SIN 448

Suppliers' Information Note

For The BT Network

OPENREACH BACKHAUL EXTENSION SERVICES 1000 /1000ER (BES 1000/1000ER)
Service & Interface Description

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

Enquiries relating to this document should be directed to: sinet.helpdesk@bt.com

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1 Introduction

This Suppliers Information Note (SIN) describes the interface provided with Openreach Backhaul Extension Services 1000 (BES 1000). Also provided is some additional general information on BES and on some of the physical aspects of the NTEs currently being deployed for new customer orders.

Backhaul Extension Services (BES) are high speed, point-to-point data circuits that are permanently connected and available 24 hours a day, 365 days per year. They provide a secure link between a Communication Providers network located in a BT Exchange using a Licensed Facility and a Communications Provider's network located in their own accommodation or a Licensed Facility in the BT Exchange.

Backhaul Extension Services Extended Reach (BES1000ER) extends the radial distance capability between customer sites. The BES1000ER product does not impact on the customer network interface characteristics described in this SIN.

Any specific technology mentioned in this document is current as of today, however it may be subject to change in the future. Should the specification of the interface be changed, this will be notified by a new issue of this SIN. Openreach reserves the right to adapt technology to deliver BES as new developments are made. All services are delivered over an uncontended transmission path.

SPECIAL NOTICE

Openreach has briefed Industry that this Product will longer be supported as from 1 April 2018

Please refer to briefing GEN061/14 (www.openreach.co.uk)
WES WEES BES 2.5Gbit/s and 10Gbit/s will remain available along with WES Aggregation

2 Service Outline

The BES 1000 service comprises a single uncontended transmission link between the CP's equipment at unbundled MDF sites and a site within an Operator's own network, with an Openreach provided NTE at each end of this link.

The BES 1000 service operates at a speed of 1000 Mbit/s in full duplex mode between sites. The service is a point-to-point data service offering high bandwidth connectivity over radial distances up to 25 km between sites, or up to 15 km for BES Daisy Chain. This radial (or point-to-point) distance can result in physical line plant route distances of up to 40 km.

Backhaul Extension Services (BES)	1000	
NTE Interface Option:	SX or LX	
Maximum allowable **Radial** Distances between sites:	25 km (15km for BES-Daisy Chain)	*See Note 1*
Maximum **Route & Range** Distances between sites:	40 km	*See Note 2*
Half / Full Duplex Operation:	Full Duplex	

Table 1. List of Services & Principle Features

Note 1. This is the direct distance "as the crow flies" between the two site locations.

Note 2. The maximum Route distance is the limiting factor of either the physical transmission limit between NTEs over the provided interconnecting transmission infrastructure, or alternatively the maximum range that the service may be extended to due to other technical considerations (e.g. optical loss).

A schematic of the BES 1000 service is shown in Figure 1.
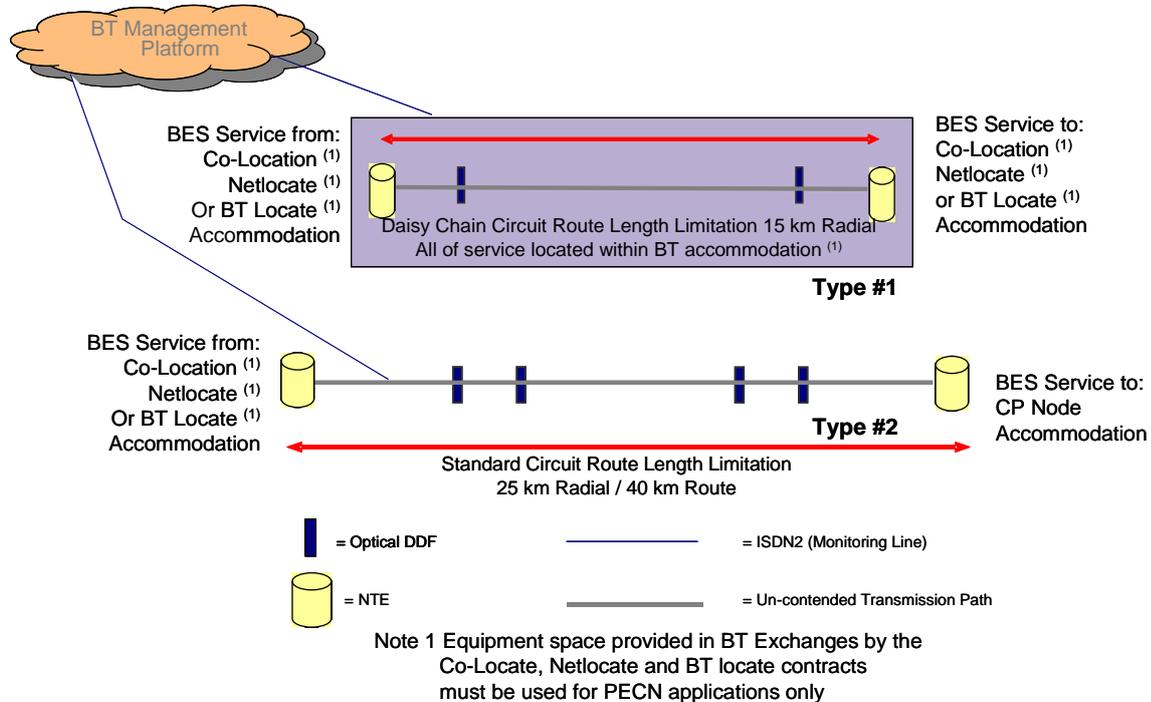
Figure 1. Typical BES 1000 service configurations

