SIN 487

Issue 1.3
August 2015

Suppliers' Information Note

For The BT Network

BT IPstream Connect Symmetric
Service Description and Interface Specification

This SIN is available in Portable Document Format (pdf) from: http://www.btplc.com/sinet/

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1 Introduction

This SIN describes the BT IPstream Connect Symmetric Service. This SIN provides information for use by BT and Customers - Service Providers (SPs), Other Licensed Operators (OLOs), Other Network Operators (ONOs), and Corporate Businesses - and Customer Premises Equipment (CPE) manufacturers and developers.

Please note: BT IPstream SHDSL is no longer available for new supply and has been retired at exchanges served by the Wholesale Broadband Connect product.

BT's portfolio of Broadband Symmetric data services will utilise SHDSL (Single pair High bit rate Digital Subscribers Line) technology as outlined in the ETSI specification TS 101 524[1], and referred to by the ITU as G.SHDSL.

SHDSL technology requires a dedicated Metallic Path Facility (MPF). No other services (e.g. PSTN) can be supported on the same metallic path.

A specific SHDSL modem or terminating device, provided by the Service Provider or End User, is required. ADSL modems will not function with this service.

In particular this SIN should be read in conjunction with, SIN 482[2] detailing BT's launched Broadband IPstream Connect products and SIN 376[3] detailing BT's SHDSL interface.

2 Service Outline

2.1 BT IPstream Connect Symmetric Portfolio

The BT IPstream Connect portfolio consists of a range of products (both symmetric and asymmetric) that enables a Service Provider to access multiple End Users via an IP network.

The BT IPstream Connect Symmetric service offers symmetric IP connectivity between customers and their End Users providing a "wires only" SHDSL interface. End Users are connected to the Service Providers BT Central link over BT's High Speed Data Network. BT manages the contention across BT's Network.

The service is aimed at End Users who require business class connectivity to their Service Provider with higher upstream data rates than those offered over the ADSL variants. The service is ideal for applications such as fast file transfer and web hosting. However, the service is not suitable for End Users who require sustained continuous bit-rate connectivity.

BT Wholesale does not provide CPE as part of the service. Any CPE provided by the Service Provider must comply with this document and SIN 376[3] in order to interoperate successfully with the BT service.

The Service Provider owns the contractual/service relationship. BT supplies the delivery platform and basic service wrap.

IPstream Symmetric products are in the process of being withdrawn

Definitions:

Customer: The Service Provider (SP) who purchases the BT IPstream Connect Symmetric service from BT and sells or provides it to End-Users. Where appropriate the term Service Provider will be used to refer to the wider potential Customer base.

End User: The person using their CPE to connect to a Service Provider's network via the BT IPstream Connect Symmetric service.

2.2 Service Availability

BT IPstream Connect Symmetric is no longer available for new supply and has been retired from exchanges where Wholesale Broadband Connect exists.

BT IPstream Connect Symmetric is only available over a dedicated BT Metallic Path Facility (MPF) with a dedicated BT NTE at the End Users premises. The product cannot co-exist with other BT services on the same MPF e.g. PSTN service is not supported. The service cannot be offered on an existing MPF. BT Wholesale provides the MPF as part of the service

Service is only available from enabled Exchanges where SHDSL capacity is available. There are technical reach limitations that may prevent some End Users from receiving SHDSL services, depending on the metallic path distance and attenuation from the local serving BT Exchange to the End User premises.

2.3 Data Rates

The following table provides guidance on the rates supported on BT IPstream Connect Symmetric End User Accesses (IPSEUA), together with an illustration of the predicted radial reach. Technical limitations may further dictate maximum data speeds that can be achieved for each of the ANFP categories.

Symmetric Service Option	DSL line rate (kbps)	ATM rate Inclusive of headers	IP data rate** (kbps)	ANFP Line Category	Estimated reach over 0.4mm gauge copper from serving exchange* (For guidance only and subject to change)
BT IPstream Connect Symmetric 250	264	256	231	Extra Short, Short, Medium & Long	3.9km
BT IPstream Connect Symmetric 500	520	512	463	Extra Short, Short, Medium & Long	3.4km
BT IPstream Connect Symmetric 1000	1032	1024	927	Extra Short, Short & Medium	2.5km
BT IPstream Connect Symmetric 2000	2056	2048	1854	Extra Short, Short	1.6km

* BT line plant includes a range of cable gauges hence 0.4mm is indicative only.

