ISDN Voice Services

ocument provides guidance on Colt's ISDN Voice Services. It is
nd does not form part of any formal contract between customers and Colt.

Service Guide

01.04.2021

1 Contents

2 Overview

This document describes the standard, next generation 'Voice Line', which is the enhanced ISDN service over SIP.
Colt deliver full inbound and outbound services with ISDN Primary Rate Interface (PRI/ISDN30)) over the IP network which enable customers to easily evolve to SIP Trunking. Colt's ISDN services are available for both small to large enterprises as well as White Label and Reseller customers that require value added voice capabilities.
Colt offers Voice Line in the following countries: Austria, Belgium, Switzerland, Germany, Denmark, Spain, France, Ireland, Italy, the Netherlands, Portugal, Sweden and the UK.
The Voice Line service provides a range of TDM interfaces that can be connected to the customer's (TDM based) PBX. The service is delivered across Colt's VoIP platform. The ISDN interfaces presented to the customer PBX are 1 PRI up to 10 x PRIs (15-300 voice channels).
For outbound traffic the customer routes ISDN/TDM traffic to the on-premise Colt managed Voice Gateway. Colt's managed Voice Gateway will convert the traffic to VoIP, and will route calls to the Colt VoIP network and to the PSTN. For inbound traffic the reverse happens.
Colt's ISDN services combine the traditional TDM Voice service with the advantages of SIP trunking.

- Call distribution across multiple sites and across multiple PRI enables a precise routing plan for the voice traffic
- Consolidation of geographic numbers to a single address provides for a possible centralised infrastructure, which is the standard architecture for SIP Trunking
- Resiliency
  - Disaster Recovery
  - Dual Homing
  - Inbound Call Re-routing
  - Partial Number Replacement

Voice Line is both available as a standalone voice service and as a bundle with IP Access.

- Combination with COLT IP Access
  - Fully featured IP Access
  - No restrictions in bandwidth
  - Managed Dedicated IP Access
  - Guaranteed Bandwidth & Quality of Service

Similarly, Colt offers ISDN over SIP in Japan. Voice Line (v) in Japan is available in the Tokyo area, where for the rest of the country, traditional technology is still in use. The 23 channel T1 PRIs are available for both resellers and enterprise customers. Multiple voice resiliency options are available:

- o Disaster Recovery 'DRCONTACT'
- o CityCONTACT
- o GlobalCONTACT

Convergence with the underlying IP VPN service is not supported.

The service is designed to connect to customer PBXs, and is not intended to connect end user devices such as ISDN phones.

3 Why choose Colt

Colt's voice portfolio consists of all components required to connect the customer's own communication infrastructure to their clients and the PSTN. The Colt portfolio delivers reliable and affordable business grade services. Unlike other telecommunications providers Colt have a singular focus on business customers and their needs.

Colt provides traditional telephony services, helping customers transition from legacy telephony over to new voice technologies. While all operators are anticipating to the end of SDH and TDM based services, Colt continues to support ISDN services. For customers still requiring TDM ISDN Services, Colt provides the opportunity to easily transition - commercially and technically - to SIP trunking, when ready.

Colt works hand in hand with its customers to understand their challenges and deliver a service that can flex to meet changing needs, allowing customers to access new and emerging markets.

- **Business-grade telephony** and communication solutions to support business processes
- Simplified, consistent Voice services across **multiple geographies**
- **Compliant** with regulatory requirements and legal intercept capability across Europe and Japan

Telephony calls are routed over Colt's **fully redundant European network with premium routing.** Colt's resilient topology and capacity levels are maintained below 70% to ensure that customer traffic keeps flowing even at the busiest times.
Customers benefit from outstanding resilience and security capabilities, price leadership, as well as value-added features.
Colt is a trusted partner. With a target availability of up to 99.99%, Colt ISDN Services are extremely reliable. Customers can trust that the service is there when they need it.
Superior customer service: Colt's pan-European SLA, equally covering the services in Japan, assures customers of a high levels of resilience and simplified multi-country services. Colt provide proactive voice and data monitoring 24 hours a day, 7 days a week to detect and alert Customers to any fault immediately and start early diagnosis.

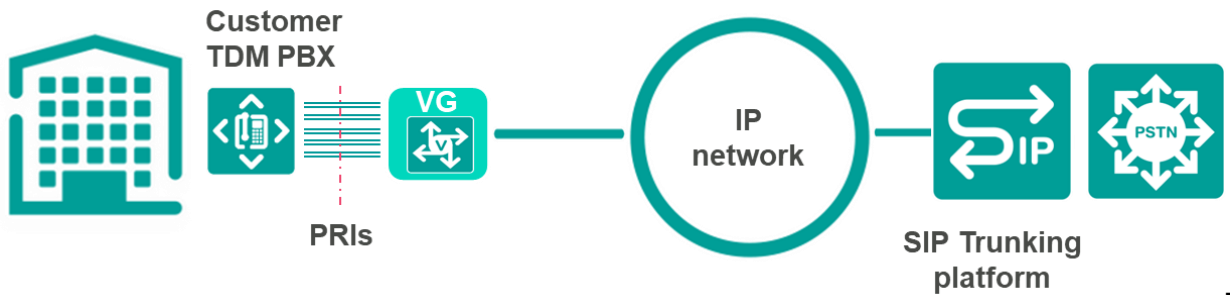
4 Customer Benefits

Future proof: ISDN over SIP ensures a future proof VoIP based service for both inbound and outbound ISDN telephony.
Features: ISDN over SIP is enabled for most of the TDM capabilities and has been enhanced with the typical SIP Trunking features.
Centralised telephony: ISDN over SIP supports a centralised IP telephony architecture with number consolidation.
Operational efficiencies through voice and data convergence[1]: Colt ISDN Services enable organisations to converge voice and data traffic onto a single end-to-end IP network. This allows customers to minimise the infrastructure required to carry voice calls. E.g. not requiring PSTN connections at each site.
Control over costs: Customers can reduce administration costs through simplified vendor management and by not having to build their own expertise in each country.
There is a cost benefit of a converged architecture combining voice and data[2] networks providing the highest levels of availability. Colt ISDN Services allow voice traffic to be converged and delivered to the PSTN over Wide Area Network (WAN) links. This reduces the requirement for multiple dedicated ISDN access circuits from customer sites, and reduces the cost of Primary Rate Interface (PRI) hardware by delivering a centralised service through SIP Trunking.
Through Colt's Global network coverage, Colt can provide competitive call rates locally, nationally and to international destinations, to both fixed and mobile networks. Access is delivered across Colts multiple European PSTN switches.
Security and reliability: Colt's Voice Services' infrastructure is housed in multiple Colt network nodes, which are both physically and environmentally secure. All network components for the service are continuously monitored, and the service is backed by comprehensive Service Level

[1] Convergence is not supported in Japan
[2] Convergence is not supported in Japan

Agreements (SLA). A number of options is available for providing resiliency in the WAN so customers can have utmost confidence in service availability and reliability. The service has been designed to perform at a target 99.99% availability (This is applicable to the Colt infrastructure only and does not include the network access elements.).
Customer will retain traditional telephony features for business critical needs.
PBX inter-operability: Colt ISDN Services are compliant with ETSI ISDN specifications. Customers can be confident that their PBX will work with Colt's ISDN Services first time avoiding testing time and lengthy configuration costs.
European coverage: Colt's ISDN Services are available in 13 countries across Europe.
Coverage in Japan: The IP-based 'Voice Line (v)' is available in the Tokyo area. Services delivered over traditional technology are still supported in the rest of Japan.

5 Design



The Voice Line (v) PRIs are delivered over a standard Colt IP Access service in Europe and a Colt IP VPN service in Japan.
To support PRI services across Colt's VoIP network, a Voice Gateway is installed on the customer site to provide the conversion between PRI voice interfaces to IP. The Voice Gateway is fully managed and supported by Colt.
Calls from the customer are converted to SIP by the Voice Gateway and transported across the Colt IP network to the VoIP Network for breakout to/from PSTN. A SIP trunk is built between the CPE cluster and the Colt SBC in the Colt VoIP POPs.
In Europe, thanks to cascading up to 5 Voice Gateways, Colt can deliver up to 10 PRIs using just one access line, which can be Colt Fibre and Ethernet Leased Lines. Up to five Voice Gateway One Access IAD CPEs, converting ISDN signals to SIP VoIP signals, are installed at the customer's premises. Those are connected to the LAN side of the IP Access service. Over wDSL Colt deliver up to 2 PRIs on the same access line and Voice Gateway.
All of the bandwidth is dedicated to route voice traffic for non-converged Voice Line customers.
In Japan, a single AudioCodes Voice Gateway CPE will be installed with the exception for 9 or 10 PRIs where a secondary device is required.