Note. Figure 1 depicts two separate circuit scenarios, not a combined service.

The upper horizontal black line (#1 - NTE to NTE) represents a BES circuit where both ends have a common serving exchange.

The lower line (#2) represents a circuit where the ends are served from different exchanges.

It is envisaged that CPs will use this service for the interconnection of Gigabit Ethernet Local Area Networks (LAN). The BES 1000 service is connected for operational support purposes to the Backhaul Extension Services management platform.

A schematic of the BES 1000ER service is shown in Figure 2.
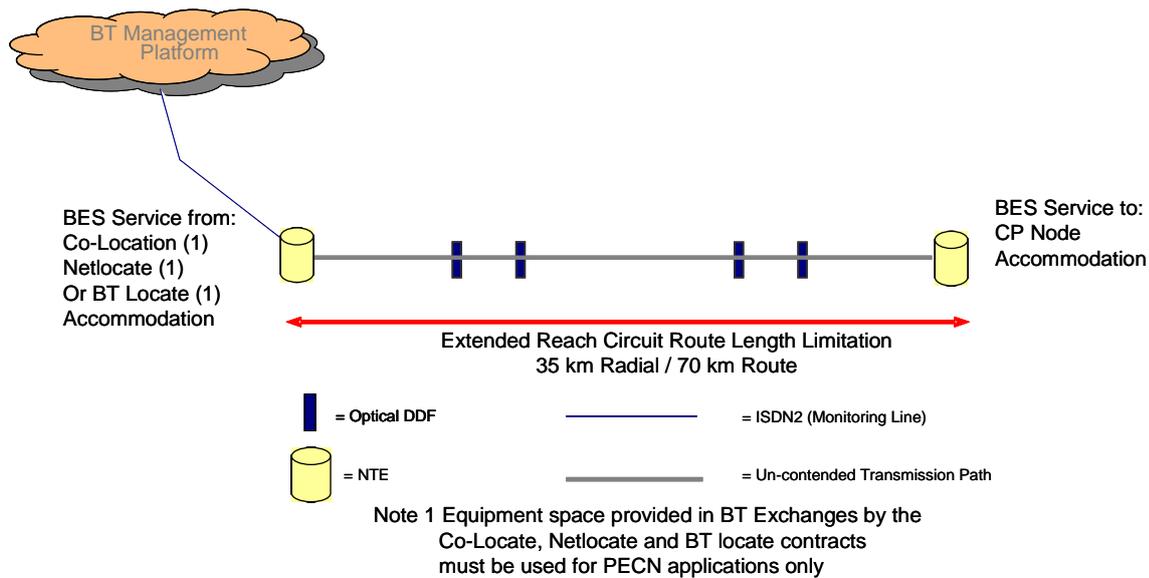
Figure 2. Typical BES 1000ER service configuration

3 Customer Interface

Gigabit Ethernet conforms to the IEEE 802.3 standard. It is conventional Ethernet but 10 times faster than Fast Ethernet, operating at 1000 Mbit/s instead of 100 Mbit/s. Based on the IEEE 802.3z[1] Gigabit Ethernet standard, data can move from 10 Mbit/s to 100 Mbit/s to 1000 Mbit/s without protocol translation or changes to application and networking software.