*** The IP data rate is defined as the rate available for the transport of IP packets in the payload of ATM cells. The actual data payload will be less then this as the effects of TCP/IP and PPP headers have to be taken into account, but no allowance is required for the overhead introduced by the ATM layer, as this has already been taken into account in the above figures.*

Table 1 - Data rates for BT IPstream Connect Symmetric

The Access Network Frequency Plan (ANFP)[12] exists to prevent signals on any given line from interfering unduly with the signals on adjacent lines in the access network.

The BT IPstream Connect Symmetric service will only be available over a dedicated Metallic Path Facility (MPF). Under the "Specification of the Access Network Frequency Plan (ANFP) applicable to transmission systems used on the BT Access Network" – Issue 2[13], each distribution point (DP) within the access network is categorised as being either "Extra Short", "Short", "Medium" or "Long". The judgement is made on the basis of the lowest line loss present at the DP.

The ANFP categorisation places an upper limit on the DSL transmission rates that may be offered using SHDSL. These limits are currently as follows:

Lines connected to a DP categorised as "Extra Short" $\leq$ 2320 kbps

Lines connected to a DP categorised as "Short" $\leq$ 2056 kbps

Lines connected to a DP categorised as "Medium" $\leq$ 1505 kbps

Lines connected to a DP categorised as "Long" $\leq$ 784 kbps

Note. These are gross data rates as specified in Annex D section D.3.1 of the "Access Network Frequency Plan applicable to transmission systems used on the BT Access Network issue 2" published by OFTEL.

Whilst the ANFP requirements must be adhered to, it is in fact far more likely that the physical characteristics of the End User's MPF, i.e. its attenuation, will limit the maximum speed attainable.

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3   BT IPstream Connect Symmetric Service Description

3.1   General

The BT IPstream Connect Symmetric service provides session controlled symmetric IP connectivity between an End User and a Broadband Access Server (BAS) in BT's High Speed Data Network from which the End User connects to the Service Provider. The service is restricted to a single Service Provider; however, that customer can choose to allow his End Users the facility of "Limited Service Selection" (see SIN 482[2]). The BT IPstream Connect Symmetric service comprises of two main components. An overview is given in Figure 1: BT IPstream Connect Symmetric Overview, and consists of:

  BT IPStream Connect Handover Component

This component provides a means of conveying traffic from IPstream Connect end users to the IPstream Connect Point of Service Interconnects. Customers connect at the 10 IPStream Connect point of service interconnects via either a connection at the BRAS site to a patch panel, or via a 21C connection via one or more MSILs. Further details are specified in SIN 482

  BT IPstream Connect Symmetric End User Access (IPSEUA)

This provides session controlled SHDSL based IP connectivity between an End User and a Broadband Access Server (BAS) in BT's High Speed Data Network. The BT IPstream Connect Symmetric product presents a 'wires only' (SHDSL) interface to the End User as per SIN 376[3].

These component parts will be described in greater detail in the following sections.
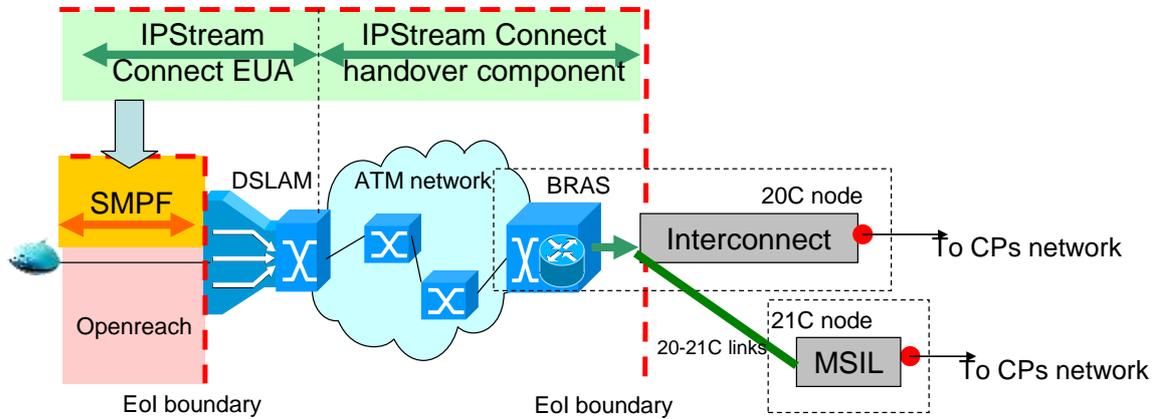
Figure 1 - BT IPstream Connect Overview

