

Enable Networks UFB Services Agreement  
Service Description for Bitstream 4 at NBAP locations

Version 1 September 2023

## 1 Interpretation

- 1.1 The Bitstream 4 Service described in this Service Description will be available from the date it is launched by the LFC. The LFC will notify the Service Provider of the launch date for the Bitstream 4 Service.
- 1.2 References to clauses or sections are references to clauses or sections in this Service Description unless expressly provided otherwise. The definitions set out in the General Terms and the Operations Manual apply to this Service Description unless expressly provided otherwise.
- 1.3 References to the Operations Manual are references to the Operations Manual for the Bitstream Services.
- 1.4 References to Bitstream 4 in this Service Description are Bitstream 4 Services delivered to an NBAP location. NBAP locations are further clarified in section 9.

## 2 The Bitstream 4 Service

- 2.1 The Bitstream 4 Service is a high speed single-class Bitstream Service suitable for complex business grade applications delivered over point-to-point fibre access to an NBAP location. Bitstream 4 is part of the UFB family of Bitstream Services:

Bitstream 2a	Based on the TCF Mass Market service.
Bitstream 3	Based on the TCF Business service.
Bitstream 3a	Based on the TCF Business service with Low Priority options.
Bitstream 4	Based on the TCF Business Premium service.
Hyperfibre 2 & 3	Based on the LFC Hyperfibre Service Description
UFB Handover Connection	Based on the TCF E-NNI specification.
Multicast	Based on the TCF Ethernet Multicast Access ( <b>EMA</b> ) service.
ATA Voice	An analogue telephone access service.

- 2.2 Diagrams of the configuration for the Bitstream 4 Service are set out in Appendix A. The Bitstream 4 Service provides an Access-EPL Bitstream Service from the UNI at an NBAP location to a UFB Handover Connection Service located at the POI that enables a Service Provider to access and interconnect with the LFC Network.
- 2.3 The Bitstream 4 Service is an input service which a Service Provider can combine with other LFC services (or with the Service Provider's own network or wholesale services provided by other Service Providers) to provide fibre based telecommunications services to NBAP locations.
- 2.4 The Bitstream 4 Service at NBAP locations has the following key characteristics:
- 2.4.1 Support for solely glass-only access termination types
- 2.4.2 It is available in two Access Rate configurations:
- a) 1/1 Gbps (1000/1000 Mbps);
  - b) 10/10 Gbps (10000/10000 Mbps)
- where the Access Rate defines the maximum bandwidth that can be consumed on the access.
- 2.4.3 An Access-EPL Bitstream Service delivered over Active Optical Network (P2P) fibre that allows up to 4050 VLANS to be passed transparently from the NBAP location to the Service Provider's UFB Handover Connection at the POI.

- 2.4.4 A range of standard service plans are offered as outlined in 3.4.4.
- 2.4.5 Supports tagged or untagged traffic.
- 2.4.6 Supports Access Diversity as an optional feature.
- 2.4.7 A connectorized fibre tail UNI that plugs into a compatible SFP/SFP+ in the NBAP CPE:
  - a) 1Gbps access rate (1000Base-X) with High Priority (CoS)
  - b) 10Gbps access rate (10GBase-X) with High Priority (CoS)
- 2.4.8 Complies with the Business Premium service specified in the *TCF Ethernet Access Service Description v33, 11 May 2017*.

### 3 Bitstream 4 Service and implementation activities

#### **Installation Services**

- 3.1 There is not a Standard Install for the Bitstream 4 Service at NBAP locations and the LFC will provide the installation of the Bitstream 4 Service at NBAP locations as an Ancillary Service (which will be charged to the Service Provider by Price on Application (POA))

#### *Provisioning at NBAP locations*

- 3.1.1 The installation may include approved conduit or open trenches arranged by the Service Provider or other third parties.
- 3.1.2 While there is not a Standard Install for the Bitstream 4 Service to an NBAP location, an installation would generally include:
  - (a) a Fibre Lead-in from the Fibre Access Point to an ETP at the closest convenient location at the NBAP, as agreed with the Service Provider, and
  - (b) an extension of the Fibre Lead-in from the ETP (there will not necessarily be a break in the Fibre Lead-in at the ETP) to:
    - (i) a suitable mounted SC/APC connector at a secure location inside the NBAP; or
    - (ii) if there is an OFDF beyond the ETP, a splice or LC/APC connector on the OFDF.

