



# Colt IP Access Service Guide

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## 1 IP Access Introduction

Colt IP Access provides a dedicated permanent access to the public Internet. Colt IP Access allows customers to connect business sites of all sizes to the Internet easily, efficiently and securely with guaranteed IP bandwidth.

Colt's ability to provide end-to-end managed networks ensures that we can offer a high quality, cost-effective solution backed by comprehensive service level agreements (SLAs) and award-winning customer service.

A number of additional services are available to further tailor the service to the customers' requirements. These services include basic features such as domain registration and managed router as well as more complex backup and high availability solutions.

The security add-ons include virtual and physical fire walls and a sophisticated protection from distributed denial of service (DDoS) attacks.

## 2 Benefits

Colt IP Access provides extensive coverage, reliability and a range of cost-effective connectivity options.

### 2.1 Extensive network reach

With one of the largest networks in Europe and Asia Colt can deliver IP Access directly to customer premises in major European and Asian cities, to all of our Data Centres and to locations around the world through partnership agreements. In many cases, the IP Access service will be delivered end to end over our own network, ensuring the highest quality and availability at all times.

### 2.2 IP backbone

Our backbone has an overall capacity of multiple 100Gbps and a level of saturation that is constantly kept under 70% on each route.

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Colt is present in the main public European and Asian Internet exchange Points (IXPs): Amsterdam (AMS-IX), Frankfurt (DEC-IX), London (LINX), Paris (PAR-IX) and Tokyo (JPIX) with multiple 10Gbps interconnections. Colt is also present in main public country level IXPs (for example, MIX in Italy) with multiple 10Gbps interconnections.

Furthermore, we have direct private interconnections with the main incumbents, Tier 1 operators and content providers. Minimum interconnection size is 10Gbps. We have two quality upstream providers to reach American and Asian routes.

All the mentioned interconnections are geographically diverse, leading to redundancy and reliability. The overall saturation of these interconnections is around 30%, allowing Colt to grow with its customers' business and provide the best possible performance.

## 2.3 Reliability

With target availability up to 99.99%, the Colt network is extremely reliable. Enhanced resilience options enable customers to further ensure that their Internet access, either from the customer premises or from any rack located in any of the Colt connected data centres, is not interrupted.

## 2.4 Scalable and complete range of cost-effective connectivity options

Colt offers a wide range of flexible and cost-effective connectivity options so that customers can seamlessly connect headquarters and branch sites to the Internet.

IP Access offers highly granular choice of bandwidths, allowing customers to purchase only the bandwidth they require.

Customers are able to increase or reduce their bandwidth requirements to suit their business and application needs.

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## 2.5 Flexible billing

Colt is able to bill the IP Access service using the traditional Flat Fee or different Usage-based Billing (UBB) methodologies.

## 2.6 A modular approach

Colt offers a complete set of features, options and add on products.

IP Access is optionally available with a fully managed and supported Colt router. A range of resilience options are available to ensure continuous connectivity to the Internet. Security services to protect customer network are only a few examples.

Customers are able to customise their service and take advantage of only the features they require with the flexibility of adding to these whenever they need.

## 2.7 Quality and service assurance

Colt offers an industry-leading SLA with the IP Access service covering service delivery, service availability and fault resolution. We are confident of the quality and reliability of our service and offer service credits if our service targets are not met

## 2.8 Outstanding customer service

With Colt's best-in-industry customer service, customers can be assured that their Colt IP Access service will be delivered on time. The customer network will be managed proactively and repaired rapidly should any faults occur. Our customer care centre provides support 24 hours a day, seven days a week. See "Service Assurance" section for more information.

## 3 Network Description

The Colt IP Access core network is highly resilient. The availability targets and assurances offered for each access type are detailed in the IP Access Service Level Agreement.

The customer site can be connected to the backbone IP network either directly using Colt Fibre, using DSL or via a third-party transmission link.

### 3.1 Colt network coverage

Our secure and reliable network provides unrivalled reach across 28 countries with fibre-based metropolitan area networks (MANs) in 48 major cities. More than 24,000 buildings are directly connected to this network.

### 3.2 Dedicated IP-based network

Colt has made a substantial investment in the creation of a dedicated IP-based network to provide flexible, scalable IP-based solutions to the mission-critical Internet needs of our customers.

The Colt network is designed to ensure optimal routing of international traffic. This dynamic design enables Colt to keep a customer's traffic on its own network as long as possible to provide the highest levels of resilience and performance. Colt is also a key participant in major European and Asian direct and indirect peering and partnership agreements, enhancing its capability to provide customers with the highest levels of service worldwide.

Colt has deployed and configured the latest technologies to offer Internet customers the highest levels of reliability and flexibility. The inner core (London-Paris-Amsterdam-Frankfurt) has been upgraded to 100GE.

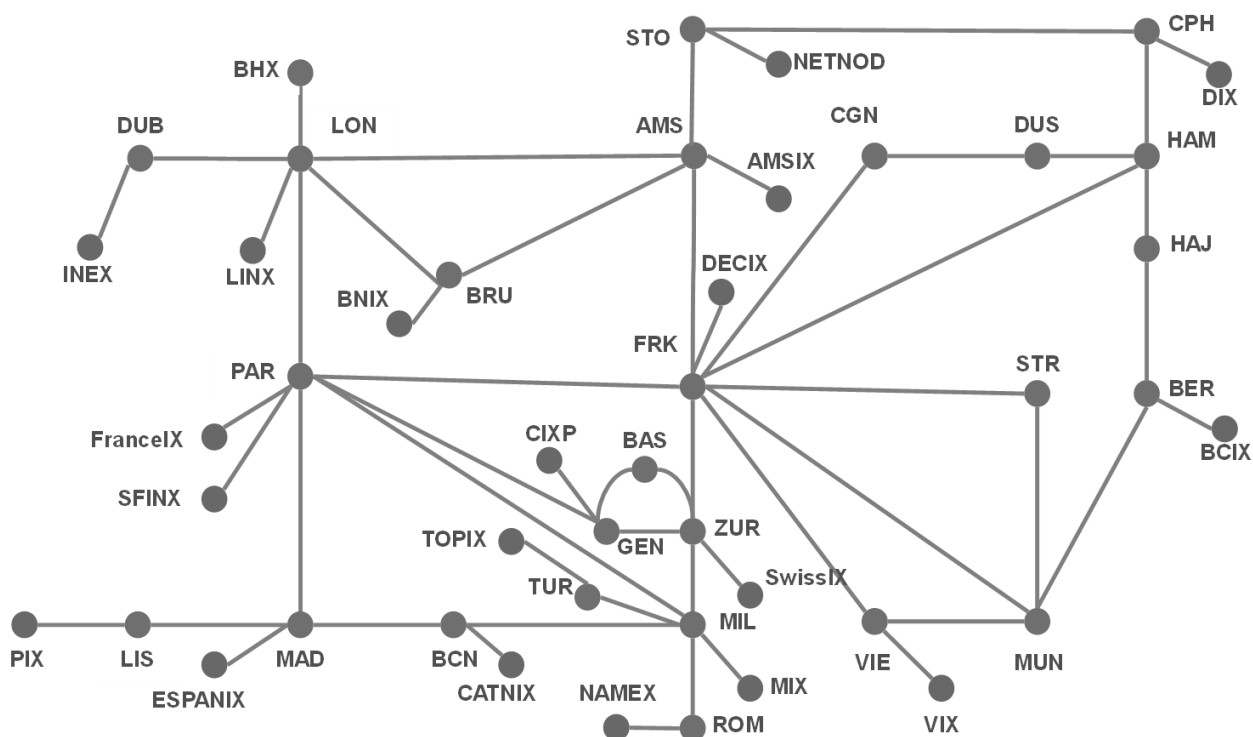
Colt's network comprises the following elements:

- **High bandwidth local access networks within each city** - These run at multiple 10Gbps. In countries where Colt has more than one city network, a national backbone network has been built connecting all local networks. Depending on the country this network runs at up to 100Gbps.



- **High capacity backbone** - The European and Asian network connects all Colt cities in Europe/Asia and is constantly managed and upgraded to ensure the capacity requirements from the access networks are met.
- **High bandwidth peerings** - Colt has peering with multiple operators in each major Colt city – overall Colt exchanges traffic at 20 public internet exchanges with more than 800 AS directly.

The following diagram shows Colt's network footprint in Europe: cities are referred to with a three character code (BHX for Birmingham, HAJ for Hanover, STR for Stuttgart), whereas the IX suffix stands for the local IXP. In Asia, Singapore and Japan (Tokyo and Osaka) Metropolitan areas are connected.



**Figure 1: Colt IP backbone**

In each city, Colt has access and core routers. Core routers are part of the backbone: in each city, a pair of core routers is deployed and connected together. No two routers go to the same city via the same path.

