for Carrier Ethernet Services, the Customer will be entitled to Service credits as set out under paragraph e) below.
- e. The Service Credits for the Frame Delivery under specified target shall be as follows:

Carrier Ethernet Service: Frame Delivery during Monthly Review Period falling below 99.9% by:	Service Credits as % of Total Monthly Charges in the applicable Monthly Review Period:
Up to 1%	1%
Up to 2%	2%
Up to 3%	3%
More than 3%	4%

- f. For all Carrier Ethernet Services, the applicable Frame Delivery Service Level is not applicable to Planned Outage events on the Interoute Network and /or the Customer Port.

4.5. Round Trip Delay

4.5.1. Measurement and Targets

- a. For Customers purchasing a Carrier Ethernet Service with the optional fixed routing feature whom require a RTD Service Level, Interoute will provide as part of the “Performance Testing”, which is subject to additional charges and needs to be ordered as part of the service. A test report will be handed over to the Customer with the tested latency. The RTD Service Level will be calculated by adding a 5% buffer on to the tested latency.
- b. For Customers purchasing a standard Carrier Ethernet Service without the optional fixed routing feature, the RTD Service Level is applicable to the average RTD calculations made by Interoute between the two Interoute Ethernet Core Nodes which are located the closest to the two ends of the Interoute Circuit during a Monthly Review Period. The target monthly average Round Trip Delay for the corresponding pair of Interoute Ethernet Core nodes can be found in the “Intercity RTD for Carrier Ethernet Services target table” in Appendix 1. The average RTD measurement will be based on 1518 byte Ethernet frames. The Round Trip Delay for an individual pair of Interoute Core Ethernet Nodes that will be used for a specific service can be provided upon request at time of order. RTD will be measured continuously between all Interoute Ethernet Core Node with the results reported for every fifteen (15) minute period on the Interoute hub.

4.5.2. RTD Credits

- a. Where the average Round Trip Delay measured as described above for the appropriate Service exceeds the applicable RTD Target, the Customer will be entitled to a service credit equivalent to 5% of the affected relevant Service Monthly Charge.
- b. For Protected Services with the optional fixed routing feature, the Round Trip Delay Service Level is not applicable when traffic has switched to the protected path.

4.6. Frame Delay Variation

4.6.1. Measurements and targets

- a. For Customers purchasing a Carrier Ethernet Service with the optional fixed routing feature, the Frame Delay Variation Service Level is applicable to the Interoute Circuit and the target average Frame Delay Variation measured with 64 byte Ethernet frames is 1 millisecond.
- b. Carrier Ethernet Services that are purchased without the optional fixed routing feature do not offer a Frame Delay Variation Service Level.

4.6.2. Frame Delay Variation Credits

- a. Where the average Frame Delay Variation measured between the appropriate points using 64 byte Ethernet frames for a Carrier Ethernet Service with the optional fixed routing feature exceeds the applicable Frame Delay Variation Target, the Customer will be entitled to a service credit equivalent to 5% of the affected relevant Service Monthly Charge.

4.7. Burst Traffic

For Carrier Ethernet services that may allow the Customer to burst beyond the CBR as set out in the Purchase order via a Burst Charge, Interoute does not guarantee that the Customer will be able to Burst

at any given time nor guarantee the Frame delivery, RTD or Frame Delay Variation when burst is used. Burst capacity cannot exceed the physical port size set out in the Purchase Order. Charges for Burst traffic are not included in the recurring fixed Annual or Monthly Charges.

4.8. Limitations to payment of Service Credits

- a. Exclusions of Service Credits are set out in clause 9.6 of Schedule 1.
- b. In respect of any Monthly Review Period the total amount of any service credit payable in relation to a breach of the Service Levels shall not exceed 50% of the Monthly Charge for the affected Circuit.
- c. Service credits do not apply to any Burst traffic above the Customers CBR.
- d. Service Credits are not applicable for more than one breach of any Service Level outlined in this Schedule 2 arising from the same occurrence.
- e. Any testing time will be excluded from any Service Level calculation and Service Credits are not applicable.

5 FAULT REPORTING AND MANAGEMENT

5.1. Fault Handling

Any suspected faults should be reported to the Interoute Customer Service Centre using the procedures detailed in the Service Handover Document to be provided to the Customer at the commencement of service. When reporting a fault, the Customer should identify the affected Circuit and provide details of the fault.

5.2. Reporting on Repairs

Interoute will provide the Customer with progress updates every two (2) hours, unless otherwise agreed.

5.3. Fault Duration

All faults recorded by the Network Management System will be reconciled against the corresponding fault ticket raised by the Customer Service Centre. The exact fault duration will be calculated as the elapsed time between the fault being reported to the Customer Service Centre and the time when service is restored.