6 Delivery – Customer requirements

6.1 Installation

Colt aims to visit the customer's premises only once to do the physical installation of the service. In case a 3rd party OLO is involved (for Leased Line and wDSL Access Types), the 3rd party will do its installation prior to Colt's installation.
Colt ensures the customer is notified about the visiting technicians so that the customer can organise its availability.
Colt's installation does not include internal cabling at the customer's premises (or cross connect cabling in a carrier hotel or datacentre), unless this is ordered additionally.

6.2 Colt's demarcation point

Colt's demarcation point is the Voice Gateway. Colt delivers interfaces and the customer connects his equipment to Colt's equipment after this demarcation point. In case a Colt Presentation Panel is installed, Colt's demarcation point is this Presentation Panel.

6.3 Patch cable – Connector

The customer patches the PRIs from his PBX to the Colt Voice Gateway or the presentation panel using ISDN network cables equipped with RJ45 connectors. 'Straight' cables are required. In case of a COAX cable for a PRI, a balun (balanced-unbalanced) convertor would be required. The ports on the voice gateway device are configured for NT mode.
In case the ISDN service is delivered over an internet access provided by a company other than colt, the customers should connect it to the Colt voice gateway with another 'straight' ethernet cable.

6.4 Customer Premises Equipment (CPE)

Colt will install the required devices at the customer's premises and will manage and maintain those.
For each Voice Line (v) service, one or more Voice Gateways is needed, depending on the number of lines (One per 2 PRIs in Europe and one for all PRIs in Japan or two in case of 9 or 10 PRIs).
The rest of the equipment is rather specific to the Colt access service bearing the voice service and depends on the Access Type: Colt or the OLO will require to place a modem. On top of that, Colt will also install the right physical router, depending on the bandwidth requirements, for Converged Off-Net deliveries.
Per default, these boxes are not rack mountable and may require a shelf in a rack. The required space depends on the type of service. Each device takes up less than 2 U (See *Glossary*).

6.5 In case the ISDN service is delivered over an internet access provided by a company other than colt, Colt will only deliver a preconfigured voice gateway which the customer should connect to his internet and the PBX devices. To enable a quick test, customer readiness is expected. ISDN over SIP

For Inbound and Outbound ISDN Services, Colt delivers the Product 'Voice Line'/'Voice Line (v)'. By default, all new services are delivered over Colt's IP network with the exception of the non-Tokyo area in Japan.
To make the distinction between the legacy product 'Voice Line' *over SDH*, Colt has added '(v)', *from VoIP*, for the services delivered over the IP network.
Most communications towards customers will contain the '(v)'.

6.6 Prerequisites Voice Line (v) over public internet[3]

The customer's connectivity should be compliant with following conditions:
- The customer's broadband router should support QOS, COS and IPSec passthru and have one DHCP enabled LAN port available for Colt s Voice Gateway per max. 2 PRIs.
- Colt cannot manage the customer's router. In case of issues with the internet connectivity, the customer handles the communications and resolution with the ISP.
- In case of convergence, the minimum bandwidth capacity is the double of IP bandwidth required for voice traffic, otherwise the minimum requirement is the IP bandwidth required for Voice.
- In case a capacity of more than 2 PRIs is required, a bespoke solution with POC is due as not all routers are equipped to support the service.

[3] Voice Line (v) cannot be provided over a third party internet connection in Japan.

- UDP ports 500 & 4500 should be enabled to all the IPSec protocol to build the encrypted tunnel from the customer s router to the Colt target routers.
- In case of Firewall, to allow the traffic to pass through, the customer will have to whitelist IP Addresses of the Colt target routers 212.36.166.254 & 213.41.124.30.

6.7 Existing (IP) Voice Line & Business Pack services

For customers already making use of Colt ISDN services, a comparison between the main features available on the following services can be obtained upon simple request.

- Colt Voice Line (over SDH; legacy)
- Colt IP Voice Line (Legacy ISDN over SIP)
- and Voice Line (v), the default ISDN Service over SIP

Chapters *Call Distribution* and ***Error! Reference source not found.*** may contain important information for these customers.

7 Availability & Connectivity

The service is available in Japan and in 13 European countries: Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Netherlands, Portugal, Spain, Sweden, Switzerland, United Kingdom, excluding the islands.

7.1 Multi-Country deployments

For customers who are located in multiple countries, in order to support national dialling formats, network tones, numbering and number portability, and emergency services access, individual trunks (or trunk groups) per country must be created. Hence the service must be ordered per country.

7.2 Access Types [4]

Different access types are used to connect Colt's services to the customer site, depending on where the customer is located, and what type of connectivity and bandwidths are available in that local area.

[4] In Japan, only Colt/NTT fibre is used and the service cannot be provided over public internet.

7.2.1 Colt Fibre – On-net Ethernet

The Access Circuit is supplied by Colt via the Colt Fibre. Ethernet over MSP is the most cost-effective and scalable access technology available on Colt Fibre, providing the same built-in redundancy as SDH-based technologies.
In Japan, the fibre is mostly provided by NTT.

7.2.2 Leased Line - Off-net Ethernet

Where Colt has no Fibre present, a Leased Line Ethernet OLO tail circuit can be used. The Access Circuit is supplied via a third-party provider. Services on third-party OLO tails are equivalent to Colt fibre access; however, it cannot be guaranteed that fibre access will be used by the third-party OLO tail provider.

7.2.3 Off-net DSL Ethernet (EFM) Tails - wDSL

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. Integration is achieved using both simple cross-connect and Ethernet NNI connections. EFM is a technology that allows symmetrical, high bandwidth connections on DSL copper pairs. The technology is based on the well known and scalable Ethernet protocol. Colt has chosen this technology for the high bandwidth capability, cost effectiveness and simplicity of the Ethernet technology.
,The wDSL copper pair is terminated on the local PTT's equipment. The PTT will deliver the customer traffic to Colt on one (or more) ATM trunks or L2TP/IP tunnels using one or more physical interconnections. The method of delivery depends on the local PTT product offering.
DSL speed granularity depends on the country. DSL availability must be checked and, despite the excellent coverage, due to distance limitations, the exact speed and availability can be confirmed only after line testing has taken place

7.2.4 Public internet

The internet access is supplied by a provider other than Colt.

7.3 Bandwidth requirements

For the standalone voice offering, following IP Bandwidths are required per Voice Interface. The below table is just for information as the required Connectivity Check to verify the available bandwidth at the customer's premises is done by the customer's account manager, prior to the commercial service proposal.

Voice Interface	Required IP Bandwidth for Voice traffic
4 BRIs	1 Mbps (1.5Mbps for service over public internet)
2 PRIs	8 Mbps (10Mbps for service over public internet)
3 PRIs	12 Mbps
4 PRIs	16 Mbps
5 PRIs	20 Mbps
6 PRIs	24 Mbps
7 PRIs	28 Mbps
8 PRIs	32 Mbps
9 PRIs	36 Mbps
10 PRIs	40 Mbps

In case the service is delivered over a non-Colt internet connection, sufficient access bandwidth should be available to meet the anticipated peak call volumes. Colt recommends that the Customer does not exceed 90% (for a dedicated connection) or 50% (for a converged connection)

of the Customer's total access bandwidth for voice calls, as this may lead to deterioration in speech quality during peak periods.
In case of ISDN over Internet, data connectivity provided by the party other than colt should be compliant with following specification: Bandwidth for voice calls should be at least 50% of the total access bandwidth.
In Japan, Colt will foresee in the required bandwidth. Since the T1 in Japan offers 23 channels, as opposed to 30 channels on an E1 in Europe, only about 3Mb per service is required. For simplicity, 30Mb will be foreseen per service.

8 Features

The following section lists the features and functionality available with Colt Voice Line. Colt Voice Line is a telephony service that provides either ETSI PRI connectivity to the customer's legacy TDM PBX and transports the voice traffic over the Colt IP Network.
All features are set up on service level, also in case of multisite solutions. They cannot be set up per site. Only the Emergency Service is set up per DDI ranges (per allocated physical address).