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Access routers are those in which customers are connected. Colt typically has several access routers in every city in order to be able to provide resilient services to customers. Any access router is always diversely connected to the two core routers in that particular city.

### 3.3 Network access

Colt has a comprehensive range of options for connecting the customer's sites to Colt's services. Whichever access method type is used, the solution will be created and managed by Colt under a single end-to-end Service Level Agreement.

The maximum bandwidth of Colt services using DSL and EFM depend on copper line distance. For all DSL types (for example, ADSL and SDSL), the maximum bandwidth depends on the length of the copper line between the PTT Central Office (CO) and the customer site. If the copper line length is longer, the maximum bandwidth is lower.

Therefore, the best maximum bandwidth is achieved if the customer site is very near the CO. Colt always lists the maximum bandwidth with minimal copper line distance. As a result, the maximum bandwidth can be lower than the listed bandwidth.

For ADSL, the download bandwidths (Colt network to customer site) above 2Mbps are mostly affected by the copper line length. For SDSL, the identical upload and download bandwidths are both affected by the copper line length. In general, bandwidths up to 2Mbps are possible if the copper line length is less than 2km.

In the case of ADSL and ADSL2+ lines in the UK, an additional line stabilization period of 10 days applies after delivery of the service. The purpose of the stabilization period is to optimize the line performance. During the stabilization period (especially during the first days), the line can be unstable and cause errors.

**Note:** For services delivered over DSL access technologies, the throughput achieved by an IP application may be lower than the advertised bandwidth due to the inherent nature of IP over DSL and its associated overhead.

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### 3.3.1 Colt access types

Colt's network connects fibre-based metropolitan area networks (MANs) in 48 major cities across 28 countries. More than 24,000 buildings are directly connected to this network.

To complement the coverage of this network and reach more buildings, Colt has invested in unbundled local loop (copper pair connections from the incumbent operator) with more than 600 central offices in 45 cities and 12 countries.

#### 3.3.1.1 Fibre

Colt's MANs deliver high capacity, high speed bandwidth services to Europe's and Asia major business centres, which are interconnected via a European or Asian fibre-optic network delivering high quality reliable services door to door.

#### 3.3.1.2 Unbundled local loop (ULL)

Colt uses unbundled local loop (ULL) to provide Symmetrical Digital Subscriber Line (SDSL) connections to customer sites. Colt owns the SDSL equipment with the copper provided by the incumbent PTT. The bandwidth provided is uncontended (bandwidth is not shared with other customers and therefore constant) and symmetrical (same bandwidths in both directions).

#### 3.3.1.3 Ethernet in the First Mile (EFM)

Colt also uses ULL to provide Ethernet in the First Mile (EFM) connections to customer sites. EFM is a cost-effective access technology based on Ethernet protocol that allows high bandwidth connections over (PTT) copper lines. Bandwidths are available at a maximum speed of 40Mbps, if the Colt service and the length of the copper line permits.

Colt is able to provide on top of the minimum required number of copper pair for the respective bandwidth an additional copper pair, so that there is a much higher resilience against any change of line quality or outage of a single copper line. This option is called EFM Enhanced Bandwidth Availability. If there are no increased requirements on the bandwidth stability or resiliency, the standard deployment is sufficient. The choice which provisioning rule should be applied for the respective site can be selected on the order form.

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### 3.3.2 Partner access types

Colt interconnects with and manages more than 85 partners in order to connect sites that are outside the reach of the Colt network in Europe or in other global locations.

Colt will order a circuit or circuits from the OLO on the customer's behalf, and customers will still be dealing directly with Colt at all times. Colt also takes responsibility for testing the interface between our network and the OLO's circuit to ensure that the customer's overall service operates seamlessly.

Customer sites can be connected through partner networks using the following access types.

#### 3.3.2.1 Fibre

Colt can provide Off-Net fibre-optic network connectivity on request and where available by connecting the customer's service to the fibre-optic infrastructure and services of several partners.

#### 3.3.2.2 Wholesale DSL (wDSL)

Colt interconnects with and manages 17 partners providing wDSL Off-Net coverage in 12 European countries. wDSL can be used to provide SDSL and ADSL access at Off-Net sites.

Note: If the contention ratio is not described in the bandwidth description, the contention ratio is not guaranteed. In other words, this implies a best effort service.

#### 3.3.2.3 Leased lines (SDH)

Leased lines are circuits or combination of circuits designated to be at the exclusive permanent disposal of a given subscriber. The interconnects to our partner networks consist of highly resilient, SDH-based Network-to-Network (NNI) connections.

#### 3.3.2.4 Ethernet tails

Both protected and unprotected Ethernet circuits can be used to extend Colt's network to customer sites. Partner services are technically validated for compliance with key Ethernet technology standards and Colt's own product specification.

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Integration is achieved using both simple cross-connected point-to-point services and Ethernet NNI connections. E-NNIs offer many advantages in terms of manageability, cost and deployment. Colt adheres to developing MEF standards and now has E-NNIs in the USA, Ireland, the UK, France, Austria, Spain, Germany, the Netherlands, the Czech Republic, Slovakia and Switzerland.

Colt uses Ethernet demarcation devices to provide sophisticated standards-based Operations Administration and Maintenance (OAM) end-to-end.

### 3.3.3 Colt IP Access network access

Colt IP Access can be provided to customer sites not directly connected to the Colt network using a mixture of Colt and third-party other licensed operator (OLO) infrastructure and services. These are integrated seamlessly and provide numerous benefits such as simplified management and provisioning, network transparency and a single point of contact.

## 3.4 Bandwidth options

Depending on the access type (Colt Fibre, OLO or DSL), access technology and the billing type (Flat or UBB 95th Percentile), different IP bandwidth ranges are available.

Colt Fibre including secure lease fiber in Asia (Japan and Singapore):

- 1-10mbps in 1mbps increments
- 20-100mbps in 10mbps increments
- 200-1gbps in 100mbps increments
- 2gbps-10gbps in 1gbps increments
- Best effort 100mbps shared with 100mbps uplink (Japan only)
- Best effort 1000mbps shared with 1000mbps uplink (Japan only)

Colt EFM ULL follows the same structure with a maximum bandwidth of 10mbps in Italy and 40mbps in all other countries.

Bandwidth available via OLO depend on the OLO provider and access type but are generally available up to 10gbps.

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The bandwidths are estimates and do not correct for the underlying access technology overhead or inefficiencies. For example, if SDH is the underlying access technology, then the IP packet throughput will be lower due to the protocol overhead.

DSL bandwidths depend on copper line distance. For all DSL types (for example, ADSL and SDSL), the maximum bandwidth depends on the length of the copper line between the PTT Central Office (CO) and the customer site. If the copper line length is longer, the maximum bandwidth is lower. Therefore, the best maximum bandwidth is achieved if the customer site is very near the CO. Colt always lists the maximum bandwidth with minimal copper line distance. As a result, the maximum bandwidth in a certain situation can be lower than the listed bandwidth.

For ADSL, the download bandwidths (Colt network to customer site) above 2Mbps are mostly affected by the copper line length. For SDSL the identical upload and download bandwidths are affected by the copper line length. In general, bandwidths up to 2Mbps are possible if the copper line length is less than 2km.

DSL bandwidths vary by country, ranging from highly contended ADSL speeds up to 40Mbps guaranteed bandwidth on Next Generation DSL.

## 3.5 Technical attributes

### 3.5.1 Access circuit type

#### 3.5.1.1 IP Access on Colt Fibre

IP Access is delivered on Colt Fibre Asia for buildings directly connected to the Colt Fibre network. In Colt Asia this definition includes lease fibre. There are two options for connecting a building to the Colt network:

- Single Entry (default) - The standard configuration is to provide single entry into the customer's building; the access circuit can optionally be provided via diversely routed circuits offering resilience after the single entry point

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- Dual Entry (optional) - A different possible configuration is for Colt to provide dual diverse entries into the customer's building, further enhancing the resilience by eliminating the single point of failure of the single entry. When dual entry into a building does not exist, there is an additional charge

### 3.5.1.2 IP Access on third-party OLO tails

IP Access on third-party OLO tails is logically equivalent to fibre access described in IP Access on Colt Fibre; however, it cannot be guaranteed that fibre access will be used by the third-party OLO tail provider.

### 3.5.1.3 IP Access on DSL

IP Access can be delivered on DSL (SDSL or ADSL) where available. IP Access on DSL provides cost-effective reliable access underpinned by a SLA.

This option is logically the same as the On-Net service, but the local loop from the nearest interconnection point to the customer's premises is provided by a third-party (usually the incumbent PTT). IP Access on DSL provides a low cost access method at various rates of contention (from fully guaranteed IP bandwidth to high contention ratios) for offices where OLO tails are prohibitively expensive. Availability must be checked and all orders are provisional until confirmed after testing and a Colt Promise Date (CPD) is issued due to the variation in local DSL availability.