3.2 Customer Connection

The Service Provider connects into the BT Broadband Network via the BT IPStream Connect Handover component, as currently specified in SIN 482[2].

Service Providers may utilise any existing Handover components that may have been provisioned for use with BT IPStream Connect ADSL services to support BT IPstream Connect Symmetric services where sufficient capacity exists.

3.3 End User Service

The End User service comprises of a dedicated metallic path between the End User NTE and the serving DSLAM in the local BT Exchange. Over this path SHDSL technology is used to transport a Symmetric Permanent Virtual Circuit (Symmetric PVC) to a Broadband Remote Access Server (BRAS) in BT's High Speed Data Network. Table 1 describes the BT IPstream Connect Symmetric End User rates supported.

The BT IPstream Connect Symmetric product presents a 'wires only' (SHDSL) interface to the End User as per SIN 376[3].

3.4　Interface Descriptions

3.4.1　Customer Interface

SIN 482[2] provides further information concerning the interfaces to the customers network for IPStream Connect.

3.4.2　End User Interface

SIN 376[3] describes the interface presented at the end of a SHDSL MPF at an end user's premises. SHDSL technology requires a dedicated metallic path facility, therefore no other service (e.g. PSTN) may be supported on the same MPF.

3.5　Physical Layer Aspects

The Network Terminating point will be the socket on the BT provided NTE 5, which will be provided for all new end user access orders placed on and after 30th June 2006. A RJ11 to NTE5 connector will be required between the NTE and SDSL modem.

For the existing orders placed on and before 30th June 2006, the Network Terminating point is the standard NTE and SHDSL Service Specific Front Plate (SSFP) for BT IPstream Connect Symmetric. Both of these versions are shown in Figure 2. Note that cables or CPE are not supplied by BT as part of the SHDSL service.
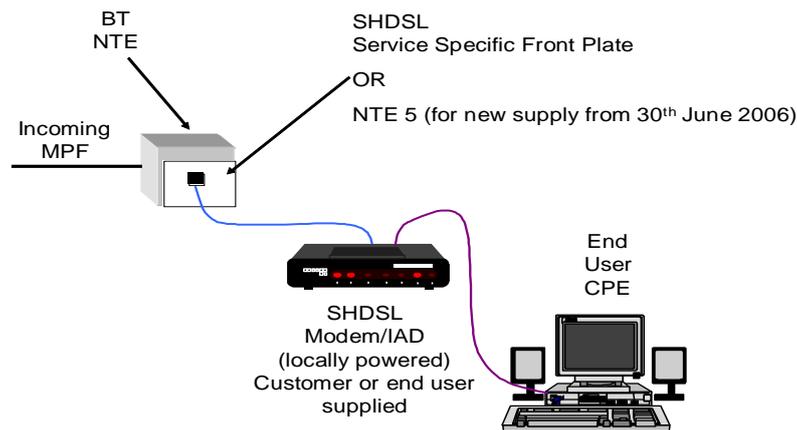
Figure 2 - Standard BT NTE and SHDSL Service Specific Front Plate

The SHDSL SSFP plugs into the NTE in place of the standard front plate and presents a socket for connection of SHDSL CPE. The SHDSL connection is presented on the middle two pins of the socket, and corresponds to pins 4 & 5 of a RJ45 plug and to pins 3 & 4 of a RJ11 plug (which has only 6 pins). Polarity is unimportant. The other pins are not connected. Pin numbering of the socket is 1 to 8 from the left, looking into the socket with the contacts uppermost.