8.1 Standard Voice Features

8.1.1 Voice codec

- G.711alaw is the default codec used for all Colt's ISDN services in Europe

To ensure the highest possible voice quality via the xDSL or Colt Fibre access circuit, the Voice over IP network uses the G.711alaw codec per active channel (without silence suppression) including IP packet overheads on the connection from the service interface to the Colt PSTN gateway.

- G.711mu-law is the default codec used for all Colt's ISDN services in Japan

To ensure the highest possible voice quality meeting 0ABJ-IP requirements, the Voice over IP network uses the G.711mu-law codec per active channel (without silence suppression) including IP packet overheads on the connection from the service interface to the Colt PSTN gateway.

8.1.2 ISDN Protocol

- Colt provides ETSI PRIs. The protocol is ETS 300 102 / ITU Q.931 in Europe and TTC JT-Q931 in Japan.

8.1.3 ISDN Interfaces

Colt provides primary rate ISDN (PRI) connectivity to an existing voice PBX or key switch.

- 1 up to 10 PRIs depending on the available bandwidth at the customer's premises and the access type (using the same access circuit for connectivity)

8.1.4 Fax

The ITU standard of T.38 for the conveyance of Fax over IP is the recommended method for use with Colt ISDN services over SIP.

- Group 3 (T.38) Fax Relay or Fax - G.711 (Pass-through)

As an alternative, sending faxes in an in-band G.711Alaw call may be used, but not recommended.

- Group 4 Fax for IP Voice Line and Voice Line is a 64kbps unrestricted data transmission and is supported but not recommended. It is not supported in Japan.

Where the usage of fax is for business critical needs, then Colt recommend that analogue exchange lines are used.

8.1.5 Modem

Modems are rarely used on IP Telephony systems and are not recommended to be used over the service. The only method is to use G.711 codec and carry modem within the voice codec

(G.711Alaw modem-pass-through), however, this will only have a limited connection speed which may be unsatisfactory for the application required.
Modems of type V.92 and V.23 are not supported on IP based services.
If modem transmission is a critical part of a customer's needs then Colt recommend the use of a traditional PSTN line.
Modem transmission is not supported in Japan.

8.1.6 Video Calls

Carrying video calls, trading and channel bonding are not supported on ISDN services over SIP.

8.1.7 Analogue Lines

Analogue lines, lift (elevator) alarms and services such as health alert are not supported through ISDN services over SIP.

8.1.8 Supplementary Services MoU 2

Supplementary Services MoU 2 (CF, AoC, MSN, 3PTY, CONF, UUS) are not supported on ISDN services over SIP.

8.1.9 Cyclic Redundancy Checking

CRC4 (Europe) / CRC6 (Japan) is a feature of voice services delivered over PRI circuits and is used to determine if an error has occurred in received data. By default, Colt will enable the CRCfeature, but if required, the feature can be disabled.

8.1.10 Point Of Sale terminal (POS, Payment Machine)

Colt provides support for POS devices with modems operating with an answering tone of 2100 Hz only (V.25 modem tone). This service is not recommended for mission critical applications.
POS is not supported in Japan.

8.1.11 DTMF

Out of band with RFC 2833/4733 is supported to carry DTMF tones: RTP Payload for DTMF Digits, Telephony Tones and Telephony signals.

8.1.12 ISDN Data Calls – Digital Data Transmission

Setup of 64kbps URD calls is supported, but with the following caveats to the bearer path: some applications do not work well over clear-channel CODEC connections. Characteristics of non-supportable applications include:

- Applications which are clocking and jitter-sensitive
- Applications with no higher layer protocols to discover and recover from errors (packet loss)
- Applications which require support for ISDN bonding (for example, video)

ISDN Data Calls are not supported in Japan.

8.2 Voice Quality

8.2.1 QOS

For the standalone option (and the converged on-net option), the bandwidth of the access circuit is dedicated to voice traffic only, so QOS (Quality of Service) is not required to guarantee the Voice traffic. For the converged[5] offnet options, QOS is configured on the access circuit. For both standalone and converged options QoS is used to guarantee Voice traffic across the Colt IP backbone network.
It is important to ensure voice quality that overall IP quality of service parameters are not exceeded between End-points to SIP Trunking Platform. The following table forms a guide to follow:

Parameter	*Maximum value*
Latency (Round trip)	150ms
Jitter	20ms
Packet loss	1 in 10E3 (or better)

[5] Convergence is not supported in Japan

The Colt network will not add more than the following to the overall end to end performance budget for IP access (these figures do not apply to DSL based access):

Parameter	*Value*
Latency (Round trip)	30ms
Jitter	10ms
Packet loss	1 in 10E6

This is for trunks terminating in Europe delivered over Colt data network.
In case the service is delivered over a non-Colt internet connection, QOS is in customer's hands.
In case of ISDN over Internet, data connectivity provided by the party other than colt should be compliant with following specifications:

Target Packet Loss Ratio of 1 in 103.
Round Trip Delay < 90ms
Jitter < 20ms

8.2.2 COS

CoS (Class of Service) in the Ethernet circuit is not required to prioritise the Voice traffic as the access circuit is dedicated for Voice. All Voice traffic is marked and is prioritised across the IP backbone.
In case the service is delivered over a non-Colt internet connection, COS is in customer's hands.

8.2.3 MOS

MOS (Mean Opinion Score) is the telephony industry standard for determining voice quality. MOS is based on what is deemed acceptable speech quality. In the past, MOS was calculated in a subjective manner by trained listeners rating calls on a scale of 0 (worst) to 5 (best). These days, MOS is calculated by computer algorithms. Factors which affect MOS include:

- Choice of CODEC – each has a theoretical maximum
- Volume of the call
- Noise on the line (caused either by environmental factors or by system malfunction)
- Delay, jitter and so on

Toll Quality or PSTN Quality is generally defined by a service achieving a MOS of over 4 out of 5. Colt uses G.711alaw as standard which offers a much higher quality. There is no voice compression implemented. G.711alaw offers a MOS score of between 4 - 5 which is comparable to Toll Quality.
To compare, mobile quality is generally regarded as being around 3.5 out of 5, with customers prepared tolerate lower quality in order to achieve mobility. When speech is compressed, the voice quality will always suffer.
Most MOS scores are still subjective by nature and so an allowance of 0.5 MOS should always be made in any calculation. This is why the IP Telephony industry can use the terms Toll Quality and Compressed Voice together – most customer's ears are very unlikely to be able to tell the difference between a MOS score of 4.0 and 3.92.
In case the service is delivered over a non-Colt internet connection[6], the quality of the voice service lies in customer's hands.

8.3 Security

8.3.1 Service with Colt IP Access (Europe) / IP VPN (Japan)

Colt is using static SIP peering (no SIP registration) to connect to the CPE devices. Since the traffic is transported over the Colt Internet Backbone and not over the public Internet, the IP Access is not encrypted.

[6] Services over a non-Colt internet connection are not available in Japan

8.3.2 Service with public internet access

Crypto config is built in the Voice Gateway and the Colt Access Routers. Each Voice Gateway is authenticated and authorized via an IPSec Tunnel. All traffic from Customer via Internet is Encrypted over IPSec Tunnel. In case the customer uses a Firewall, the IP Addresses of the Colt Access Routers should be added to the Inbound Access List and Outbound Access List of the customers' firewall. The Colt IP Addresses can be obtained from the Colt Service Delivery team. Services over a non-Colt internet access are not available in Japan.

8.4 Numbering and routing features

8.4.1 Number ranges

The formats defined hereunder address the default formats for national, and international numbers where appropriate, for the Called and Calling Party Numbers contained in signalling to and from the SIP Trunking platform. Special numbers (eg. Emergency numbers) are exceptions and follow local formats.
For successful operation, these formats should be followed for all number types when configuring the PBX, both for incoming and outgoing calls.

Key to the tables below:
NSN – National Significant Number : This is the telephone number without the initial '0' trunk code or the '00xx' country code. Significant digits without leading zero (e.g. For dialled number: 0170996465; the NSN is : 170996465 and 0+NSN is: 0170996465).
CC – Country Code : digits defining destination or origin country of the call (e.g. for dialled number 0033170996465; the CC+ NSN is: 33170996465 and 00+CC+NSN= 0033170996465)
TON= ISDN Type of Number : National (NAT) / International (INT) / Unknown (UNK)
'SN' = Subscriber Number, it is called number without local area code

8.4.1.1 DDI (Direct Dial In) – Format

Incoming calls to any of the allocated numbers against the PBX trunk are typically delivered for Called and Calling Party Number in below mentioned formats. In the B Number we also support subscriber format. Other number formats are supported upon request.
For Incoming Calls (Customer receives a call)
For incoming calls, the A and B number can be received in the following formats.