#### *NBAP Termination Point*

- 3.1.3 The termination point of the Layer 1 component of the Bitstream 4 Service at an NBAP location between the LFC Network and the NBAP wiring is, as applicable, either:
  - (a) the SC/APC plug on the end of the Fibre Lead-in from the ETP (which is the jack); or
  - (b) if there is an OFDF beyond the ETP, a splice or LC/APC plug on the OFDF.
- 3.1.4 The termination point of the Layer 2 component of the Bitstream 4 Service for a glass-only interface is:
  - (i) when delivered over 1 Gbps Access Rate (Optics), using 1000Base BiDi TX1310/RX1490nm (10km or 40km) to the Layer 1 Termination point described in Clause 3.1.3
  - (ii) when delivered over 10 Gbps Access Rate (optics), using 10GBASE BiDi TX1270/RX1330nm (10km or 40km) to the Layer 1 Termination point described in Clause 3.1.3

#### *Installation of Glass-only*

- 3.1.5 A Service Provider may only request installation with an optic interface, i.e. glass-only.
- 3.1.6 The Service Provider must provide a suitably located mains power outlet for the NBAP Equipment (CPE) which is not provided as part of an installation.

#### *Testing*

- 3.2 The LFC will test the Fibre Lead-in from the termination point at the NBAP location referred to in clauses 3.1.3 and 3.1.4 to the Central Office where the access node is located to ensure the fibre is within the technical specification for fibre set out in Appendix B.

#### *Additional Services*

- 3.3 If the Service Provider requires additional services such as:
  - 3.3.1 Provision of diversity at an NBAP location;
  - 3.3.2 Installation of Fibre-Lead-in diversity at an NBAP location (from the FAP to the ETP or OFDF as applicable);
  - 3.3.3 Premises wiring services; or
  - 3.3.4 Installation and testing of Service Provider equipment and services,then the LFC may be able to provide the services in clauses 3.3.2 to 3.3.4 on request subject to terms to be agreed between the LFC and the Service Provider. The service in clause 3.3.1 is available on terms as set out in this Agreement.

#### **Core Bitstream 4 Service**

- 3.4 The core Bitstream Services provided as part of the Bitstream 4 Service are as follows:
  - 3.4.1 An Access-EPL Service that supports transparent pass-through of 802.3 and 802.1Q frames on a designated UNI delivered at an NBAP location.
  - 3.4.2 Delivered over a single 802.1ad SVLAN or Double Tagged QnQ on the E-NNI at the POI.
  - 3.4.3 All tagged and untagged traffic sent from the Service Provider is treated as High Priority.

3.4.4 Multiple service plans are available to Service Providers, using the following parameters:

- (a) Access Rate; and
- (b) Service bandwidth

as set out in the table below.

<b>Product Name</b>	<b>Access Rate</b>	<b>High Priority Bandwidth</b>	<b>Low Priority Bandwidth</b>
NBAP Bitstream 4 1G CIR 100	1 Gbps	100/100 Mbps	0/0
NBAP Bitstream 4 1G CIR 200	1 Gbps	200/200 Mbps	0/0
NBAP Bitstream 4 1G CIR 500	1 Gbps	500/500 Mbps	0/0
NBAP Bitstream 4 1G CIR 1G	1 Gbps	1/1 Gbps	0/0
NBAP Bitstream 4 4G CIR 4G	10 Gbps	4/4 Gbps	0/0
NBAP Bitstream 4 10G CIR 10G	10 Gbps	10/10 Gbps	0/0

3.4.5 Access Rates defines the maximum downstream and upstream Layer 2 bandwidth allowed for that Access Rate:

- a) 1000/1000 Mbps (1/1Gbps);
- b) 10000/10000 Mbps (10/10Gbps)

Note the transmission of Ethernet frames includes additional overheads such as Ethernet preamble, frame delimiters and inter-frame gaps. This limits the maximum throughput to ~90% of the physical medium speed depending on frame size.