3.5.1.1 End User CPE Configuration

Once connected to the MPF, the CPE for BT IPstream Connect Symmetric services must be configured to work with BT's network according to the requirements of the service.

For information, the configuration parameters shown in Table 2 will be requested of the End User CPE:

Parameter	BT IPstream Connect Symmetric EUA			
	250	500	1000	2000
ITU G.SHDSL mode[11]	Yes	Yes	Yes	Yes
Upstream & Downstream ATM rate (including ATM overheads)	**256kbit/s**	512kbit/s	1024kbit/s	2048kbit/s

Table 2 - End User CPE Parameters

3.5.1.2 ATM Layer Aspects

BT IPstream Connect provides a single ATM virtual channel connection between the End User and BT Broadband Network. The ATM layer VP at all End User interface will be presented with a VPI=0. Within the VP, the BT IPstream Connect Symmetric service will present the data channel on VCI=38. Loopback diagnostic traffic VPI/VCI values are defined in SIN376[3].

3.5.1.3 Traffic Shaping

In order to ensure optimum and correct operation of the service, upstream traffic (towards the BT network) should be shaped by the End User premises equipment such that the IP data rate does not exceed 99% of the IP data rates shown in Table 1 above. Traffic exceeding this value may be subject to excessive CDV. If traffic is not shaped at the IP layer, the maximum SCR should be set to the PCR minus 1kbps with an MBS=100, however, if user traffic is shaped to 99% of IP data rate, then this constraint can be avoided. This ATM shaped rate shall include all ATM cells i.e. user cells, OAM cells and traffic on the looped VPI/VCI=0/21 channel (if supported). Buffering may be required to allow for CDV in any traffic being offered to the modem.

3.6   Physical Arrangements

3.6.1   Customer Premises Requirements

SIN 482[2] provides information concerning the interconnect arrangements to the customers network.

3.6.2   End User Premises Requirements

At the End User premises, the BT IPstream Connect Symmetric NTE 5 (for end user orders placed on or after 30th June 2006) or Service Specific Front Plate will have been installed in accordance with standard BT practices. It is the responsibility of the Service Provider to both provide and configure the End User CPE and ensure that an appropriate power supply exists.

3.6.2.1 End User Configuration

For BT IPstream Connect Symmetric Configuration see SIN 482[2] section 4, covering Session Establishment, IP Addressing (including NAT/No Nat Options), Radius Authentication, Test Account requirements, Routing protocols and other Service Provider Hosting responsibilities.

3.6.2.2 CPE – Customer Provided

In order to correctly interoperate with the services the CPE device(s) should:

- conform to the requirements in SIN 376[3]
- support PPP over AAL5 (RFC 2364[4]) using VC based multiplexing
- use ATM VPI/VCI pair 0/38 for data transmission/reception
- support PPP (RFC 1661[5])
- support User Authentication (CHAP) with PPP (RFC 1334[6], RFC 1994[7])
- support IPCP (RFC 1332[8])
- support PPP IPCP Extensions for Name Server Addresses (RFC 1877[9])
- carry out upstream traffic shaping to the ATM rate corresponding to the IP data rate
- not issue a CHAP challenge, but must respond if challenged

The CPE device(s) may (optionally):

- support network renumbering (RFC 1631[10])
- be set to become the slave in PPP negotiation (in order to speed up the negotiation process)

To establish a session to the Service Provider the End User CPE must supply a username, domain name and password. Two formats of presenting the domain name and user name are supported. These are:

1. End.user@link.business-name.com
2. Link.business-name.com/end.user

Note 1. The characters '/' '\' '%' '@' and '#' are reserved characters and cannot be used in a username or domain name.

Note 2. BT IPstream Connect supports Domain Name options of 'One to One', 'Many to One' and 'One to Many'. Please refer to SIN 482 for details.

Note 3. It is possible for customers to receive "domain/user" even if they are expecting "user@domain". How this is processed is up to the Service Provider.