Europe	A Number **(Originator)**	B Number **(Customer, destination)**
National Call	NSN (TON=UNK) 0NSN (TON=UNK)*	Extension Digits (TON=UNK) **NSN (TON=NAT)** **0 NSN (TON=UNK)***
International Call	00CCNSN (TON=UNK)	CCNSN (TON =INT) 00CCNSN (TON=UNK)

*In countries where national dialling prefix 0 is used

Japan	A Number **(Originator)**	B Number **(Customer, destination)**
National Call	0 NSN (TON=UNK)	0 **NSN (TON=UNK)** SN (TON=UNK)
International Call	CC NSN (TON=UNK)	

Defaults are highlighted in BOLD. If the customer does not use the default configuration, the customer should inform Colt before the service activation.

8.4.1.2 DDO (Direct Dial Out) – Format

The default format for Called Party Number and Calling Party Number is in the table here below. Other types of formats are supported upon request.
For SIP trunks, numbers must be sent 'enbloc'. Enbloc or Overlap dialling: 'Overlap receiving' will be converted to Enbloc
For Outgoing Calls (Customer places a call)
The A-number will be used when the calling party number screening is passed. Otherwise, Default CLI will be used.
For outgoing calls, the A and B number can be sent in the following formats.

Europe	A Number **(Customer, originator)**	B Number **(Destination)**
National Call	NSN (TON=NAT) 0 NSN (TON=UNK)* CC NSN (TON=INT) 00 CC NSN (TON=UNK)	NSN (TON=NAT) 0 NSN (TON=UNK)* CCNSN (TON=INT) 00CCNSN (TON=UNK)
International Call		CCNSN (TON=INT) 00CCNSN (TON=UNK)

*In countries where national dialling prefix 0 is used

Japan	A Number **(Customer, originator)**	B Number **(Destination)**
National Call	0 NSN (TON=UNK)	0 NSN (TON=UNK)* SN (TON=UNK)
International Call		010CCNSN (TON=UNK)

National dialing prefix 0 is used, but can be omitted when calling from the same area

8.4.1.3 DDI Ranges

The customer can choose whether to:

- Reserve and receive new range of DDI numbers from Colt or
- Port their existing numbers from their current provider to Colt or
- Use their existing Colt supplied range or
- Combine any of the above

8.4.2 Calls to Emergency Services

To enable Colt to route emergency calls correctly and provide the correct address to the applicable emergency authorities, the customer must provide the addresses to which the telephone numbers are allocated and which will be provisioned by Colt as part of the Voice Line service. The addresses must be related to the caller's location, which may not necessarily be the same as the customer's installation address (cfr. *Centralised telephony network - Number consolidation*). Any changes to addresses must be communicated by the customer to Colt as soon as possible.

8.4.3 Number porting

Where customers wish to retain existing telephone numbers, they make use of Colts Number Portability Service.
Local in-country Letter of Authorisations (Porting forms) must be completed and signed to comply with local regulations.

In order to enable a flawless porting, it is highly recommended that the customer provides Colt with the number ranges, the correct grouping of the number ranges and the relevant legal addresses and owners of the DDIs which need to be ported. This information can

be obtained by the customer from their current provider. Number ranges are usually to be ported as a complete range. Most operators will not allow ranges to be split over different operators. In principle, Colt cannot obtain these details from the donor operator.

More information with regards to Porting, including the required forms can be obtained from Colt's Account Managers.

8.4.4 Centralised telephony network - Number consolidation

Numbers with different Local Area Codes (LAC) can be configured on the same service. Hence, Colt can physically deliver ISDN services at one site, while logically provisioning services for multiple sites.
To enable correct calls to Emergency Services, each LAC needs to be associated with the relevant physical address, for administrative reasons. This information needs to be given at the time of ordering. (Cfr. *Calls to Emergency Services*)

Customers with a hybrid IP-TDM telephony network can make use of this feature to simplify their telco procurement and centralise their telephony network. A centralised telephony network is an excellent preparation for a complete SIP Trunking solution.

8.4.5 Call Distribution

In case of multiple PRIs, Load Share (Round Robin) is configured for the customer across a single port group unless otherwise requested, so that if the first is busy (engaged), the call goes to the next interface. All services will be configured to enable calls both ways (receive inbound calls and send outbound calls) unless requested otherwise.
Calls can be distributed across PRIs at a single site or across PRIs across multiple sites (Cfr. *Multisite solution*).
Multiple Port Groups with overflow or load-share call distribution are supported. Details must be specified on the order form.

Call distribution across PRIs/BRIs across platforms (SDH and VoIP) and across different Voice services are not available as a standard service.

8.4.6 Multisite solution

Colt Voice Line supports multisite solutions within the same country. This means that Colt physically deliver up to 10 PRIs per site, and a multiple of ISDN circuits can be ordered together. (Cfr. *ISDN Interfaces*)

For simplicity, in case the numbers of multiple sites do not overlap, it is not required to order the service as a multisite solution.

In case number consolidation is done to enable a centralised telephony network, a multisite solution is irrelevant.

In case Call Distribution across multiple sites is required, the relevant call distributions details must be given at the time of ordering. It is possible to add a site to an existing service at a later stage.

8.4.7 PRI Port to DDI Number Mapping

Voice Line enables the customer to map a specific number to a specific port. By default, all numbers are assigned to one port group. For multiple PRIs the calls are distributed in a Load share (Round Robin) configuration.
The customer can opt to not have this defaulted to Load share and choose the Overflow (Sequential) option instead by specifying this in the order form.

8.4.8 Bypass numbers for testing purposes

In order to enable the customer to test the service, it is possible to order a Bypass number. Details must be specified on the order form.

8.4.9 Destinations

Colt enable calls to national and international geographic, non-geographic, mobile and service number (including emergency call service) destinations.

8.4.10 Call Barring

Colt offer the Call Barring option to disable calls to specific destinations. There are predefined call barring destinations groups.
The customer must supply the number/s the filtering needs to be applied to as part of their order.

8.4.11 Call Forwarding

Colt refers to its IN Services (IN Geo) to have Call Forwarding enabled on the network level. When IN Geo is implemented, call forwarding will remain enabled if the ISDN service is out of service. Otherwise, calls have to be forwarded by the PBX, forwarding on a DDI number within the PBX and providing the Diversion Header. Hence, for individual changes, when the customer configures the Call Forwarding on his PBX or phone, Colt supports CLI handling, thus displaying the number of the original calling party instead of the redirecting number.
Colt does not provision Call Forwarding on the Voice Line (v) service.

8.4.12 CLI Features - Caller ID (CLIP, CLIR or CLIP No Screening)

Below features are available subject to country regulations (see Country Specific Regulatory Requirements).
CLIP (Calling Line Identification Presentation) provides the Customer with the number of the calling party in a form that allows the Customer to return the call.
CLIR (Calling Line Identification Restriction) prevents presentation of the caller's number and sub-address to the called party

8.4.12.1 CLIP Screening and CLIR per Call (DEFAULT) ('display', 'Temp Allow (TA)')

CLIP provides the Called Party with the number of the Calling Party as provided by the customer PABX subject to successful screening by Colt. Where a CLI is out of customer DDI range configured on the Colt service, then Colt will replace with default network CLI, which is defined per service (not per site). When the screening fails and the number matches a DDI Range prefix, then the DDI Range main number will be used, else the default trunk main number is used.
The customer can send the same CLI from any site as long as it is within the DDI ranges configured on the Colt service. The Default number (used if screening fails) is defined per service (not per site).
The main number per site/per port can be implemented using CLIP Screening, setting the main number CLI per port (ISDN Interface: PRI).

8.4.12.2 CLIP Main Number ('Fix Number Display')

If CLIP Main Number is enabled, the customer default number is always sent as the CLI. The customer default number is defined per service but can be defined separately per site or per port as part of a bespoke design (by configuring CLIP Screening in the network and setting the main number CLI on the voice CPE).

8.4.12.3 CLIR per call ('TR', Temp restricted – not available in Europe)

CLIR restricts presentation of the Calling user's ISDN number and sub-address to the Called Party. This could be configured per line or per call. When the CLIR supplementary service is applicable and activated, the originating network notifies the destination network that the calling user's ISDN number and sub address information (if provided by the calling user) are not allowed to be presented to the called user. The Colt Network transports the CLIR information across the network.