The interface is the Network Termination Point (NTP), i.e. the point of connection on the BT Network Terminating Equipment (NTE) for connecting CP equipment.

3.1 Connector

The Interface consists of a Dual SC type 1000BaseSX **or** LX fibre interface port (**not both on a single NTE**). The CP provides the fibre patch connectors between NTE and customer equipment. The maximum fibre length between the NTE and CP equipment is 550 metres for SX (850nm multi-mode) ports when 50/125 micron optical patch cords are used or 220 metres if 62.5/125 micron optical patch cords are used. For LX (1310nm single-mode) ports, the maximum fibre length is 3 kilometres when a 9/125 micron optical patch cable is used.

The SX and LX type interface are as specified in the Gigabit Ethernet IEEE802.3z[1] specifications. Attention is drawn to the Intellectual Property Rights (IPRs) set out in the preface of this agreed International standard. It is the responsibility of the supplier of the CP equipment to ensure that they have the necessary rights from the owner of the IPR. The IPR owner has stated that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world.

3.2 Transmission

The NTE is capable of transporting IEEE 802.1q[2] VLAN-tagged frames of 1522 bytes in length, as well as being capable of transporting frames of up to 1548 bytes in length to maintain compatibility with a large number of vendor proprietary frame tagging formats. The NTE can transport frames in both directions simultaneously (full duplex) at wire-speed without frame loss or error.

Note. The definition of frame length includes the 4-byte CRC but does not include any preamble.

The NTE does not have the capability to intercept and / or view 'customer data'.

3.3 Network Link Break

When a break is detected on the Openreach network link, an 8B/10B specific fault signal is continuously transmitted on the customer interface to indicate the state of the infrastructure. This continues until such time as the network break is repaired.

On the BES 1000Mbit/s products only, Openreach will offer the option to choose fault signalling using c1/c2 or K28.5 protocol corresponding to network link loss forwarding (LLF). Customer LLF is not available.

Note: For c1/c2 signalling type to work, auto negotiation must be enabled on the customer's equipment. It is recommended in any case, that auto negation is enabled for 1000Mbit/s interfaces. Historically the default setting used for fault signalling on this service has been K28.5.

4 Power Supply

4.1 General

By placing a order with BT the customer has accepted the conditions placed by BT. In relation to powering of equipment, the customer must comply with the requirements of BS7671 and the details giving within the 'DC Power Planning and Installation Guide for WES-BES Products' document.

The Openreach BES 1000 NTE is locally powered and offers AC or DC power options. The CP will be required to provide either 50Hz AC mains supply in the form of a standard 13 Amp power socket(s), or dual -50V DC power distributions and Earth connections, with all wiring colour schemes conforming to BS 7671 (IEE Wiring Regulations). It will be the customer's responsibility to ensure that the power supply is fused and safe for Openreach to use. These should be in close proximity to the NTE installation location.

4.2 Installation and Testing

In addition to the NTE and Chassis powering requirements below, a spare 50Hz AC mains supply 13A socket should also be provided in close proximity to the NTEs, to power BT test equipment during both initial commissioning and subsequent maintenance support activities.

4.3 AC Power Connection

AC power connection between Openreach equipment and the power socket will be made using a standard IEC320 C13-14 power lead fitted with standard 13A plugs. The NTE itself has dual power supply units internally, but only requires one mains supply socket.

- **For most installations:**
  This will require one power connection for each NTE provided, and the consumption of the BT NTE and power unit chassis in this managed service arrangement will be no more than 30 Watts per NTE.

- **For larger installations (at Openreach discretion):**
  At Openreach's discretion, where a large number of systems of one type are being deployed, a 16-slot NTE chassis version may be deployed. This will require two power connections for each 16 slot chassis provided. The consumption with a maximum number of 16 service cards provided will be no more than 200 Watts per chassis.

4.4 DC Power Connection

The DC In-Line (Molex) connector is specified as the standard method of connecting DC power by Openreach, and represents the "Demarcation Point" between Openreach and the customer. At their site, the customer is required to provide suitable power and earth connection to, and be responsible for the supply, wiring and labelling to the demarcation point. Openreach will not supply or install the DC distribution system as part of the standard Ethernet installation.