4   References

[1]	TS 101 524	Transmission and Multiplexing (TM); Access transmission system on metallic access cables; Symmetric single pair high bitrate Digital Subscriber Line (SDSL)	ETSI
[2]	SIN 482	BT Broadband IP Products - Interface Specification	BT
[3]	SIN 376	BT Broadband SHDSL Interface Specification	BT
[4]	RFC 2364	PPP over AAL5	IETF

[5]	RFC 1661	The Point-to-Point Protocol	IETF
[6]	RFC 1334	PPP Authentication Protocols	IETF
[7]	RFC 1994	PPP Challenge Handshake Authentication Protocol (CHAP)	IETF
[8]	RFC 1332	The PPP Internet Protocol Control Protocol (IPCP)	IETF
[9]	RFC 1887	An Architecture for IPv6 Unicast Address Allocation	IETF
[10]	RFC 1631	The IP Network Address Translator (NAT)	IETF
[11]	G.991.2	Single-pair High-speed Digital Subscriber Line (SHDSL) Transceivers	ITU
[12]	ANFP	Specification of the Access Network Frequency Plan applicable to transmission systems used on the BT Access Network'; Oftel Technical Requirement, OTR004:Issue 2, 2003 – NICC Document ND1602:2002/11	NICC

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For further information or copies of other referenced sources, please see document sources at http://www.btplc.com/sinet/.

5   Abbreviations

Acronym	Expansions
AAL5	ATM Adaptation Layer 5
ADSL	Asymmetric Digital Subscriber Line
ANFP	Access Network Frequency Plan
ATM	Asynchronous Transfer Mode
BAS	Broadband Access Server
BT	British Telecommunications plc
CBR	Constant Bit Rate
CHAP	Challenge Handshake Authentication Protocol [IETF]
CPE	Customers' Premises Equipment
DP	Distribution Point
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
ETSI	European Telecommunications Standards Institute
EUA	End User Access
IP	Internet Protocol [IETF]
IPCP	Internet Protocol Control Protocol [IETF]
IPSEUA	IPstream Connect Symmetric End User Access
ITU	International Telecommunications Union
ITU-T	International Telecommunication Union - Telecommunications Standardisation Sector
L2TP	Layer 2 Tunnelling Protocol [IETF]
MBS	Maximum Burst Size

Acronym	Expansions
MPF	Metallic Path Facility
NICC	Network Interoperability Consultative Committee
NTE	Network Termination Equipment
NTP	Network Terminating Point
OLO	Other Licensed Operator
PAP	Password Authentication Protocol [IETF]
PC	Personal Computer
PCR	Peak Cell Rate
PPP	Point-to-Point Protocol [IETF]
PSTN	Public Switched Telephone Network
PVC	Permanent Virtual Circuit/Channel
RADIUS	Remote Authentication Dial In User Service [IETF]
RFC	Request for Comment [IETF]
RJ45	Registered Jack 45
SCR	Sustainable Cell Rate
SHDSL	Single pair High bit rate Digital Subscriber Line
SIN	Suppliers' Information Note [BT]
SP	Service Provider
SPIN	Service Provider Industry Notification [BT]
SSFP	Service Specific Front Plate [BT]
SSO	Symmetric Service Option
SIN	Suppliers' Information Note
STM-1	Synchronous Transport Module Level 1 (155 Mbit/s)
TCP	Transmission Control Protocol [IETF]
VC	Virtual Connection [ATM]
VCI	Virtual Connection Identifier [ATM]
VP	Virtual Path
VPI	Virtual Path Identifier [ATM]

6 History

Status	Date	Details of Change
SIN 487 Issue 1.0	19 June 2008	First Issue
SIN 487 Issue 1.1	24 April 2012	Comment added to section 2.1 to advise that IPstream Symmetric products are in the process of being withdrawn
SIN487 Issue 1.2	11 April 2013	Retirement date within the WBC footprint included in introduction

| SIN487 Issue 1.3 | August 2015 | Updated to note IPstream Connect Symmetric is no longer available for new supply and is withdrawn from WBC enabled exchanges. |
| | | Change SINet site references from http://www.sinet.bt.com to http://www.btplc.com/sinet/ |

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