3.4.6 The Bitstream 4 Service has similar characteristics to the other services within the UFB family of Bitstream services as identified below:

Attribute	Bitstream 2a	Bitstream 3	Bitstream 3a	Hyperfibre 2	Hyperfibre 3	Bitstream 4
Bitstream	A-EVPL	A-EPL	A-EPL	A-EVPL	A-EPL	A-EPL
High Priority	Yes	Yes	Yes	Yes	Yes	Yes
Low Priority	Yes	No	Yes	Yes	Yes	No
Service Bandwidths <sup>1</sup>	From 50/10 Mbps up to 100/50 Mbps	From 2.5Mbps up and downstream to 100/100 Mbps	100/100 Mbps with High Priority from 2.5Mbps	2 Gbps 4 Gbps 8 Gbps	2 Gbps 4 Gbps 8 Gbps	100 Mbps 200 Mbps 500Mbps 1 Gbps 4 Gbps 10 Gbps
MTU	2000 Bytes	2000 Bytes	2000 Bytes	2000 Bytes	2000 Bytes	9100 Bytes
MAC addresses	16	64	64	16	64	128
Number of available UNIs	4 standard	4 standard	4 standard	1x 10G RJ45 4x 1G RJ45	1x 10G RJ45 4x 1G RJ45	1 (with a second UNI available on request for NID only)
L2CP support	No	No	No	No	No	Limited
Diversity	On request with limited availability	On request with limited availability	On request with limited availability	On request with limited availability	On request with limited availability	Available to Priority Users in selected areas

#### *UNI – NNI characteristics*

3.4.7 The Bitstream 4 Service requires a dedicated UNI.

3.4.8 The sum of High Priority traffic profiles of all services delivered at a UFB Handover Connection can exceed the UFB Handover Connection Service line rate. If there is insufficient line rate to deliver the High Priority traffic then frames will be randomly discarded and Service Levels do not apply. It is therefore the Service Provider's responsibility to shape and queue traffic appropriately.

- a) It is recommended the aggregate CIR service bandwidth does not exceed 70% of UNI or E-NNI physical speed.
- b) The headline rate = CIR. There is no bandwidth overhead to compensate for higher protocol encapsulation overheads.

---

<sup>1</sup> Bandwidth options for each Bitstream Service are detailed in each Bitstream Service Description and further options can be developed using the Product Development Process.

### *Operations, Administration and Maintenance*

- 3.5 A Service Provider may request particular management attributes via the Product Development Process.

### *Service Requirements*

- 3.6 To use the Bitstream 4 Service the Service Provider must have the capability to access and interconnect with it, by one of the following:
- 3.6.1 Co-locating Service Provider equipment at the POI using either a UFB Handover Connection Service or a Shared Handover Connection and Central Office and POI Co-location Service;
  - 3.6.2 Connecting to third party co-location space at the POI using the UFB Handover Connection Service, and with the third party taking the Central Office and POI Co-location Service;
  - 3.6.3 Connecting to a backhaul service at the POI; or
  - 3.6.4 By using the Direct Fibre Access Service to connect to Service Provider equipment at a remote location within the Central Office area.

### *Additional Service Characteristics*

- 3.7 The technical specification of the Bitstream 4 Service is set out in Appendix B.
- 3.8 The LFC will provide certain support and other assistance as part of the Bitstream 4 Service including:
- 3.8.1 An automated facility for Service Requests;
  - 3.8.2 An automated facility for fault notifications; and
  - 3.8.3 A tool to assist the Service Provider in determining the location and availability of the Bitstream 4 Service (pre-qualification),
- each as more particularly set out in the Operations Manual.
- 3.9 The Bitstream 4 Service specifically excludes:
- 3.9.1 The UFB Handover Connection Service;
  - 3.9.2 Provision or maintenance of any cabling or connection or active device:
    - (a) beyond the service demarcation points described in clauses 4.1 and clause 5.1; and
    - (b) between the jack terminating the LFC provided Fibre Lead-in and the UNI where that cabling or connection is not provided by the LFC and the LFC has not agreed to take responsibility for that cabling or connection.
  - 3.9.3 Configuration, monitoring, operation, on-going support or maintenance of Service Providers' applications, equipment or networks; and
  - 3.9.4 Supply of AC mains & UPS power, accommodation space, heating, ventilating, and air conditioning at the POI or NBAP location.