Although DSL has excellent coverage, due to distance limitations, the exact speed and availability can be confirmed only after line testing has taken place and not at time of ordering. This means that orders are generally not confirmed until a CPD is issued, and any orders are provisional until DSL testing is confirmed. Delivery times are specified as indicative and, until a CPD is issued, the price and delivery mechanism may be subject to change.

Colt has invested heavily in DSL throughout Europe and can provide customers (depending on the exact location) with various DSL access mechanisms, ranging from low speed traditional ADSL or SDSL up to Next Generation DSL access capable of handling up to 40Mbps and more of symmetrical, fully guaranteed IP bandwidth.

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## 3.5.2 Access technology

### 3.5.2.1 Delivery on Colt Fibre

There are two standard delivery mechanisms used on Colt Fibre, both of them based on Ethernet.

- Via Colt MSP: MSP is Colts standard Multi Service Ethernet platform. All IP Access up to 1gbps will be delivered via MSP.
- Dedicated fibre: Above 1gbps Colt will use a dedicated fibre from the customers premises to the nearest IP provider edge router

A Colt managed router is optional and will either be provided via a physical Layer 3 Router from Cisco or via a virtual routing instance on the PE-Router.

Note that for the Ethernet access line delivery the circuit should always be terminated on a routing function. If no Colt managed router is being ordered this routing function needs to be implemented by the customer. The routing function can be provided by a router or by a firewall acting as a router (defining a segment on the WAN and not in transparent mode).

### 3.5.2.2 Delivery on OLO tail

Depending on the options available to connect customer sites, traditional leased lines from an OLO provider or Ethernet-based OLO tails can be used. The technology used by the OLO and levels of resilience and availability may differ from country to country. A Colt managed router is optionally available.

### 3.5.2.3 Delivery on DSL

Depending on the location, Colt is able to offer Asymmetric DSL (ADSL), Symmetric DSL (SDSL) or Next Generation SDSL (EFM). Unlike MSP technology, DSL does not include any intrinsic resilience. Except if explicitly noted otherwise, the DSL circuit does include by default a Colt managed router that also integrates the DSL modem function.



### 3.5.3 Connectors and interfaces

There are different choices for the connector and interface depending on the access type, access technology and the inclusion or exclusion of a Colt managed router. Please see the following table for details. Standard Interfaces are **bold**.

	Access type	Access technology	Max. Interface bandwidth	without Colt Router (unmanaged)		with Colt Router (managed)	
				Interface	Connector	Interface	Connector
FIBRE	Colt Fibre	Ethernet over MSP Up to 600mbps service BW	100Mbps	<b>10/100BASE-T</b>	RJ45	<b>10/100BASE-T</b>	RJ45
			1Gbps	<b>1000BASE-T</b>	RJ45	<b>1000BASE-T</b>	RJ45
				1000BASE-SX	LC or SC	1000BASE-SX	LC
				1000BASE-LX	LC or SC	1000BASE-LX	LC
	Ethernet over Fibre	1Gbps	<b>1000BASE-T</b>	RJ45	<b>1000BASE-T</b>	RJ45	
			1000BASE-SX	LC or SC	1000BASE-SX	LC	
			1000BASE-LX	LC or SC	1000BASE-LX	LC	
		10Gbps	10GBASE-SR	LC or SC	10GBASE-SR	LC	
			10GBASE-LR	LC or SC	10GBASE-LR	LC	
	OLO	TDM/SDH	2Mbps	G.703	RJ45	<b>10/100BASE-T</b>	RJ45
			Nx2Mbps	NxG.703	NxRJ45		
			34Mbps	G.703	BNC		
45Mbps			G.703	BNC			
			G.957	LC or SC			
155Mbps				<b>10/100BASE-T</b>	RJ45		
				1000BASE-T	RJ45		
				1000BASE-SX	LC		
				1000BASE-LX	LC		
Ethernet Olo		100Mbps	<b>10/100BASE-T</b>	RJ45	<b>10/100BASE-T</b>	RJ45	
	1Gbps	<b>1000BASE-T</b>	RJ45	<b>1000BASE-T</b>	RJ45		
		1000BASE-SX	LC or SC	1000BASE-SX	LC		
		1000BASE-LX	LC or SC	1000BASE-LX	LC		
	10Gbps	10GBASE-SR	LC or SC	10GBASE-SR	LC		
		10GBASE-LR	LC or SC	10GBASE-LR	LC		
DSL	ULL	Ethernet (EFM)	100mbps	NOT APPLICABLE (always includes CPE)		10/100BASE-T RJ45	
	wDSL	ATM	100mbps				
		L2TP (IP)	100mbps				

Table 1: Interfaces

### 3.5.4 Equipment and power supply

Depending on the router type, only AC, or AC/DC power options might be available. AC power is the default for all deliveries, whereas the DC power is available as an option, with a premium pricing.

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If the customer has a resilient AC power supply (for example, UPS) Colt will try to get a feed to run the AC equipment. DC batteries are available when a Colt rack is delivered.

If delivered as a physical device the Colt managed router can be of two types:

- For built-in rack
- As desktop box

For Ethernet over OLO SDH, there is normally a Colt rack at customer site to house the Colt equipment (included in the service). For delivery via DSL (ULL or wDSL) or OLO (except Ethernet), there is no Colt rack at the customer site as standard.

In case a rack-mountable Colt managed router is delivered, the router needs to be put in a rack (either the customer's or Colt's). In those cases where no Colt rack is provided, there shall be a customer rack available.

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## 4 Features

### 4.1 Billing models

#### 4.1.1 Fixed (Flat Fee)

Fixed (Flat Fee) billing is the traditional and default method of billing for IP Access: the customer pays for the level of bandwidth they subscribe to, no matter what their usage profile and/or actual bandwidth consumption is.

Fixed (Flat Fee) billing is available on all access circuits and compatible with all features and bandwidths.

#### 4.1.2 Usage-based Billing (UBB 95% PP)

With UBB, additional bandwidth is available if needed, so in high traffic situations, customers will have the capacity that they need to enable them and their business to operate without problems. For UBB 95<sup>th</sup> Percentile, billing samples are taken at five minute intervals in order to determine the Incoming and Outgoing bandwidth consumption of the customer.

#### Definitions:

- **II and OI**, being "I" the sample sequence: the Incoming and Outgoing samples. In a month, there are  $(60/5) \text{ minutes} * 24 \text{ hours} * 31 \text{ days} = 8928$  samples in every traffic direction (assuming a month of 31 days)
- **CBW** - Committed Bandwidth - is the bandwidth (expressed in Mbps) the customer pays for regardless of usage. A Flat Fee is linked to this CBW in the pricing, called "CBW Flat Fee", expressed in Currency/month
- **EBW** - Excess Bandwidth - is the bandwidth (expressed in Mbps) calculated by the 95% method in order to check if and how much the customer has bursted above the CBW. There is a charge associated per Mbps of EBW, called "EBW Fee per Mbps", expressed in Currency/Mbps/month. The EBW is calculated by sorting the inbound and outbound traffic samples from a whole month from biggest to smallest and then discarding the top 5% biggest

samples from both Incoming and Outgoing traffic. The next largest sample of both inbound and outbound is used to calculate the usage charge. These are denoted as the next largest samples in the incoming direction I95% and in the outgoing direction O95%

- **I95%** : expressed in bits/second
- **O95%** : expressed in bits/second
- **BBW** - Maximum Burst Bandwidth - is the maximum bandwidth up to which the customer can burst

### Calculation method

Charges are based on two elements: a fixed charge corresponding to the customers' minimum monthly bandwidth commitment (CBW) and a usage charge for the excess bandwidth above the committed (EBW).

If  $\{[(\text{MAXIMUM}[I_{95\%}, O_{95\%}])] / (1024 \times 1024) - \text{CBW}\} > 0$  then

Monthly Rental Fee = (CBW Flat Fee)

+

$\{[(\text{MAXIMUM}[I_{95\%}, O_{95\%}])] / (1024 \times 1024) - \text{CBW}\} \times (\text{EBW Fee})$

If  $\{[(\text{MAXIMUM}[I_{95\%}, O_{95\%}])] / (1024 \times 1024) - \text{CBW}\} \leq 0$  THEN:

Monthly Rental Fee = (CBW Flat Fee)

In general, UBB 95<sup>th</sup> Percentile is not available on:

- 2Mbps
- Nx2Mbps
- DSL Access Type
- Best effort 100mbps, 1000mbps
- Any services in Singapore

Availability does not depend on the presence of a Colt managed CPE. For the bandwidths offered with UBB 95<sup>th</sup> Percentile, the following applies:

- **CBW** - The Committed Bandwidth is determined by the customer in the order form.
- **EBW** - The Excess Bandwidth is calculated by the model following the UBB 95<sup>th</sup> Percentile method. It might be of any value between 0Mbps and 10Gbps
- **BBW** - The maximum Burst Bandwidth is either specified by the customer on the order form or if nothing specific is ordered determined as follows: BBW equals MIN (4 \* CBW, access line bandwidth)

## 4.2 IP addressing

### 4.2.1 Provider-aggregated IP V4 addresses (default)

Colt IP Access includes as default a range of fixed, dedicated provider-aggregated (PA) IP addresses as described in the following table.

