



## Suppliers' Information Note

*For the BT Network*

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# 21CN Optical Solution

## Service & Interface Description

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## 1. Introduction

This Suppliers' Information Note (SIN) describes the 21CN Optical Solution and its interfaces. The 21CN Optical Solution is a BT Connectivity Services product within the BT Optical services portfolio.

## 2. Service Outline

The 21CN Optical Solution is an end-to-end wavelength service delivered over Ciena 6500 optical multiplexer based Dense Wavelength Division Multiplexing (DWDM) technology. The 21CN Optical Solution is suitable for connecting together enterprise customer premises, communications providers' premises, third party data centres and BT 21CN Core/Metro Nodes.

High bandwidth connectivity of up to 100Gb/s per service is offered. The service can be provided over a dedicated or shared 40Gb and 100Gb wavelengths.

The elements of the service are:

- **Service:** this is the end-to-end circuit at 10Gb, 40Gb or 100Gb offered to the customer
- **Wavelength:** used to transport the 10Gb, 40Gb and 100Gb services delivered to the customer. It is carried over the BT 21CN optical core network and suitable Openreach access products
- **Openreach Access Products:** these provide connectivity from the Ciena 6500 optical multiplexer equipment installed in BT 21CN Core/Metro Nodes to the customer's equipment. Depending on the location of the customers' equipment one of four Openreach access products can be used
  1. 10Gb Optical Spectrum Access (OSA) or Optical Spectrum Extended Access (OSEA)
  2. 40Gb/100Gb Openreach Optical Spectrum Extended Access (OSEA) 6500
  3. In-building (Internal) Cablelink
  4. In-span (External) Cablelink

Where the OSA, OSEA or OSEA6500 access product is used to deliver the 21CN Optical Solution to the customer, the customer interface will be part of the OSA, OSEA or OSEA6500 product

For details of the customer interface specifications for the Openreach OSA please refer to SIN 489 at <http://www.btplc.com/sinet/>. Note: Only the 10Gb Ethernet interface option is applicable to the 21CN Optical Solution

For details of the customer interface specifications for the Openreach OSEA please refer to SIN 490 at <http://www.btplc.com/sinet/>. Note: Only the 10Gb Ethernet interface option is applicable to the 21CN Optical Solution

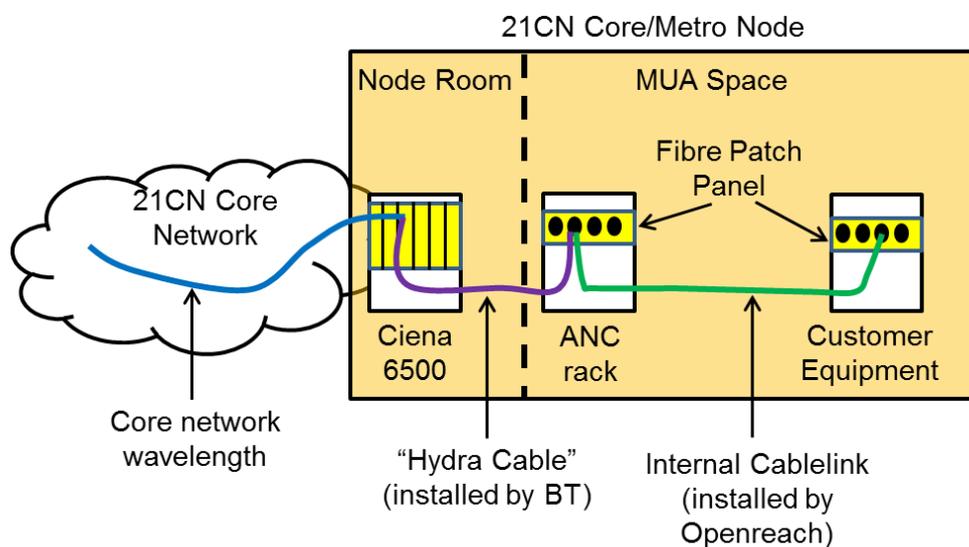
For details of the customer interface specifications for the Openreach Ciena 6500 OSEA please refer to SIN 514 at <http://www.btplc.com/sinet/>. Note: Only the 10Gb, 40Gb and 100Gb Ethernet interface options are applicable to the 21CN Optical Solution

Where an Internal or External Cablelink product is used, the information in this SIN applies.