8.4.12.4 CLIR Permanent ('PR', Permanent restricted)

The network is configured to permanently marking the Calling Party Number as restricted. By default, a redirecting number or generic number (if present) is not marked as restricted.

8.4.12.5 CLIP No Screening ('CLNOSCR' – not available in Japan)

CLIP No Screening allows the customer to send their own Calling Party Number (CPN) to the called party without the number being validated. It provides an additional number to the called party for display purposes.

For example a customer could have a 0800 number configured with a network CLI of 01473 390000. By using the CLIP NO Screening feature the 0800 number would be displayed to the called party providing any networks used carried it as an additional Calling Party number.

The customer can send the same CLI from any site as long it qualifies as a valid CLI.

This feature does not guarantee that the display CLI is presented to the called party, as it depends on any networks used for the call carrying it as an additional Calling Party number.

This service depends on country regulation and cannot be offered in each country. Please verify the Country Specific Regulatory Requirements.

8.4.12.6 Presentation Number ('TF Number Display')

Functionality similar to the 'CLIP No Screening' but still screens the number the customer sends against a predefined list of DDIs for CLI purposes. Presentation Number allows an alternative CLI that has been pre-authorised by Colt to be sent for display purposes.

CLIP No Screening – Presentation Number enables the customer to specify as part of the order the number or number ranges that they wish Colt to present to the Called Party. These numbers do not have to be a number that has been hosted by Colt, or ported in to Colt's network, or a Colt DDI range. Colt will screen the calls and will present the numbers that are predefined by the customer. Colt screen the incoming call and check the number the customer send and if it is one Colt know about, the 'presentation CLI' is set with the number. If it fails screening, only the default Colt CLI is sent with the call. So, it is a part of the ordering process and therefore there is no need for the pro-forma.

The Presentation Number can be sent in international or national format.

This feature does not guarantee that the display CLI is presented to the called party, as it depends on any networks used for the call carrying it as an additional Calling Party number.

This service depends on country regulation and cannot be offered in each country. Please verify the Country Specific Regulatory Requirements.

8.4.12.7 Number consolidation - CLIP (No Screening) – Presentation Number

Number consolidation refers to configurations with DDI ranges of different LACs on the same trunk.

In order to support emergency call handling, the customer is required to send a valid Colt CLI so that the site that originated the call can be identified. If Colt receives an emergency call with an invalid CLI, the customer default number will be used for emergency call routing.

This configuration also works with CLIP No Screening and Presentation Number without any restrictions

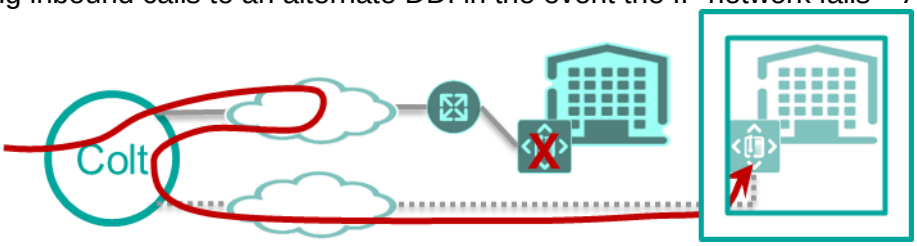
8.5 Voice Traffic Resiliency (Europe)

Voice Traffic Resiliency is not physical resiliency, not on access line, not on data pop, only on voice pop/IN platform

8.5.1 Inbound Call Re-Routing

Also for ISDN services, Colt offers a typical SIP trunking feature known as 'Inbound Call Re-routing' which is automatically enabled when loss of connectivity occurs and no trunks are available between the Colt SIP Trunking platform and the PBX. Customers should direct the call to an operator console or auto-attendant.

Redirecting inbound calls to an alternate DDI in the event the IP network fails – Automated



In case of **Error! Reference source not found.**, the Inbound Call Re-routing number will only be invoked when both sites are down.

No extension information will be provided as the redirection number is not passed in the re-directed call to the alternate DDI number.

8.5.1.1 Operation

When loss of connectivity occurs and no trunks are available between the Colt SIP Trunking platform and the PBX, all inbound calls to the customer may be automatically redirected to a single E.164 number specified by the customer.

8.5.1.2 Ordering

This E.164 number to which Colt must redirect the calls in case of emergency must be specified in advance, via the product Order Form. It can be:

- A Colt provided E.164 number, associated to a Colt TDM circuit or Colt SIP trunking service. In the latter case, the E.164 number must be associated to a totally different Colt Voice service for the feature to work
- A Non-Colt provided E.164 number (associated to a non-Colt voice service)

8.5.2 Partial Number Replacement

Partial number replacement allows the automatic number manipulation for inbound calls (Colt to customer) to be routed to pre-defined alternative numbers whilst preserving the extension number details. For example calls to the number range of 020 7390 1000-2000 would be re-routed automatically to 020 7450 1000-2000 in the event of loss of connectivity. This feature is activated when no configured trunks are available to route calls to the customers PBX. The lines associated with the alternative numbers may be any PSTN number not necessarily part of the ISDN Service, nor belonging to Colt. As with inbound call re-routing, the range start and range end of the numbers being replaced must be specified in advance via the product order form.

The features described previously are automatically revoked when communication between the SIP Trunking platform and the customers PBX is restored. The operation of these features is as follows:

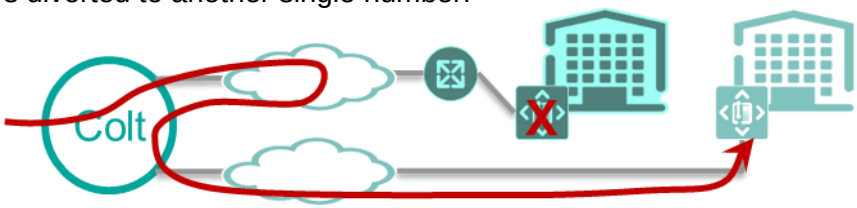
1. An inbound call attempt to the customers PBX is made over the configured trunks.
2. If the connection to the PBX has failed then either a SIP INVITE transaction timeout (2 attempts) or a TCP connection timeout occurs, and the call is then re-routed to the backup number or number range defined which is configured on the customers trunk.
3. Subsequent inbound calls are re-routed to the backup number or the number range following the same timeout mechanism until connectivity is restored.
4. When connectivity is restored, inbound calls automatically revert to the customer PBX.

Note: When inbound call re-routing or partial number replacement is combined with trunk resiliency, the failure detection and recovery mechanism of the trunk resiliency feature takes

precedence. In other words the trunk resiliency mechanism shall be used first until no trunks are available, and then at that point the above features described shall be invoked.

8.5.3 Disaster Recovery

A customer's disaster recovery planning for ISDN services is managed through TDM re-routing otherwise known as DDI based disaster recovery.
DDI based disaster recovery enables customers to divert incoming calls to pre-defined PSTN telephone numbers. A maximum of 5 disaster recovery plans can be defined and will be activated after calling the Colt helpdesk and authorizing one of the plans. Each plan can hold up to 90 diverts, which can be a combination of a single number divert to another number, or a contiguous range of numbers diverted to another single number.