Service	Supplied number of public IP addresses	Usable number of public IP addresses
IP Access	8	5
IP Access resilient dual access	16	11

**Table 2: IP Addresses**

Routing within Colt has been set up so that any PA address can be announced from anywhere. Most changes in access circuit do not impact IP addressing. If a customer migrates from DSL to Fibre (or vice versa), changes its infrastructure significantly or moves to a different country, there might be an impact on the IP addressing.

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More IP addresses can be provided on request and at an additional price. Note that a Réseaux IP Européens Network Coordination Centre (RIPE) approval might be required for larger number of IP addresses. Colt cannot guarantee the approval of any IP addresses because this is outside of our control.

#### 4.2.2 Provider-independent IP V4 addresses

It is possible to use existing provider-independent (PI) IP addresses for most of the access technologies offered.

If customers require a new PI address space, Colt will intermediate with RIPE. This process takes about six weeks. There is no guarantee that the request will be approved by RIPE.

The minimum number of contiguous IP addresses Colt will route is 256 (this is known as a /24 block). This is to avoid filtering of the customers address space and to keep the global routing table within limits. Colt cannot assure that the Internet community will allow /24 filtering in the future.

#### 4.2.3 IP V6 addresses

Colt IP Access is fully IPV6 enabled and offers IPV6 in either a dual stack configuration together with IPV4 or as IPV6 only. The standard number of provider aggregated IP V6 addresses delivered with an IP Access is a /48 subnet.

Similar to IPV4 it is possible for the customer to apply for provider independent IP addresses. Colt can help to facilitate this with RIPE on behalf of the customer.

### 4.3 Colt managed router

Colt can optionally supply, install, configure, manage and maintain the router as part of the service. The router is not leased or sold to customers but is provided as a Managed Router service. This also includes a fast replacement in case of failures in accordance with our SLA.

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Colt managed router is provided as a standard for DSL Access Type (both ULL and wDSL) and Resilience options.

The specific model to be used depends on a set of options/parameters related to the specific configuration needed by the customer.

Following recent technical development the router might be provided not via a piece of equipment at the customer's premises but in the Colt network. This so called virtual CPE or vCPE will work exactly as a physical device at the customer's premises.

#### 4.4 Colt Wires Only service

Note that although in some instances the Colt managed router may be optional, a routing function is required to terminate the IP Access. Directly connecting a service without managed router to the customer LAN is currently not supported. Issues with directly attaching the service to the customer LAN include:

- ARP spoofing
- Risk of MAC table flooding
- Risk of Layer2 floods (broadcast, multicast and so on)
- Impact of propagation of worms on the customer LAN

In summary, a routing function is always required, be it a Colt Managed Router, or a customer supplied and customer managed routing function.

#### 4.5 Network Address Translations (NAT)

Network Address Translation (NAT) is designed for IP address simplification and conservation as it enables private IP inter-networks that use non-registered IP addresses to connect to the Internet. NAT operates on a CPE and translates the internal network private addresses into public addresses to be used on the Internet. This provides additional security, effectively hiding the entire internal network from the world behind that address.

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Customers can choose to have NAT or No NAT. If they chose NAT, dynamic, static NAT and Port Address Translation (PAT) are supported.

Dynamic NAT is configured by default when a Colt managed router is provided.

## 4.6 DHCP server

Colt can provide Dynamic Host Configuration Protocol (DHCP) services. DHCP is a protocol that lets network administrators centrally manage and automate the assignment of IP configurations on a computer network. When a user logs onto the network, DHCP automatically assigns the user computer all the IP information required in order to access the corporate LAN and the Internet.

The DHCP Server feature offers the following benefits:

- Using automatic IP address assignment at each remote site substantially reduces Internet access costs - Static IP addresses are considerably more expensive to purchase than automatically allocated IP addresses
- Reduced client configuration tasks and costs - DHCP is easy to configure and minimizes operational overhead and costs associated with device configuration tasks and eases deployment by non-technical users
- Centralized management - The DHCP server maintains configurations for several subnets. An administrator only needs to update a single, central server when configuration parameters change
- DHCP is not configured by default

## 4.7 SNMP read only access

SNMP read-only access is optionally available and allows customers visibility inside the optional Colt managed router terminating at the IP Access circuit at the customer site. In general, the customer can analyse the LAN and the WAN interfaces and the view includes the Standard MIB-2 and Cisco environmental monitoring or equivalent.



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## 4.8 DNS services

DNS service is included in the IP Access, distinguished for reliability, performances and security:

### **Authoritative Name Servers**

Colt DNS service runs three authoritative name servers (ANS) located in London, Frankfurt and Paris. All local name servers have been migrated to the central ones, so even in the unlikely event of a catastrophic failure in the Colt network, one of the servers is reachable. Colt DNS service is designed to use the incremental zone transfer (IXFR) mechanism, which allows transferring just the changes occurred rather than the whole zone file to keep all the servers synchronized.

### **Recursive DNS Anycast Service**

Recursive resolvers are questioned every time someone enters a URL into a browser or an email program tries to deliver an email. It is practically impossible to use the Internet when a recursive resolver is down. That's why most operating systems allow entering a number of resolver IP addresses: if the first doesn't answer, a second or a third is asked. However, it might take up to five seconds to detect that a resolver is not working, making Internet browsing unbearable.

The user experience of web browsing heavily relies on how fast a response is achieved from these servers.

To overcome the problem, Colt keeps the first resolver's IP address up all the time, using anycast: an IP address can appear multiple times in a network and the request is always sent to the nearest resolver. If that fails the request is sent to the next one, using the same IP address.

Furthermore, Colt places the resolvers as close as possible to the customers so that the network latency is not a limiting factor. These servers can cache the records they get from the authoritative name server and so the second answer to these recursive resolvers comes out of the cache (that's why the resolvers are also referred to as Cache Name Servers – CNS

### **Security - Port Randomization Technique**

DNS services are core Internet services, which is why it is often the target of security threats, such as hacking. Recent findings have shown that it is quite easy to attack a DNS (for example, by getting an entry in the cache of a recursive resolver).

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The software used by Colt to deliver its DNS service uses Port Randomization Technique, widely recognized as a valid countermeasure against DNS attacks.

Customers can choose between:

- **Recursive DNS service** - Customers use Colt recursive resolvers
- **Authoritative DNS service** - Full domain name hosting and DNS services on secure, resilient name servers. Colt can provide these DNS services both for a domain name transferred to Colt or a new domain registered on behalf of the customer by Colt

The Authoritative DNS service comes in different flavours :

- **Colt as primary and secondary DNS** - Customers will not have additional server requirements or management: Colt will host and administer the domain on the customer's behalf
- **Colt as secondary DNS only** - An economical and reliable way of increasing the fault tolerance of the customer's DNS solution: if customers already have a primary DNS server, Colt can act as the secondary DNS for the customer. Colt will provide Secondary DNS resolution for up to 10 forward zones (DNS Authoritative Slave) free of charge

Hidden and Reverse DNS options are also available in case the customer wants its name server to act as Primary DNS with only the Colt name servers shown or needs the resolution of IP Addresses into domain names.

Recursive DNS service is the default option and is enabled for all customers. Authoritative DNS services are available with the IP Domain add on, with the only exception of the Secondary DNS.

## 4.9 Autonomous system (AS) number

An autonomous system (AS) is the unit of router policy. This consists of either a single network or a group of networks that is controlled by a common network administrator (or group of administrators) on behalf of a single administrative entity (such as a university, a business enterprise or a business division). An autonomous system is also sometimes referred to as a routing domain. An autonomous system is assigned a globally unique number, called an Autonomous System Number (ASN).

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Colt can help the customer obtain their own AS number. This process takes about six weeks and there is no approval guarantee. Colt will make a charge to the customer for completing the required forms and checking on the progress of the request.

#### 4.10 Border Gateway Protocol (BGP-4) feed

Customers who have their own registered IP address block (provider-independent IP addresses) as well as their own autonomous system (AS) use BGP-4 as a routing protocol with other ASes.

Colt can provide a BGP-4 feed (containing all or part of the BGP routes of the Internet).

The BGP-4 Feed may allow the customer to have multiple connections to the Internet and to autonomously manage its routing through AS path pre-pending, Multi-Exit Discriminator (MED). This is in cases where he has more than one access route to the Colt IP network, use of communities and BGP authentication.

The BGP-4 feed is not available on all access technologies: the BGP-4 feed in itself does periodically consume bandwidth on the access circuit and is not suitable for DSL and small bandwidths (below 2Mbps).