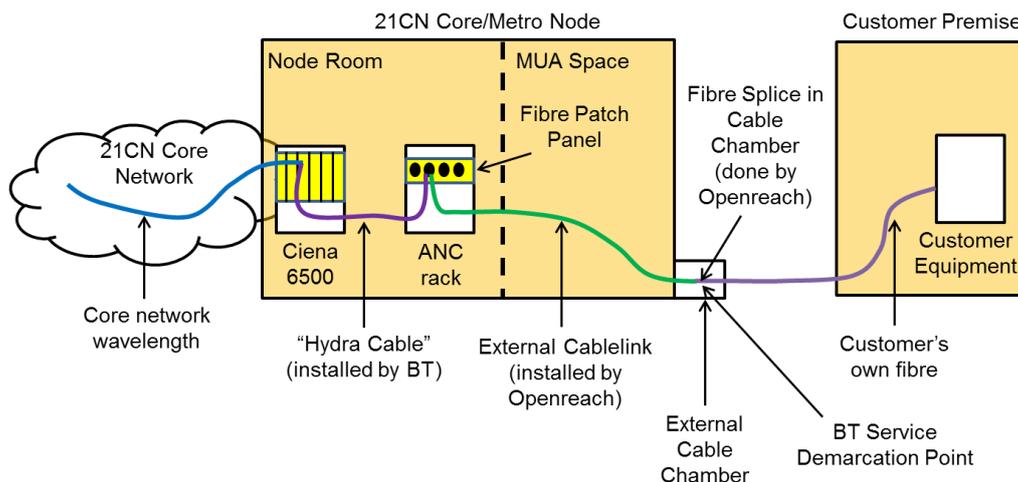
The 21CN Optical Solution has no maximum radial distance between the customer's equipment. However, additional amplification may be required as the fibre route distance increases.

### 3. Customer Interface

The presentation to either the customer or the Openreach OSA/OSEA/OSEA6500 access product will be via a fibre patch panel with Subscriber Connector/ Angled Polished Connector ("SC/APC") connectors or Little Connector (LC). The SC/APC or LC connectors are the termination point of the Openreach Internal Cablelink product.



For the External Cablelink, the presentation to the customer will be a fibre splice between the External Cablelink and the customer's own fibre in the 21CN Core/Metro Node cable chamber. The fibre splice will be provided by Openreach and is the termination point of the Openreach External Cablelink product.



## 4. Services Supported

The services are available with the following bandwidths/protocols:

- 10 Gigabit Ethernet (LAN PHY)
- 10 Gigabit Ethernet (WAN PHY)
- 40 Gigabit Ethernet
- 100 Gigabit Ethernet

21CN Optical Solution services are intended for connection to standard optical interfaces of 850nm multimode or 1310nm and 1550nm single mode types. 1310nm multimode fibre interfaces are not supported. No electrical interfaces are offered. Table 1 gives details of the client interface options

Client Interfaces						
Service Supported	Bandwidth	Interface Card	850nm	1310nm	1310nm	1550nm
			MM	MM	SM	SM
10 Gigabit Ethernet (LAN PHY)	10.3125Gb	4x10Gb and 10x10Gb Ethernet	Customer Site only OSEA6500 access only (Note 1)	No	Customer Site, Core Node and Data Centre Node	Core Node and Data Centre Node only (Note 2)
10 Gigabit Ethernet (WAN PHY)	9.95328Gb	4x10Gb and 10x10Gb Ethernet	Customer Site only	No	Customer Site, Core Node	Core Node and Data Centre

			OSEA6500 access only (Note 1)		and Data Centre Node	Node only (Note 2)
40 Gigabit Ethernet	41.25Gb	1x40Gb Ethernet	Not Available (Note 3)	No	Customer Site, Core Node and Data Centre Node	Not Available
100 Gigabit Ethernet	103.125Gb	1x100Gb Ethernet	Not Available (Note 3)	No	Customer Site, Core Node and Data Centre Node	Not Available

Note 1 - The OSEA 6500 offers an 850nm multi-mode 10GE client interface, but it is not offered by the OSA, OSEA or the NGWDM Core network. The 850nm multi-mode 10GE client interface is only available at Customer Sites connected to the BT 21CN optical core network via an OSEA 6500 access product