One active link to one active PBX, redirecting calls to another PBX in case of failure – Upon request

8.5.3.1 Operation

The Disaster Recovery plan must be invoked and revoked by the customer. Once a disaster occurs and the activation of the disaster recovery plan is required, the customer must call the Colt Helpdesk, authenticate himself by providing name, telephone number, and pre-defined password and then request activation of the relevant disaster recovery plan.
The diagram below explains the Disaster Recovery capability.
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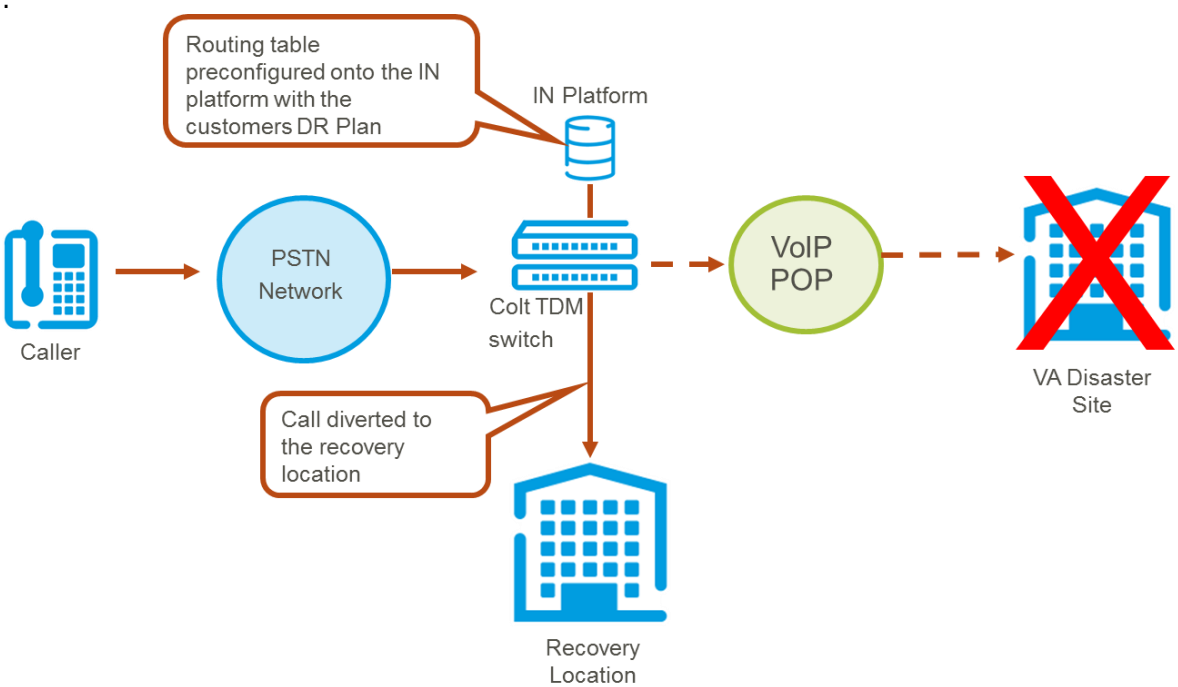
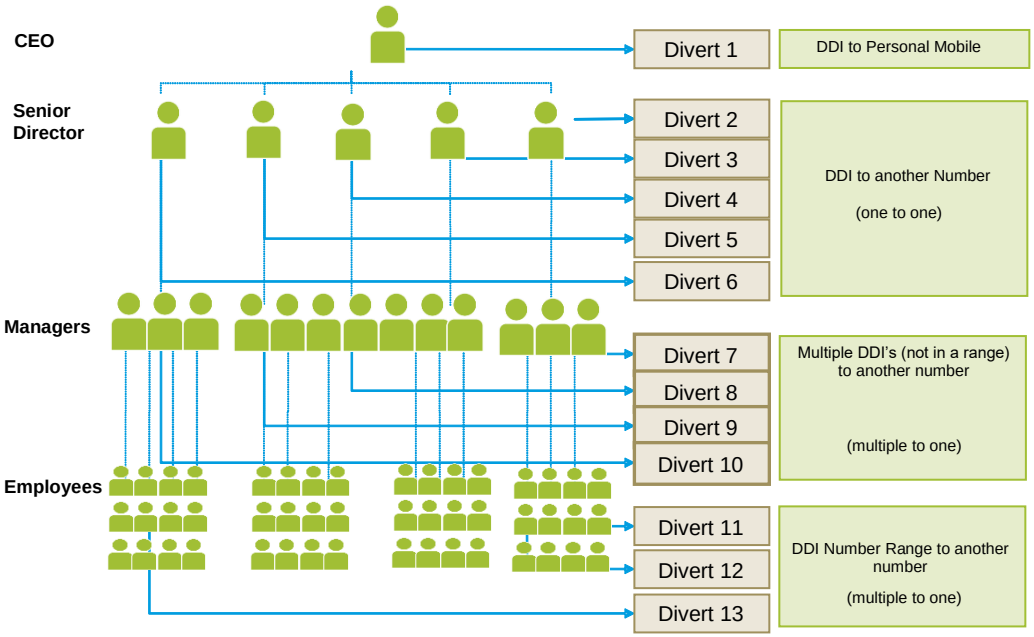


8.5.3.2 Example implementation plan

The diagram below shows an example disaster recovery plan implementation.



A divert can be either a single number diverted to another number, or a single contiguous range of numbers diverted to another single number. For example, a contiguous range such as 020 7390 1000-2000 would be diverted to 020 7450 1000.

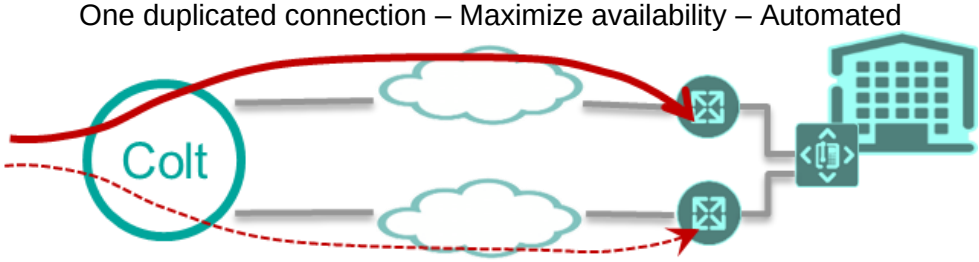
8.5.3.3 Testing and ordering

Any DR option needs to be specified in the ordering process and needs to be tested to ensure the correct operation of the disaster recovery plan, before Colt can apply and comply to the disaster recovery service level agreements (DR SLA).

8.5.4 Dual Homing

Voice Dual Homing is provided by implementing two separate trunks across two geographically diverse nodes, and can be set up in load share (default, active/active) or overflow (active/standby) configuration with automatic failover.

One duplicated connection – Maximize availability – Automated



The resiliency can be set up across two customer sites or one site across two access circuits. Colt will provision Voice Dual Homing as a symmetric service where the circuits and number/port mapping and routing for each of the two sites mirror each other.

Dual Homing is only available as standard for Voice Line services without convergence with Colt IP Access.

8.5.4.1 Operation

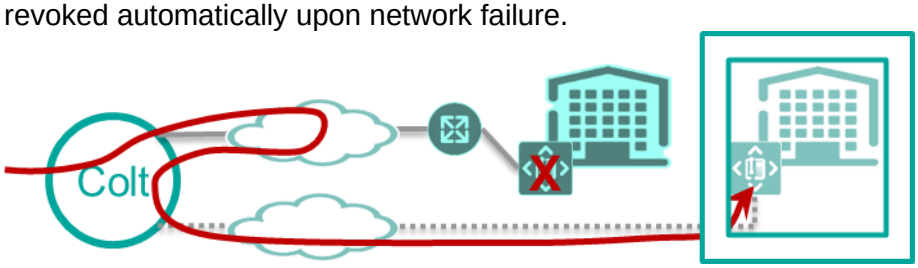
Depending on the type of Dual Homing, the traffic will be load shared over both sites or the overflow circuit will be activated in case the active circuit becomes unavailable. Once the service is restored, the overflow circuit will automatically go in to standby modus again.

8.5.4.2 Ordering

Dual Homing must be requested via the Colt order form. It must be specified whether Load share or Overflow is required.

8.6 Voice Traffic Resiliency (Japan)

Voice Traffic Resiliency is not physical resiliency, not on access line, not on data pop, only on voice pop/IN platform. The Inbound Call Resiliency options are pre-configured and invoked and revoked automatically upon network failure.



8.6.1 DRCONTACT

Termination calls are diverted when a problem is detected in the transmission route between a switch in the Colt network and equipment at the customer's premises, thus when an original termination location is hit by a disaster. Pre-registration is required.

8.6.2 CityCONTACT

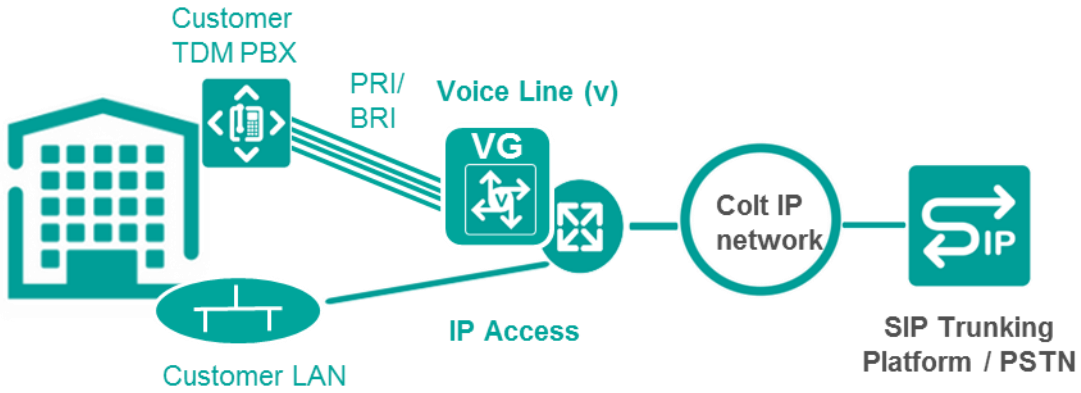
CityCONTACT enables inbound termination calls to be forwarded to other domestic termination telephone numbers pre-registered by users.