#### 4.11 Simple Mail Transport Protocol (SMTP) services

Colt offers optional SMTP Mail Relay (service for outgoing email) and SMTP Mail Backup (service for incoming email) services with IP Access. SMTP is a protocol governing electronic mail transmission and reception for customers managing their own mail servers.

**SMTP mail relay** service is optionally available. Note that the SMTP mail relay service is not intended for large mass mailings.

Colt can also provide a secondary **SMTP mail backup** server to help store incoming email in the event that the customer's primary SMTP mail server is not reachable for any reason. After the primary mail server is reachable again, all stored mail for the customer's domain will be delivered to the primary mail server. Colt's backup SMTP server will continue to attempt to deliver stored mail for a period of seven days. There is a per message size limit of 42MB. While Colt dimensions its backup mail servers

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to cope with predictable mail volumes, there is no guarantee that all customer email can be stored for seven days (for example, in case a huge amount of spam is directed to the customer).

Mail backup is available as an option but will not be configured by default, since these services have been abused recently by spammers. These servers have to accept mail for the customer domain at any time and can probably accept more than the customer's mail server can handle, this can bring the customer mail server to a halt. This issue is general and not specific to Colt.

If customers wish to implement spam filtering/blocking, Colt does advice against using the mail backup service because Colt cannot rebuild the customer implementation and thus might deliver the spam mail that the mail server had already rejected.

Note that in any case, open relay SMTP mail servers are not allowed (SMTP servers accepting all email instead of only accepting the domains under their ownership).

## 5 Internet Access Services add on products

### 5.1 IP Domain Overview

Colt provides one (1) free domain name with the service. This domain can either be the registration of a new domain name or the transfer of an existing domain name. This domain name is limited to:

- A country specific domain extension from an extended Colt country (see following table); OR
- One of the following generic top level domains: com, org, net, biz, info, mobi, eu, asia

The Colt IP Domain Registration service includes:

- Domain registry administration
- Ongoing billing and renewal costs with no hassle for the customer

<b>Antigua and Barbuda</b>	ag
<b>Austria</b>	at
<b>Belgium</b>	be
<b>Switzerland</b>	ch
<b>China</b>	cn
<b>Czech Republic</b>	cz
<b>Denmark</b>	dk
<b>Germany</b>	de
<b>Spain</b>	es
<b>Finland</b>	fi
<b>France</b>	fr
<b>Greece</b>	gr
<b>Hungary</b>	hu
<b>Ireland</b>	ie
<b>India</b>	in
<b>Italy</b>	it
<b>Japan</b>	jp
<b>Liechtenstein</b>	li
<b>Luxembourg</b>	lu
<b>Netherlands</b>	nl
<b>Norway</b>	no
<b>Poland</b>	pl
<b>Portugal</b>	pt
<b>Singapore</b>	sg
<b>Sweden</b>	se
<b>Tuvalu</b>	tv
<b>United Kingdom</b>	uk
<b>United States of America</b>	us
<b>Western Samoa</b>	ws

**Table 3: Domain Names**

Additional domain names or other domain name extensions that are not generic top level domains or described in the table can be registered via Colt or transferred to Colt via the Internet Access Services add-on IP Domain product. The list of possible domain extensions is included in the IP Domain order form.

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If customers cease the service, then they must transfer all domains to another ISP. Note that Colt cannot guarantee the availability of a specific domain name because this is entirely outside of our control.

The registration needs to be in accordance with the domain issuing authority's rules of the domain. Colt cannot be responsible or intervene in respect of any claims arising from registration of domains on the customer's behalf. Customers should ensure that they have carried out relevant checks or received all relevant authorisations with respect to any domain names that they wish to procure.

**Please note:** If Colt does not host your domain name, we will not provide any DNS management for your domain.

## 5.2 Colt Security services

### 5.2.1 Managed Dedicated Firewall Overview

Colt Managed Dedicated Firewall (MDF) protects your mission-critical networks and application services from compromise and helps prevent intrusions from hackers, viruses, worms and other web-borne threats.

MDF includes a customer-dedicated firewall appliance on customer site, maintained and remotely managed by Colt. It comprises installation, operation and maintenance of hardware, software and policies.

Customers will be able to benefit from the management and monitoring performed by Colt Solution Management Centre (SMC), Security Operations Centre (SOC) and Colt Operation 24 hours a day, seven days a week. The Colt SOC uses vast security expertise from the Security Operations Centre's Security Threat Intelligence programme thus securing customers' business communications infrastructure.

In order to keep the firewall under control as a whole, easily accessible web-based reporting is provided. This covers the security policy deployed, statistics reports on the firewall activity, events viewer and the health of the firewall's performance. The MDF is available in four different variants, with the option of configuring Active/Standby High Availability to get a higher level of reliability.

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## 5.2.2 IP Guardian Overview

Colt IP Guardian offers enhanced protection against Distributed Denial of Service attacks (DDoS). While Colt is constantly protecting its backbone IP network, we can specifically monitor IP Access for any potential DDoS attack. When an attack on IP Access is detected, filtering actions are taken (including dropping of suspicious traffic) in order to protect access to the Internet.

Since IP Guardian is a network function as opposed to a CPE-based function, this monitoring and filtering is done within the Colt backbone network long before the attack traffic reaches and overwhelms the customer's access circuit, at which point it would be too late to take any action.

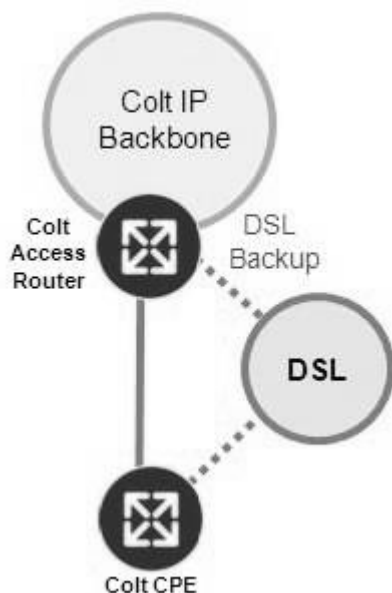
## 5.3 Enhanced availability

### 5.3.1 DSL backup

Colt can deliver backup of the primary Colt access circuit with a Colt-delivered DSL backup.

The DSL card is included in the Colt managed CPE. This card in conjunction with the DSL line supplied by Colt will automatically be used in the event of a failure on the customer's primary path to the Internet. Once the primary path is re-established, the DSL line will revert to backup status and the primary path is used again for all traffic.

A Colt managed router on the customer site is mandatory for this service option and Colt must be able to deliver a DSL circuit on the customer site. This enhanced availability allows backup only and does not enable load sharing. A Colt DSL backup is optionally available for primary access sites with a maximum of 16Mbps IP bandwidth on the primary access circuit. Rerouting time can take up to 180 seconds.



**Figure 2: DSL backup**

### 5.3.2 Resilient dual access

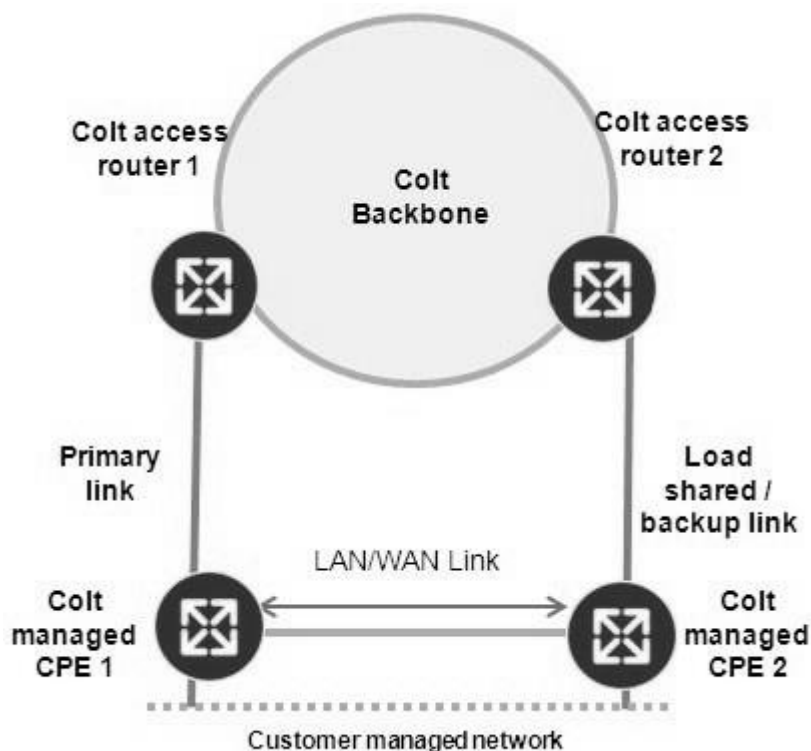
If the Internet is business-critical, Colt offers the fully managed option Resilient Dual Access. The basic goal of a Resilient Dual Access service is to exclude all single points of failure. This is basically achieved by making all involved devices and links redundant.