Note 2 - The BT 21CN optical core network offers a 1550nm single mode 10GE client interface, but it is not offered by the OSA, OSEA or OSEA 6500 access products. The 1550nm single mode 10GE client interface is only available in Core Nodes or Data Centre Nodes; it is not available at Customer Sites

Note 3 – The OSEA 6500 access product offers 40GE 850nm SR4 & 100GE 850nm SR10 client interface options, and the 21CN optical core network offers a 100GE 850nm SR10 client interface. These 850nm multi-mode fibre types are not offered on the 21CN Optical solution because they use MPO (Multi-fibre Push On) compliant connectors on multi-fibre cables. To be used, they would require direct connection between the BT equipment & the customer equipment without use of an Openreach access product.

## 5. Service protection

Two levels of end to end bearer/wavelength protection are available:

- 21CN Optical Standard
- 21CN Optical Resilience Option 2

Wavelength switching is not offered on the 21CN Optical Solution

For more details on the bearer/wavelength resilience options please refer to the Wholesale Optical and Optical Connect Core product description documentation.

For Wholesale Optical this can be found at: [www.btwholesale.com](http://www.btwholesale.com)

For Optical Connect, this can be found at: [www.globalservices.bt.com](http://www.globalservices.bt.com)

## 6. Geographic Availability

The 21CN Optical solution is offered throughout the UK subject to survey.

## 7. Buffer Crediting

The 21CN Optical solution does not support buffer crediting but is transparent to the customer own equipment distance extension protocols.

## 8. Fibre

Where a service employing a single mode interface is provided, all fibre connections to and from the optical patch panel use single mode fibre 9/125 micron according to ITU-T G.652

Where a 10Gb service employing a multimode interface is provided, all fibre connections to and from the optical patch panel use multimode fibre 62.5/125 micron or 50/125 micron @ 850nm according to ITU-T G.651

## 9. Client Side Optics

Table 2 below provides details of the optical power margins for both the receive and transmit interfaces of the client facing optical interfaces

Supported Client Rates	Interface Type	Receiver Minimum (dBm)	Receiver Overload (dBm)	Transmit Minimum (dBm)	Transmit Overload (dBm)
10GE LAN PHY, 10GE WAN Phy,	SM (1310)	-11	-1	-6	-1
10GE LAN PHY, 10GE WAN Phy,	MM (850)	-11.2	0	-8.2	0
40GE	SM (1310)	-11.5	2.3	-2.3	2.3
100GE	SM (1310)	-8.6	4.5	-2.3	4.5

## 10. Further Information

For enquiries concerning connection availability between particular sites and for further product information about the 21CN Optical solution, please contact your BT Account Manager or Sales Specialist.

If you have enquiries relating to this document then please contact: [sinet.helpdesk@bt.com](mailto:sinet.helpdesk@bt.com)

## 11. References

1	ITU-T G651	Recommendation G.651 – Characteristics of a 50/125um multimode graded index optical fibre cable
2	ITU-T G.652	Recommendation G.652 – Characteristics of a single mode optical fibre cable
3	IEC 61754-7	Standard for “Fibre Optic Interconnecting Devices & Passive Components – Fibre Optic Connector Interfaces – Part 7 MPO Connector Family
4	ETSI	European Telecommunication Standards Institute
5	SIN 489	Optical Spectrum Access, Service & Interface Description
6	SIN 490	Optical Spectrum Extended Access, Service & Interface Description
7	SIN 514	Optical Spectrum Extended Access 6500 (OSEA 6500), Service & Interface Description

## 12. Glossary of Terms

Abbreviation or term	Explanation
21CN	21st Century Network
BT	British Telecommunications plc
DWDM	Dense Wave Division Multiplexing
Gb	Gigabits per Second
LAN	Local Area Network
MM	MultiMode
NTP	Network Terminating Point
OSA	Optical Spectrum Access
OSEA	Optical Spectrum Extended Access
PHY	Physical Layer
SIN	Supplier Information Note
SM	Single Mode
WAN	Wide Area Networks

Abbreviation or term	Explanation
WDM	Wave Division Multiplexing

### 13. Document Change Control

Date	Version	Reason for Change	Author	Contact Details
29/06/2015	1	First issue	T Hubbard	07918 029088
March 2016	2	Addition of LC connectors as service handover option	T Hubbard	07918 029088