8.6.3 GlobalCONTACT

GlobalCONTACT enables inbound termination calls to be forwarded to other domestic termination telephone numbers pre-registered by users.

8.7 Combination with Colt IP Access[7]

There are two possibilities. Voice Line can be offered as a standalone voice service or as a converged service with Colt IP Access.



Single IP Access Service for Voice & Internet (Converged)

Colt delivers an IP Access CPE Router with separate LAN ports for Voice gateways and for the customer's LAN. Separate LAN subnets are used for Voice & Internet. The access circuit is shared for voice & data, which means that the bandwidth must be dimensioned according to the required voice channels and customer internet bandwidth requirement.

For On-Net solutions, Colt will deliver two technically independent services.

[7] Convergence cannot be offered in Japan.

8.7.1 Bandwidth Options

There are no restrictions in the bandwidth for the IP Access, except for those defined by the available bandwidth at the customer's premises. To maintain QoS, the IP Access bandwidth must be at least 50% greater than the Voice element.

8.7.2 Voice Options

The Voice resiliency option Dual Homing is not available in the standard Voice Line service with the Converged option.

8.7.3 IP Access Options

There are no restrictions in the available Colt IP Access features, except for the IP Access Enhanced Resiliency, which is not available in the standard Voice Line service with the Converged option.

8.7.4 Bandwidth requirements

For the converged offering of Voice Line with IP Access, the same IP Bandwidths are required per Voice Interface but the bandwidths required for the IP Access must be added to them.
The minimum required bandwidth for an off-net converged service should be at least the double of the IP bandwidth required for the voice-only service, to enable Quality of Service (QOS).
Example: 1 PRI requires 4Mb -> Min. total bandwidth is 8Mb
Cfr. *Bandwidth requirements* (Standalone Voice Line offering)
When the service is delivered over Colt Fibre (On-Net), the services will be technically separated, hence the bandwidth requirements for Voice and IP Access are not related.
In case the service is delivered over a non-Colt internet connection, sufficient access bandwidth should be available to meet the anticipated peak call volumes. Colt recommends that the Customer does not exceed 90% (for a dedicated connection) or 50% (for a converged connection) of the Customer's total access bandwidth for voice calls, as this may lead to deterioration in speech quality during peak periods.
In case of ISDN over Internet, data connectivity provided by the party other than colt should be compliant with following specifications:
Bandwidth for voice calls (4Mb per PRI/30 channels) should be at least 50% of the total access bandwidth.Add-on services. DHCP should be enabled.

8.8 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/twelve months in .pdf format depending on country regulation*

  * Not available in Switzerland due to data protection legislation
- 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
- Manage account details

8.9 Call Analyser Tool[8]

The Call Analyser Tool is an online reporting and analysis tool which customers can use to produce reports on their billed/rated call traffic.
Billed/rated call data is generated for outgoing calls and for IN calls. It is available alongside the customer invoice on our customer portal, Colt Online.

8.10 Fraud Monitoring

Fraud is the deliberate and malicious intrusion into a system's security by an outside party. Some of the warning signs that a system's security might have been compromised include:

- Abnormally long calls or an unusually high number of short duration calls
- Calls to unknown destinations
- Repetitive calls to the same number
- Large calls volumes at night, weekends or public holidays
- Difficulties (busy or delays) with retrieving voice mail messages

Colt analyses traffic and puts voice services in Fraud mode by black listing sensitive destinations, and informs the customer about possible fraud which was detected.

8.10.1 Operation

Colt operates a state-of-the-art fraud monitoring system which actively screens CDRs (Call Data Records) and generates alerts if any unusual patterns are detected. It uses various rules and thresholds to monitor the usage pattern of the customers. Alerts are triggered when customer's usage pattern exceeds the defined threshold for the rules.
The Fraud Management team monitors the alerts and takes appropriate actions by informing the customer and/or blocking the services.

8.10.2 Fraud Statement

Colt and Colt's customers can be subject to fraud whereby third parties pass traffic over the network without authorisation.
Protection of customer equipment against fraudulent activity is the responsibility of the customer. We strongly urge our customers to take steps to protect their equipment against fraud and to speak with their suppliers about the most appropriate means to do so.
Where suspected fraud is detected, Colt will endeavour to contact the customer as soon as possible.
Colt has no control of or responsibility for protecting customer equipment against fraud. Colt will not be liable for any loss resulting from any fraudulent use of customer equipment. Colt's Service Level Agreements do not cover fraud.

8.10.3 Policy

If the fraud has arisen due to activities on Customer Premise Equipment where Colt has no operational responsibility, then it is Colt policy to invoice the customer for that traffic.
Colt has complied with its contractual responsibility of delivering calls sent to its network by the customer equipment, and incurred costs for that delivery. Therefore it is the customer's responsibility to pay Colt for the services used.

8.10.4 Preventive safety guidelines for customers

Customers should be concerned about potential fraud. Hence, Colt recommends to follow the steps below as they will help protect the customer's PBX.
1. Remove or de-activate all unnecessary system functionality including remote access ports. If remote access ports are used, consider using strong authentication such as Smartcards/Tokens.

[8] The 'Call Analyser Tool' cannot be used for services provided in Japan.

2. Restrict any destinations that should not normally be dialled such as Premium Rate, International or Operators including Directory Enquiries.
3. Review PBX call logging/ reporting material regularly and analyze these for increases in call volumes or suspicious destinations.
4. Voice mail ports should be barred for outgoing access to trunks, if possible. Voice mail and DISA passwords should be changed on a regular basis, avoiding factory defaults and obvious combinations such as 1234 or the extension number.
5. If access to trunks via voice mail is necessary, then suitable controls need to be implemented. Remove Auto Attendant options for accessing trunks.
6. Surplus mailboxes should be locked until allocated to a user. Unused extensions should have their access rights deactivated.
7. If DISA is not used, then it should be disabled completely.
8. Restrict access to equipment, including comms room and master terminals.
9. Only give the appropriate and minimum level of system access required to carry out a task.
10. Ensure that all security features (such as passwords and PIN) are changed following installation, upgrade and fault/ maintenance (including resetting password defaults).
11. All internal information such as directories, call logging reports and audit logs should be treated as confidential material and be securely destroyed if no longer required.
12. Limit the number of employees with authorisation to set up new codes and passwords. When a member of staff leaves the company, cancel access rights.
13. Avoid using tones to prompt for password/PIN entry, which could be used by hacking programmers. Develop processes to cover employee entry procedures, pass cards, new employee vetting, people leaving and changing jobs. These processes could include revoking access to systems, mailboxes and buildings.
14. System security and configuration settings should be reviewed regularly. Any vulnerabilities or irregularities should be followed up.
15. Be vigilant against bogus callers such as those posing as a company employee who ask to be connected to switchboard operators to obtain an outgoing line.It is the customer's responsibility to ensure the security of its communications system. Failure to take security precautions could result in significant cost to the customer.

8.10.5 Colt's advice for fraud prevention

To prevent abuse, Colt advises the customer to follow some rules:

8.11 Reseller[9]

Similar to Voice Line & SIP Trunking, resellers can download Voice Line (v) twice daily unrated call records (CDRs) from Colt's wholesale B2B interface: Cocom Web Manager or Cocom FTP in 12 Colt countries (excl. CH), which the customer can then use to onward bill their end-customers out of their own billing systems. It is important to note that Voice Line (v) unrated CDRs are found in Cocom under "IP Voice Line". This is further explained in the Cocom user guides available on the intranet and externally in the Help section of Cocom Web Manager.