## **4 Service Demarcation Point at an NBAP Location**

- 4.1 For an optic fibre glass only interface, the service demarcation point at an NBAP location is the 1000Base BiDi TX1310/RX1490nm (10km or 40km) or 10GBASE BiDi TX1270/RX1330nm (10km or 40km) Layer 1 termination point described in clause 3.1.3, as applicable.

- 4.2 The Bitstream 4 Service excludes the NBAP location wiring. If a fault reported by the Service Provider is found to be caused by the Service Providers' equipment (**CPE**) or the wiring at the NBAP location beyond the service demarcation point, then the Service Provider may be charged the no fault found fee in the Price List. Note the wiring should comply with the industry standard Premises wiring requirements which are available at [www.tcf.org.nz](http://www.tcf.org.nz).

## **5 Service Demarcation Point at POI**

- 5.1 The Bitstream 4 Service is delivered as a transparent VLAN (the logical service demarcation point) on the UFB Handover Connection located at the POI.
- 5.2 The physical service demarcation point is the MOFDF in the POI which is part of the UFB Handover Connection Service.
- 5.3 The UFB Handover Connection Service is a separate service and is a prerequisite to the supply of the Bitstream 4 Service i.e. the Service Provider must first purchase and then maintain a UFB Handover Connection Service at all times while taking the Bitstream 4 Service.

## **6 LFC and Service Provider Responsibilities**

- 6.1 Other LFC and Service Provider responsibilities are detailed in the General Terms and the Operations Manual.

## **7 Fibre Diversity**

- 7.1 The Bitstream 4 Service provides a single fibre between the LFC Central Office and the NBAP location.
- 7.2 Bitstream 4 supports Access Diversity options. Bitstream 4 diversity is available as a standalone product and does not require another Enable Bitstream or Direct Fibre Access product instance in the same NBAP location. Diversity (between the Fibre Access Point and the Central Office) will be available to Priority Users on request. Standard Installation Service Levels do not apply to the provision of diversity products and each instance will be treated as an individual line for the purpose of availability Service Levels.
- 7.3 Where available, the diverse optical paths will be in separate fibre cable sheaths and where possible, in separate cable routes<sup>2</sup>. The diverse cable routes will, where possible, be a minimum of the width of a street apart and should not share any manholes or access points. Separate entries into the Central Office will also be used where available.
- 7.4 The Service Provider can also request diverse access to NBAP locations, or access to diverse Central Offices as an Ancillary Service where the network infrastructure to provide the diverse service does not already exist; however, this will not be available in all cases.
- 7.5 There may be practical limitations to providing full physical diversity to some NBAP locations. The provision of a separate entry to an LFC Central Office will have unique site specific engineering considerations and may attract additional costs.

## **8 Bitstream 4 Service Levels**

- 8.1 Service Levels for both the Layer 1 and Layer 2 components of the Bitstream 4 Service are set out in the Service Level Terms for the Bitstream Services.

## **9 NBAP Location Clarification**

- 9.1 Non-Building Access Points (NBAPs) require a unique address or NBAP location to be created and network records to be allocated. They are generally not consumed by an End User at a Premises.

---

<sup>2</sup> While it is intended to make route diversity available for all NBAP locations, in some areas route diversity may not be available, or only may be available on a limited basis.