6 SERVICE LIMITS

The below table describes the default maximum capabilities of the Service:

	Standard Carrier Ethernet Services	Carrier Ethernet Services with optional fixed routing feature
Ethernet Frame Structure	Ethernet v2 – IEEE 802.3	Ethernet v2 – IEEE 802.3
MAC Addresses	Unlimited	Unlimited
Transparency	Can be provided upon request	
Service Type	E-Line EPL or E-Line EVPL as specified in the Purchase Order	
Customer MTU	Maximum Customer MTU supported by Interoute is 9180. Customer MTU may vary depending upon Ethernet port type and equipment used to connect to Interoute Service.	
Maximum Throughput	Ethernet throughput performance is subject to Ethernet frame size. A typical maximum throughput is approximately 95% of available bandwidth.	Ethernet throughput performance is subject to Ethernet frame size. A typical maximum throughput is approximately 95% of available bandwidth.
Physical Interface Specification	as specified in the Purchase Order	
Connection Orientated	No	Yes
Ethertype	Any for E-Line EPL Service Type; 0x8100 for E-Line EVPL Service Type	

Third Party Access Circuits used by Interoute to reach the Customer Premises might impose additional limitations which will be discussed prior to order signature and listed in the Purchase Order.

7 OPTIONAL SERVICES

Protection for Carrier Ethernet Services

Where a standard Carrier Ethernet Service is ordered as ‘Protected’, Interoute will provision the entire service so that it will automatically re-route over the Interoute Network in response to a network based fault or degradation of service . The connection between the components of the Interoute Network used to deliver the Service are not protected and do not have redundant or alternate paths.

Protection for Carrier Ethernet Services Fixed Routing

Where a standard Carrier Ethernet Service Fixed Routing is ordered as ‘Protected’, Interoute will provision the entire service so that it will automatically re-route over the Interoute Network in response to a network based fault or degradation of service.

Interoute has many different platforms and technologies available to it and may use any number of them to deliver a single service end-end. For the purposes of this Schedule, the various platforms can all be grouped into either one or the other of the following categories:

- **Connection-orientated:** these platforms deliver Services with a fixed, pre-defined path through the Interoute Network
- **Connectionless:** these platforms make switching decisions for Ethernet frames on a hop-by-hop basis meaning that the routing for a Service is not pre-defined and any two packets for the same Service may use different paths to reach the same end destination. These platforms should be considered inherently protected as if a backup path is available in a failure scenario it will be used automatically.

Where the optional fixed routing feature has been selected only connection-oriented platforms will be used so the automated rerouting will take the form of failover to a pre-defined backup path with a fixed route through the Interoute Network. In such an instance Services are configured as revertive where the EVC will automatically return to the primary route upon fault resolution. A failure of both the Primary and Secondary routes will result in a service outage.

If the optional fixed routing feature is NOT selected then either connection-orientated or connectionless platforms may be used so a degree of protection may be provided where the connectionless platforms are used even if protection is not ordered, however it will not be guaranteed on an end-to-end basis unless it is ordered as a service feature and listed on the Purchase Order. Moreover Interoute does not provide any warranty that the routing of the circuit or the platforms used to deliver it will remain the same throughout its lifetime, only that it will continue to fulfil the contractual requirements of the Service as specified on the Purchase Order and described in this Schedule.

Regardless of the Service type or technologies used therefore, if a guarantee of end-end protection is required, a Protected Service must be ordered.

Performance Testing

As an additional layer to the standard Bring into Service Quality Check performed in order to handover over the Service to the Customer as per clause 4.1 of Schedule 1, Interoute may perform bespoke testing upon Customer's request and according to the Customer specifications. Performance testing is subject to Additional Charges and will be indicated in the Purchase Order.

Where the Parties agree that Performance Testing can be carried out this will be in the form of an end to end RFC2544 test, which is the Ethernet industry testing standard. The Customer will also receive a Performance test report as part of the Service Handover Document.

Appendix 1 - Intercity RTD for Carrier Ethernet Services target table

The target monthly average Round Trip Delay (RTD) will be measured in milliseconds between Interoute core Nodes. The results are reported for every five (5) minute period on My Services.

The following target average Round Trip Delays shall apply between each Interoute core Node in the listed cities as detailed in the table below. Latency calculations are based upon round trip delay over the course of one (1) calendar year.

Latency PA/ms	London	Paris	Frankfurt	Barcelona	Amsterdam	Geneva	Milan	Marseille	Madrid	Stockholm	Istanbul	Warsaw
London	0.53	7.88	11.98	23.66	6.47	17.12	20.31	19.25	24.03	34.21	51.65	30.57
Paris		0.53	9.55	16.19	9.57	10.28	15.31	12.12	20.38	32.74	44.93	30.30
Frankfurt			0.53	22.65	7.37	10.24	10.09	16.08	24.10	27.20	38.99	23.41
Barcelona				0.53	25.22	14.25	15.77	8.16	9.33	48.38	54.34	42.13
Amsterdam					0.53	16.63	17.14	21.05	26.28	27.24	45.82	24.96
Geneva						0.53	8.14	7.47	22.65	36.09	42.82	30.56
Milan							0.53	9.07	24.31	36.15	39.08	27.06
Marseille								0.53	16.25	42.65	47.42	35.32
Madrid									0.53	49.00	62.62	49.40
Stockholm										0.53	64.42	30.94
Istanbul											0.53	42.57
Warsaw												0.53