Resilient Dual Access provides a fully managed service with two managed CPE routers and two access circuits that are, as much as possible, diversely routed. In cities where Colt has multiple IP Points of Presence (PoPs), the two IP access circuits are terminated at different PoPs. In case Colt has only one PoP but two backbone IP routers, the circuits will be terminated on different backbone routers.

There is a choice between backup and load sharing:

- **Backup** - If the primary circuit fails, all traffic will be routed via the secondary route
- **Load sharing** - If one path fails, all traffic will continue over the other path. This feature enables customers to use the primary and secondary circuit at the same time, optimizing available bandwidth





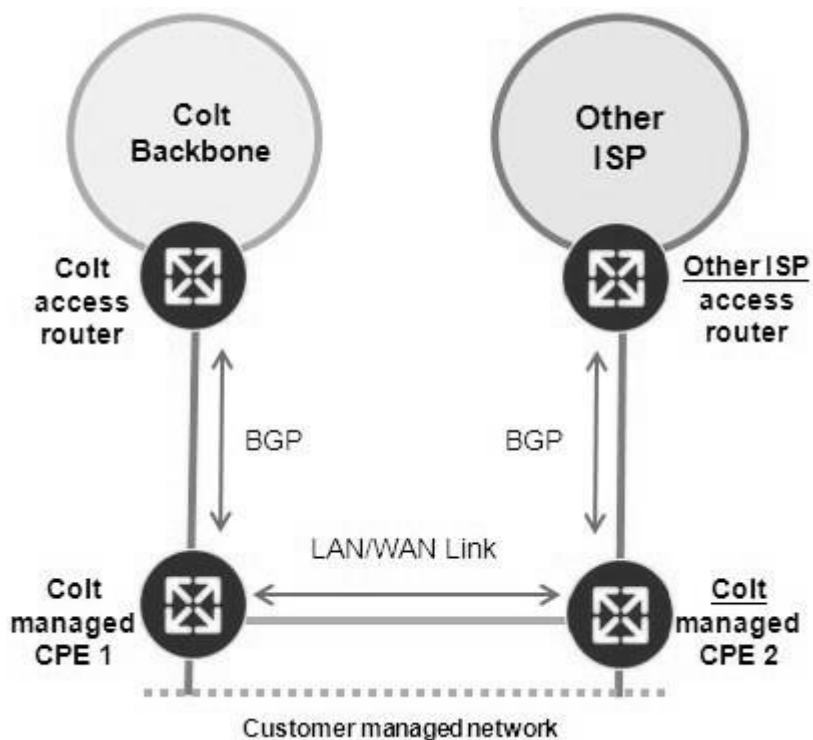
**Figure 3: Resilient dual access**

### 5.3.3 Resilient multiple ISPs

For customers requiring a fully managed service but with connectivity to two different ISPs (Colt and a third-party ISP) for ultimate resilience, the Resilient Multiple ISPs service is offered. Colt provides:

- One Colt-delivered and managed access circuit to the public Internet
- Two Colt managed routers (mandatory). One CPE router will terminate the Colt IP access circuit, the other CPE router will terminate the third-party ISP
- delivered Internet access circuit

Colt thus integrates the third-party Internet access circuit in its own service, providing one integrated, fully managed service to the customer. Unlike the Resilient Dual Access service option, this third-party ISP circuit is totally independent of Colt.



**Figure 4: Resilient multiple ISPs**

### 5.3.3.1 Summary

The following table summarizes the main dependencies/compatibilities for the resilience options. Limitations apply to the access technology that can be used for Primary and Secondary Circuit (either backup or load sharing).

Resiliency Option	Dependency/Compatibility
DSL Backup	<ul style="list-style-type: none"> <li>• Colt managed CPE required</li> <li>• Not compatible with BGP4 Feed</li> </ul>
Resilient Dual Access "Primary and Backup"	Colt managed CPE required Not compatible with VoIP Access
Resilient Dual Access "Load Shared"	Colt managed CPE required Not compatible with:

	<ul style="list-style-type: none"> <li>• VoIP Access</li> <li>• UBB</li> <li>• NAT</li> <li>• NxE1 Access</li> <li>• DSL Type Access except EFM</li> </ul>
Resilient Multiple ISPs “Primary and Backup”	<p>Colt managed CPE required</p> <p>Not compatible with VoIP Access</p> <p>Customer needs his own AS and PI IP Addresses</p>
Resilient Multiple ISPs “Load Shared”	<p>Colt managed CPE required</p> <p>Not compatible with VoIP Access</p> <p>Customer needs his own AS and PI IP Addresses</p>

**Table 4: Enhanced Resiliency**

## 6 Coverage

### 6.1 Colt countries

The service is available as standard and, depending on the availability, offered on Fibre, OLO or DSL in the following Colt countries: Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, Switzerland, UK, Luxembourg in Europe, Japan and Singapore in Asia.



**Figure 5: Colt countries in Europe**

## 6.2 Other countries

In general, outside Colt countries and Luxembourg, the services can be offered based on long-lining to the nearest PoP. If there is the necessity to connect a remote location that is part of a larger network Colt can also facilitate a 3<sup>rd</sup> party worldwide.

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## 7 Security

The physical security of our buildings is tightly controlled and access is strictly limited to authorised personnel only. All areas within Colt buildings are secured by means of an electronic access control system to ensure that access is controlled. All people must hold an appropriate pass card while on Colt premises. Non-Colt personnel are not allowed on Colt premises without specific authorisation and prior arrangement. Guests must be vouched for by a Colt host or verified by security in buildings.

In addition, Colt complies with all applicable data legislation.

## 8 Service Delivery

### 8.1 New service order

A new service order is the initial provision of the service to the customer premises, including the initial configuration of the network to the specification provided in the order form.

The customer may place orders for the service via their account executive and/or local customer care unit. Any orders should be placed using the standard Colt order forms. It is important that this form is used as all the information requested on the form is critical for the provision of the service. Non-completion of (or incomplete information on) this form will result in the order being delayed.

During provision, customers will be provided with regular updates via the customer care unit and/or account executive.

A number of visits shall be made to the customer premises during the provision phase. It should be noted that the service is ready only when notified by customer care through issue of a handover document.

The standard lead time for the service is mentioned in the Service Level Agreement. Where buildings are not currently connected, a feasibility check is required which results in either a rejection of the order or a Colt Promise Date (CPD). This is based on purely economic grounds that will consider the overall value of the customer to Colt.

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## 8.2 Fast track installation

Fast Track allows customers to expedite delivery of their order and receive their service on a date specified by the customer (generally prior to the standard lead time), or, if this date is not possible, on the earliest possible date.

Fast Track installation is available for all On-Net sites in all Colt geographic locations. If Fast Track is possible, Colt will provide a Fast Track delivery date based on technical feasibility, which customers can accept or reject. If accepted, the Fast Track option incurs an extra charge in addition to the standard installation fee.

Consult a Colt Account Executive for more information.

## 8.3 Modifying an existing service

Modifying an existing service consists of the subsequent enabling or disabling of service features, functions and interfaces as well as service changes following initial installation, which are chargeable items.

Following provision and installation of the IP Access service, customers can ask Colt to enable additional features, functions and interfaces, and request changes to the service. The implementation of most changes is chargeable, and some changes may mean that revised rental charges apply. Changes fall into the following categories: A, B and C.

- **Category A modifications** - Modifications that require physical changes to the equipment delivering service. Examples include increasing the size of the access line to accommodate increases in IP bandwidth that exceed the bandwidth of the existing access line. This is regarded as a new provision in terms of lead times. These changes are priced on application
- **Category B modifications** - Configuration changes include modifications that can be done remotely. Examples are changes in service bandwidth that do not require physical changes to the access port

**Note:** For a change of service bandwidth not requiring a physical change to the access line, bandwidth charges are subject to a minimum 30 day charging period. If customers request a reduction in bandwidth at a particular site, the charge will decrease only after 30 days have elapsed from the

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previous change. For an increase in IP bandwidth, the increased rental charge will apply immediately. These modifications may result in a one year extension to the existing contract

- **Category C modifications** - Emergency out-of-hours configuration changes (for example, Category B modifications outside normal working hours). These are subject to higher charges than normal Category B changes

## 8.4 Out-of-hours changes

Changes that need to be handled out-of-hours must be scheduled and approved in advance, and there is a two-week lead time for scheduling them. (This does not apply to emergency changes.) Ask a Colt Account Executive for more information.

## 8.5 Cessation of service

Cessation of service is within 60 working days from request by the customer. Request for cessation of service may be subject to a charge in accordance with Colt standard terms and conditions. Should the customer cancel their order during installation, Colt reserves the right to raise a charge.

## 8.6 Demarcation point

The demarcation point for Colt services is the customer interface at the Colt access equipment (normally at the base of the Colt cabinet). If customers require in-house cabling from the Colt cabinet to their equipment, this will be a chargeable service.