9.2 NBAP types will take various forms with the following list defining the initial service products which can be added to over time or deleted as allowed for by the WSA:

- 9.2.1 WiFi Sites
- 9.2.2 Traffic Control (Lights/Cameras/Signals)
- 9.2.3 Security Cameras
- 9.2.4 Mobile Cellular Sites
- 9.2.5 ATMs
- 9.2.6 Lift Phones
- 9.2.7 Phone boxes
- 9.2.8 Pump Stations
- 9.2.9 Billboards
- 9.2.10 Bus Stops

## Appendix A – Diagram

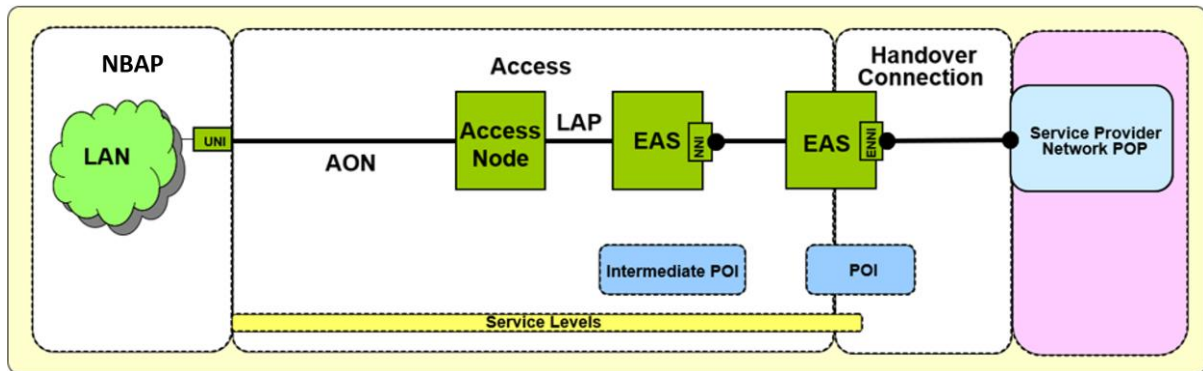


Figure 1: Bitstream 4 glass-only variant

This is a generic diagram showing the standard configuration and service demarcation points. They are not intended to represent every situation or detailed physical architecture. The following points should be noted:

- The Bitstream 4 service and pricing applies from the UNI to the E-NNI at the POI, i.e. there is no incremental charge from the intermediate POI to the POI.
- Some Bitstream Services will have a single tier of aggregation, i.e. there is no intermediate POI.
- Where there are multiple tiers of aggregation, Service Providers can pick the service up at an Intermediate POI. This intermediate POI will service a limited Coverage Area.
- Service Levels (availability, network performance) only apply to UNI to POI.
- Access node and aggregation interconnection may use redundant links to meet Service Level requirements.

## Appendix B – Technical Specification

### Technical Specification

Ethernet	<ul style="list-style-type: none"> <li>• IEEE 802.3 – 2005</li> <li>• 802.1q supporting 4050 VLANs</li> </ul>
UNI	<ul style="list-style-type: none"> <li>• Glass Only: <ul style="list-style-type: none"> <li>○ 1 Gbps = 1000Base BiDi TX1310/RX1490nm (10km or 40km)</li> <li>○ 10 Gbps = 10GBASE BiDi TX1270/RX1330nm (10km or 40km)</li> </ul> </li> <li>• MTU: <ul style="list-style-type: none"> <li>○ 9100 Bytes</li> </ul> </li> </ul>
UFB Handover Connection (E-NNI)	<p>Ethernet:</p> <ul style="list-style-type: none"> <li>• 802.1ad VLAN (SVID, CVID); or</li> <li>• Double tagged QnQ</li> </ul>
VLAN	<p>Point-to-Point (A-EPL);</p> <p>MTU:</p> <ul style="list-style-type: none"> <li>• 9100 Bytes</li> </ul> <p>Unicast Frame Delivery = passed within service CIR.  Multicast Frame Delivery = passed within service CIR.  Broadcast Frame Delivery = passed within service CIR.  Layer 2 Control Protocols Processing = limited (but may be amended by the LFC from time to time).</p>
Fibre	<p>External fibre must comply with ITU-T specification G.652D.  Internal building fibres may comply with ITU-T G.657A.  Fibre terminations must be SC/APC type connectors (complying with the IEC 61754-4 standard) or alternatively LC/APC type connectors (complying with the IEC 61754-20 standard) as appropriate.  Laser types and path characteristics expected to be designed to a minimum standard which are contained in the documents IEEE 802.3 Section 5 standard.  Testing for power loss will be at either 1310 or 1550 nm.  1625 nm reserved for non disruptive testing.</p>