8.12 White Label Customers[10]

Global & national carriers, who lack the VoIP infrastructure, systems, processes & operational resources to support big pan-EU business end-customers, can take advantage of Colt's full service wrap to ensure speed to market with low investment.
The standard chargeable White Label service includes:

- Setting up White Label customers and White Label end-customers in a new account structure
- Entering wholesale tariffs / prices and end-customer tariffs / prices in Colt's systems – please note there are specific tariff IDs for WL Voice Line (v)

[9] 'Cocom' cannot be used for services delivered in Japan.
[10] White Label is not an option in Japan.

- Delivering a White Label billing report and rated CDRs based on the end-customer tariffs/prices – please note WL Voice Line (v) will appear in the WL billing report
- Delivering rated CDRs and a Colt invoice to the White Label customer (this is business as usual and explained in section *10*)

In addition to the above, Colt offer this optional chargeable White Label solution:

- White Label End-Customer Invoicing: where Colt sends invoices to White Label end-customers under the White Label customer's brand. The White Label customer remains responsible for revenue collection and assurance – please note Voice Line (v) will appear under Voice Services on the WLEC invoice.

9 Service Assurance

Colt provides a high level of service assurance:

- The core 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 trouble tickets

Service assurance includes:

- Customer service
- Service Level Agreement
- Colt Online
- Service monitoring
- Planned maintenance

9.1 Service monitoring

The SIP core network is proactively monitored and maintained by Colt. The service is monitored and maintained by Colt on an end-to-end basis, including the access circuit and the CPE router. This means that Colt proactively instigates remedial action when a fault is detected by the Colt monitoring systems.

9.2 Service Maintenance

When service affecting planned works are required, customers will normally be notified 10 days in advance.

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Typically, planned works occur before or after business hours on weekdays or during the weekend. 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.

9.3 Customer Service

Colt has a high quality voice 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 the service is provisioned, customers are issued with a unique reference for each service that should always be used when reporting faults. The contact number for fault reporting is specified in the handover pack.

9.4 Service Level Agreement

Colt offers a comprehensive service level agreement with the Voice Line service, which pays compensation if agreed targets are not met. Our high quality European voice network enables us to provide customers with an annual service availability of up to 99.99%. Customers should contact a Colt Account Executive for more information about the SLA.

The Service Level Agreement (SLA) describes the target for service delivery, restoration and quality for Colt Voice Line. It is a separate document which forms part of the customer contract pack.
It is important to note that for a Voice Line service converged with Colt IP Access, different SLAs apply for the Voice and the IP Access service.
There is no Service Level Agreement (SLA) between Colt and the customer with regards to Fraud Management. Colt cannot offer guarantees around fraud detection but provides a best effort service.

10 Charges and Billing[11]

10.1 Charging Structure

Colt Voice Line is charged on the following basis:

- Professional Services activities undertaken for the customer (e.g. consultancy / design work)
- Installation fee (one-off)
- Service rental fee
- Additional features
- Moves, Adds, and Changes

- Voice tariff – usage based minutes charges (based upon in-country tariffs)
  - The tariff plans contain the rates per minute per destination per service. Tariff plans are agreed separately between Colt and the customer. The service cannot be delivered without a signed Tariff plan.
  - New tariff IDs specifically for *Voice Line (v)* must be setup on a new or existing BCN in order for the usage charges to be billed correctly. Existing *Voice Line* tariff IDs will not be able to rate Voice Line (v) usage.

10.2 Invoicing

Customers are usually invoiced on a monthly basis, subject to the commercial terms agreed with Colt. Invoices are sent via post to customers in paper format, with the option to have invoices delivered electronically via email. The paper invoice contains a summary of the usage changes. The Call Detail Records (CDR) can be found on Colt Online customer portal, together with the invoices in pdf-format. Invoices are archived up to 12 months.

10.3 Invoicing per Country

Due to legal, tax and regulatory reasons, Colt must invoice voice services to the countries in which the services are delivered.
Separate invoices are generated from each country where services are delivered to customers. Therefore, the services must be ordered per country. For each customer's entity per country, Colt creates a unique 'OCN' reference. Each OCN can group several 'BCN's, which are billing customer numbers on which the invoices are generated.

[11] The CDRs for services delivered in Japan cannot be downloaded from Colt Online. They are sent to customers instead.

Glossary

Call Analyser	Colt Call Analyser is a reporting and analysis tool that customers can use to produce reports on their billed and rated call traffic
CLI	Calling Line Identifier (phone number caller)
CLIP	Calling Line Identity Presentation
CLIPNOSCN	CLIP No Screening
CLIR	Calling Line Identity Restriction
CPE	Customer Premises Equipment
CRC-4	**CRC-4** (Cyclic Redundancy Check 4) is a form of cyclic redundancy checking (a method of checking for errors in transmitted data) that is used on E-1 trunk lines. It verifies if the line is free of errors. CRC-4 support is required for all network switches in Europe. However, some older switches including private branch exchanges (PBXs) do not support CRC-4.
DDI	Direct Dialing In (phone number)
Default Number	Default Number of a specific trunk
DISA	DISA is Direct Inward System Access. DISA /Call-Through solution enables authorized corporate users outside the office to make calls using the organization's special low tariffs.
DTMF	DTMF (dual tone multi frequency) is the signal to the phone company that you generate when you press an ordinary telephone's touch keys. With DTMF, each key you press on the phone generates two tones of specific frequencies. So that a voice can't imitate the tones, one tone is generated from a high-frequency group of tones and the other from a low frequency group. In-band DTMF specifically refers to sending the DTMF digit frequencies along the same voice path as the actual speech in a conversation. This works well for an uncompressed channel using G.711, but does not work reliably when using a compressed channel such as G.729. RFC2833 DTMF uses an out-of-band approach. The idea here is that special Real-Time Transport Protocol (RTP) even messages are sent instead of the raw tones. For example, a message is sent indicating a "DTMF digit 7" versus sending the two frequencies that make up a DTMF 7. This approach is more reliable.
ISDN	A telephone system network. Prior to the ISDN, the phone system was viewed as a way to transport voice, with some special services available for data. The key feature of the ISDN is that it integrates speech and data on the same lines, adding features that were not available in the classic telephone system
Main Number	Main number of a specific DDI range
Modem	A modem converts, or modulates, a signal so that digital information can be carried over it.
Number portability	The ability to transfer an existing fixed line telephone number assigned by a local exchange carrier (LEC) and reassign it to another carrier
OLO	Other Licensed Operator
Point of Presence (PoP)	An artificial demarcation point or interface point between Colt and a third party

Point of Sale (POS) terminal	A point-of-sale (POS) terminal is a computerized replacement for a cash register. The POS system can include the ability to record and track customer orders, process credit and debit cards, connect to other systems in a network, and manage inventory.
Primary Rate Interface (PRI)	A 2048kbps circuit used for the conveyance of voice and data services. For voice services, 30xB (bearer voice) channels and 2xD (data signalling) channels are provided over PRI
Private Branch Exchange (PBX)	A software application running on a server that switches calls within a customer organisation, optimises voice connections and hosts advanced features
QOS (Quality of Service)	Quality of service refers to a network's ability to achieve maximum bandwidth and deal with other network performance elements like latency, error rate and uptime. Quality of service also involves controlling and managing network resources by setting priorities for specific types of data (video, audio, files) on the network. QoS is applied to network traffic generated for VoIP.
Router	A router is a device which forwards traffic between two networks.
SIP Trunking	Session Initiation Protocol (SIP) trunking is a specific method involved in VoIP or similar systems.
U, Rack Unit (RU)	A rack unit (abbreviated U or RU) is a unit of measure defined as 1.75 inches (44.45 mm). It is most frequently used as a measurement of the overall height of 19-inch and 23-inch rack frames, as well as the height of equipment that mounts in these frames, whereby the height of the frame or equipment is expressed as multiples of rack units. For example, a typical full-size rack cage is 42U high, while equipment is typically 1U, 2U, 3U, or 4U high. A typical full size rack is 42U, which means it holds just over 6 feet (1.8 m) of equipment, and a typical "half-height" rack would be 18–22U, or around 3 feet (0.91 m) high.
VoIP	Voice over Internet Protocol (VoIP) is a technology used for delivering different kinds of data from a source to a destination using IP (Internet Protocol). The data may be in many forms, including files, voice communication, pictures, fax or multimedia messages. VoIP is a method associated with the Private Branch Exchange (PBX) systems used in modern businesses to provide unified communications to enterprise and drive Internet telephony solutions. It is most often used for telephone calls.

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