If Colt installs cabling on customers' behalf, the demarcation point remains the same: the base of the Colt cabinet. Colt is not responsible for fault-finding on the in-house cabling.

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## 9 Service Assurance

Colt provides a high level of service assurance:

- The complete network is proactively monitored
- A local language help desk is available 24 hours a day, seven days a week
- Colt Online provides a web-based portal that enables customers to view bills and trouble tickets

### 9.1 Customer service

Colt has a high quality European fibre network that enables the provision of an annual target service availability. The target availability depends on the service taken and the location of customer sites. The fault help desk is available 24 hours a day, seven days a week. Customers can report a fault at any time by contacting the Customer Service Centre and speaking to a representative in their local language.

When service is provisioned, customers are issued with a unique service reference for each circuit that they should always use when reporting faults. The contact number for fault reporting is specified in the handover pack.

### 9.2 Colt Online

Colt Online is an intuitive, user-friendly application enabling new and existing Colt customers to interact with Colt via a secure Internet connection without the need to speak to a Customer Service Agent or Account Executive.

Every Colt Online customer is provided with an administrator account for a defined user within their organisation. This administrator has full access to the available features for all their customer accounts and sub accounts, including:

- Search and view any bill from the previous six months in .pdf format (not available in Switzerland due to data protection legislation)



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- View the status of any order in the delivery process
  - View the status of any ticket (covering faults, enquiries, service requests) in real-time
  - Search and view all live services
  - View an account dashboard, summarising the four features above

### 9.3 Proactive service monitoring and notification

The Colt network is proactively monitored and maintained by Colt. Customers with managed router will be informed via email and text message in case of an outage or service degradation. Colt will open a trouble ticket.

### 9.4 Planned maintenance

When planned works are required, the customer will normally be notified in advance as per the following timelines:

- **Five working days** - Non-Service-Affecting planned works and standard planned work (routine maintenance)
- **15 to 17 days** - Service-Affecting planned works

Typically, planned works occur after 20:00 GMT on weekdays in Europe, and 22:00 local time on weekend in Asia. For emergency changes, Colt endeavours to give four working days' notice; however, on some occasions, this is not viable and the work will be done in much shorter timescales with supporting justification and reasons.

### 9.5 Service Level Agreement (SLA)

Colt offers a comprehensive SLA with the IP Access service that provides service credits if targets specified in the SLA are not met. Our high quality European fibre network enables us to provide an annual service availability of up to 99.99% for the high availability resilient dual access IP Access service. Please see the Colt IP Access Service Level Agreement for more detailed information.

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## 9.6 Denial of Service (DoS) attacks

Colt has implemented different solutions to prevent DoS attacks proactively:

- Strong filtering at the routing tables to prevent routing to RFC 1918 and RFC 3330 prefixes

**Note:** RFC1918 prefixes are used for private addressing (10/8, 72.16/12 and 192.168/16 prefixes) whereas RFC3330 prefixes are specialized address block (for example, 0.0.0.0/8. Addresses in this block refer to source hosts on this network). More details can be found at <http://tools.ietf.org/html/rfc1918> and <http://tools.ietf.org/html/rfc3330>.

- Strong filtering at the edge to prevent the forwarding of packets with RFC 1918 and RFC 3330 source addresses
- Strong filtering from the customers to prevent the forwarding of packets with source addresses others than the customers prefixes (unicast RPF where doable and RIPE based BGP announcement filtering)

Colt also filters all traffic toward the core network using infrastructure access lists (ACLs).

Therefore, it is not possible to speak with the Colt core network from outside.

The implemented solution to proactively detect and mitigate DDoS attacks is based on a market leading technical platform. The entry point of the attack into the Colt network is known immediately and one of the following actions is then taken:

- Route to Null 0
- Reroute via the DDoS protection platform

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## 9.7 Performance reporting

Online service performance and service management reports are available as part of the IP Access service. Customers can access these reports at any time for indicative information on how their network is performing.

These reports include IP bandwidth utilisation graphs for the near real-time and historic utilisation, packet drop graphs and others. For more information, please see the Colt IP Access Performance Reporting User Guide.

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## 10 Certifications and industry standards

Colt is dedicated to ensuring that our management systems adhere to the widely accepted International Standards Organisation (ISO) and British Standards Institute (BSI) standards.

Colt holds the following certifications:

- **ISO 14001** - Internationally accepted standard that sets out a framework of essential elements for putting an effective Environmental Management System (EMS) in place. The standard is designed to address the delicate balance between maintaining profitability and reducing environmental impact. This certificate is held for all Colt countries and helps us to identify the impacts that our operations have on the environment and then plan how we will reduce our most significant ones. It also ensures that we comply with all environmental regulations in each country we operate
- **ISO 9001** - The world's most established quality framework that sets the standard not only for quality management systems, but management systems in general. Colt holds this certification for the provision of service management for all Colt Data, Voice and Network Services, plus management of the Colt core network, backbone, switches, routers, infrastructure and associated systems
- **ISO/IEC 27001** - The only auditable international standard that defines the requirements for an Information Security Management System (ISMS). The standard is designed to ensure the selection of adequate and proportionate security controls, and also formally specifies an Information Security Management System (ISMS) that is intended to bring information security under explicit management control. Colt holds this certification for our Customer Managed Service (CMS) Solutions from European Data Centres. This includes customer European network monitoring, management and support services. In Colt India, this includes billing, revenue services and the Financial Shared Service Centre (FSSC). In Colt Spain, this includes Colocation Services in non-Data Centre locations.

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## 11 Glossary

**ADSL** - Asymmetric DSL

**ANS** - Authoritative Name Servers

**AS** - Autonomous System

**ASN** - Autonomous System Number

**BBW** - Maximum Burst Bandwidth

**BGP** - Border Gateway Protocol

**BRI** - Basic Rate Interface

**BW** - Bandwidth

**CBW** - Committed Bandwidth

**CNS** - Cache Name Servers

**CO** - Central Office

**CPD** - Colt Promise Date

**CPE** - Customer Premises Equipment

**CTV** - Committed Traffic Volume

**DDoS** - Distributed Denial of Service

**DHCP** - Dynamic Host Configuration Protocol

**DNS** - Domain Name System

**DSL** - Digital Subscriber Line

**EBW** - Excess Bandwidth

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**EFM** - Ethernet in the First Mile

**ETV** - Excess Traffic Volume

**FTP** - File Transfer Protocol

**Gbps** - Gigabit per second

**GB** - Giga Byte

**GE** - Gigabit Ethernet

**HTTP** - Hyper Text Transfer Protocol

**HTTPS** - HTTP Secure

**IAD** - Integrated Access Device

**IMAP4** - Internet Message Transfer Protocol version 4

**IXFR** - opcode mnemonic for Incremental Zone Transfer

**IP** - Internet Protocol

**IP Sec** - IP Secure

**IXP** - Internet eXchange Point

**kbps** - kilobit per second

**MED** - Multi Exit Discriminator

**Mbps** - Megabit per second

**MSP** - Multi Service Platform

**NAT** - Network Address Translation

**NNI** - Network-to-Network-Interface

**NNTP** - Network News Transfer Protocol

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**OLO** - Other Local Operator

**PA** - Provider Aggregated

**PAT** - Port Address Translation

**PI** - Provider Independent

**POP** - Post Office Protocol version 3

**PRI** - Primary Rate Interface

**PTT** - Postal, Telephone and Telegraph

**RIPE** - Reseaux Internet Protocol Européens

**SDH** - Synchronous Digital Hierarchy

**SDSL** - Symmetric DSL

**SLA** - Service Level Agreement

**SMTP** - Simple Mail Transfer Protocol

**UBB** - Usage-based Billing

**ULL** - Unbundled Local Loop

**VoIP** - Voice over IP

**wDSL** - wholesale DSL

**WINS** - Windows Internet Name Service

**[Download bandwidth]/[upload bandwidth] [contention ratio]** - For example, 8Mbps/800kbps 10:1

**Download bandwidth** - Bandwidth from the Colt network to the customer site

**Upload bandwidth** - Bandwidth from the customer site to the Colt network

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**Contention ratio** - Ratio of the bandwidth that is guaranteed, specified as X:1. If the contention ratio is not specified, the minimum bandwidth is not guaranteed (aka 'best effort')



## 12 Colt Online

Search and view any bill from the previous six months in .pdf format\*:

The screenshot shows the 'Find Bill' section of the Colt Online portal. At the top, it indicates the user's location: 'You are here: Colt Online Home > Billing > Bills'. The 'Find Bill' section has a sub-header 'Find a specific bill using the invoice number.' and a text input field for the 'Invoice Number:'. Below this is an 'OR' separator. The 'Search Bills' section has a sub-header 'To search for bills, use any combination of the following criteria'. It includes a 'Billing Month:' section with six radio button options: Nov 2009, Dec 2009, Jan 2010, Feb 2010, Mar 2010, and Apr 2010. There are also input fields for 'Billing Contract Number:' and 'Colt Customer Number:'. At the bottom left, there is a 'Results Per Page:' dropdown menu set to '10', and two buttons: 'RESET' and 'SEARCH'.