- **Customer provided wiring up to the Openreach specified In-Line connector.**

  Wiring, MCB isolation or fuse (i.e. C Type MCB or Cartage Fuse), must be provided by the customer, up to and including the DC in-line connector, as per BT's requirements stated within the 'DC Power Planning and Installation Guide for WES-BES Products' document with respect to:

  (i) Correctly rated MCB/Fuse: refer to BES product handbook for correct rating

  (ii) Correct labelling of wiring and MCB/fuse positions compliant with BS 7671,

  (iii) Correct size of cable for required voltage drop at required maximum current,

  (iv) Separately fused isolatable A & B power supplies, as detailed in the 'DC Power Planning and Installation Guide for WES-BES Products' document.

  The in-line connector has a maximum current handling capability of 11A, and is not to be used for equipment requiring greater than a 11A supply (such as the Nortel OPTera 5200 equipment, which require 20A feeds).

  Refer to the BES Product Handbook as detailed in Section 7 below.

For further details on the provision of DC Power, see the 'DC Power Planning and Installation Guide for WES-BES Products' available on the Openreach Ethernet website.

If there is a conflict between DC power information contained in the 'DC Power Planning and Installation Guide for WES-BES Products' and the SIN document, the order of precedence shall be as follows:

(a) DC Power Planning and Installation Guide for WES-BES Products

(b) SIN

4.5 Monitoring

The monitoring router for BES 1000 requires AC power. This is irrespective of the power option selected for the NTE. This will need to be provided as a local 50 Hz AC supply in the form of standard 13 Amp power socket.

5 Customer Apparatus Design / Installation Advice

The BES 1000 service has been designed such that any vendors' switch or router that has IEEE 802.3z compatible interfaces of the SX or LX variety will be able to connect to each NTE.

6 Technical Specification

Protocol	Gigabit Ethernet IEEE 802.3z
Line Rate	1.25 Gb/s
Maximum Bit Error Rate	10-12
Power Requirement	Mains voltage 50 Hz AC input
Customer Fibre Connector	SC type
SX Fibre Cable *Customer provided*	Multi-mode 850nm, 50/125 or 62.5/125 micron patch
SX Fibre *Maximum Delivery Distance*	550m from NTE's SX port using 50/125 micron patch 220m from NTE's SX port using 62.5/125 micron patch
LX Fibre Cable *Customer provided*	Single-mode 1310nm, 9/125 micron patch
LX Fibre *Maximum Delivery Distance*	3Km from NTE's LX port
Operating Temperature	0° to 40° C
Laser Safety	Class 1 under all conditions as per IEC 825-1

TABLE 2. TECHNICAL SPECIFICATION

7 Further Information

Further enquiries concerning the connection availability between particular sites and for further information on the BES 1000 service please contact your company's Openreach Sales & Relationship Business Manager, or see https://www.openreach.co.uk/orpg/home/products/ethernetservices/backhaulextensionservices/bes.do

8 References

IEEE Standards:

[1]	IEEE 802.3z	IEEE standards for Gigabit Ethernet in the LAN/MAN environment	1998
[2]	IEEE 802.3q	VLAN tagging of ethernet frames	1998

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

BES	[BT] Backhaul Extension Services
CP	Communications Provider (Providers of Electronic Communications Services)
BTNR	BT Network Requirement
CPE	Customer Premises Equipment
CRC	Cyclic Redundancy Check
DDF	Digital Distribution Frame
IEEE	Institute of Electronic & Electrical Engineers
IPR	Intellectual Property Rights
LAN	Local Area Network
LES	LAN Extension Service
LX	Long Wavelength (1310nm)
MCB	Mini Circuit Breaker
NTE	Network Terminating Equipment
NTP	Network Terminating Point
PoC	Point of Connect
SAN	Storage Area Network
SHDS	Short Haul Data Service
SIN	Suppliers' Information Note
SX	Short Wavelength (850nm)
VLAN	Virtual Local Area network

10 History

Issue	Date	Changes
1.0	27 May 2005	First published.
1.1	29 Sep 2006	Service description updated to be Equivalence of Input compliant. BES1000 Extended Reach product added.
1.2	30 Oct 2007	Service description amended in accordance with updated DC power guidance
1.3	18 Mar 2009	Co-location references replaced with Licenced Facility references. In-line connector's maximum current handling capability increased. Section added on Network Link Break. Contact Point amended and editorials made.
1.4	March 2011	Amended to notify no new service will be made available
1.5	March 2013	Amended to notify removal of all modify options (Bandwidth upgrade, shift, re-site & rearrange)
1.6	April 2015	Amended to notify that this Product will longer be supported as from 1 April 2018 In section 7, Updated link for further information Change SINet site references from http://www.sinet.bt.com to

		http://www.btplc.com/sinet/

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