Figure 6: Find Bills

\*Not available in Switzerland due to data protection legislation.

View the status of any order in the delivery process:

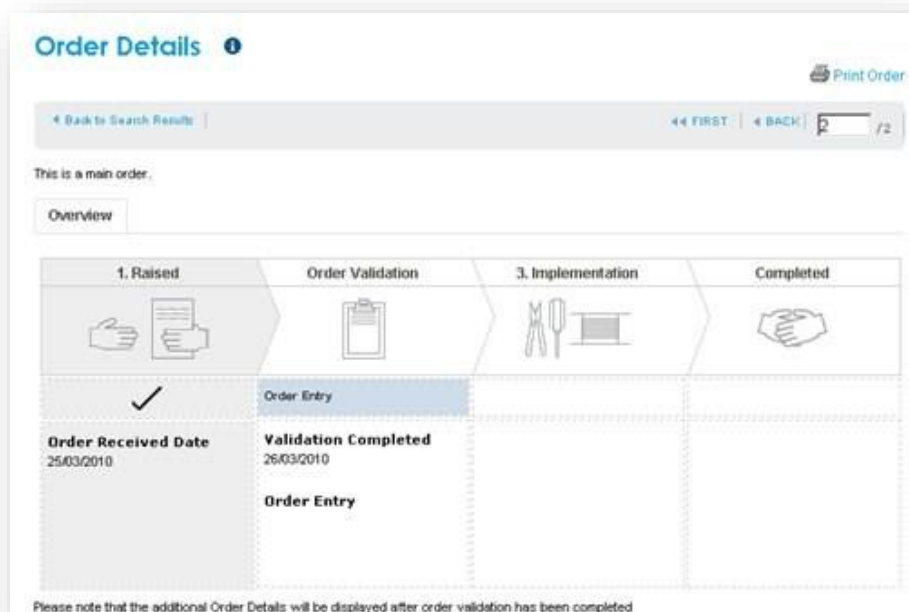


Figure 7: Order Details

View the status of any ticket (covering faults, enquiries, service requests) in real-time:

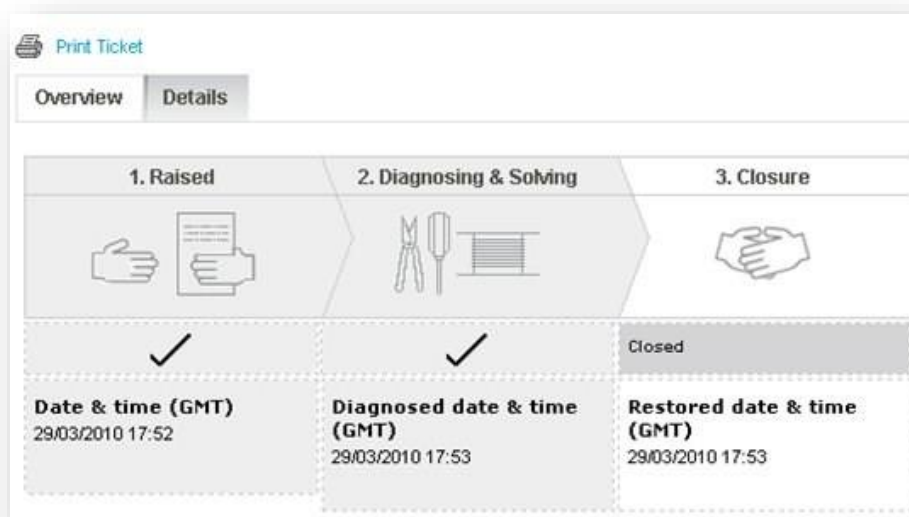


Figure 8: Ticket Status

Search and view all live services:

### Service Details ?

[Return to Search Results](#) | Service  / 19 | [NEXT >](#) | [LAST >>](#)

Customer Details
Service Details
Service Details - Billing

#### Service Details - Billing

The amount shown on the invoices may include other services in addition to the one you are viewing on this page. Please view the invoice to check which orders are included.

<b>Total Monthly Rental</b>	0.0	
<b>Billing Start Date</b>	Mon Mar 22 00:00:00 GMT 2010	
<b>Billing Expiry Date</b>		

Invoice No.	Amount	Issue Date
<a href="#">20092010</a>	78366.56	02-11-2009
<a href="#">20102010</a>	77141.92	02-01-2010
<a href="#">20092010</a>	75097.17	01-12-2009
<a href="#">20102010</a>	75146.02	02-02-2010
<a href="#">20102010</a>	75071.51	02-03-2010

Figure 9: Service Details

# 13 Service delivery timeframes

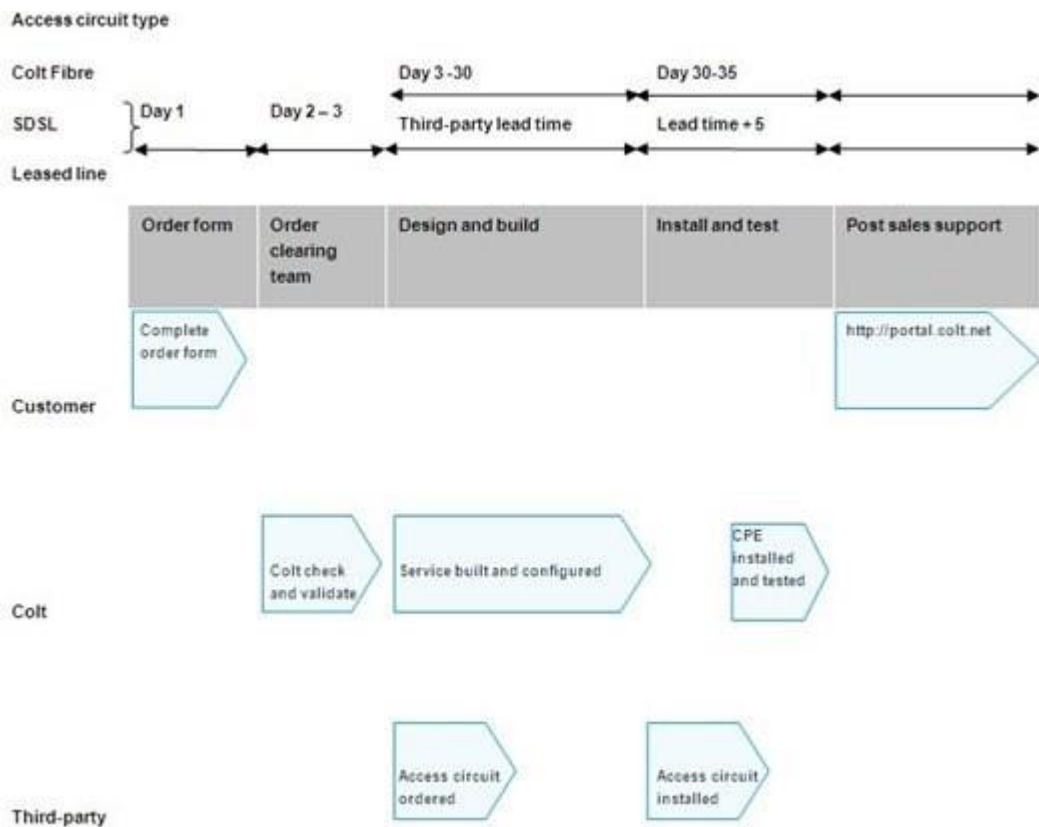


Figure 10: Service delivery timeframes

## 14 Order to delivery overview

Colt contact	Timeline of activities
Contact  Name  Tel	<p>Step 1 Day 1 <b>Order form completed</b></p> <p>Working with a sales contact, an order is raised for the service</p>
	<p>Step 2 Day 2 -3 <b>Order validated</b> The customer order is now validated by Colt and any outstanding issues or questions dealt with. Customers will be sent a letter confirming receipt and acceptance of their order</p>
Installation process	<p>Step 3 <b>Design and build</b></p> <p>The service is configured along with any optional features that may have been requested. The access circuit will be ordered and customers will be sent a letter confirming the Colt installation date</p>
	<p>Step 4 (a) <b>Access circuit installed</b></p> <p>A technician is at the customer's site to complete installation of the access circuit. Please ensure the technician is given access to the customer premises</p>
	<p>Step 4 (b) <b>Equipment installed</b></p> <p>Customer equipment is installed by Colt. The access circuit and Internet services are tested</p>
	<p>Step 5 <b>Activation and porting</b></p> <p>Service is ready for activation and (if required) numbers are ported. Customers will be given a handover pack which provides details of their service</p>

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