



Chorus UFB Services Agreement  
Bitstream Services: Service Description for Bitstream 4

Reference Offer

June 2017

[Single fibre working]

## 1 Interpretation

- 1.1 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.
- 1.2 References to the Operations Manual are references to the Operations Manual for the Bitstream Services.

## 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. Bitstream 4 is part of the UFB family of bitstream services:

Bitstream 2	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.
UFB Handover Connection	Based on the TCF E-NNI specification.
Multicast	Based on the TCF Ethernet Multicast Access (EMA) service.
ATA Voice	An analogue telephone access service.

- 2.2 A diagram of the configuration for the Bitstream 4 Service is set out in Appendix A. The Bitstream 4 Service provides an Ethernet E-APL bitstream service from the NID:

2.2.1 inside the End User Premises, Service Provider Premises or NBAP (as applicable); or

2.2.2 at the Service Provider's co-location Footprint at a Central Office (as described in clause 3.2),

to a UFB Handover Connection Service located at the POI or (using Tail Extension) another handover point 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 End Users.

- 2.4 The Bitstream 4 Service has the following key characteristics:
- 2.4.1 An Ethernet E-APL bitstream service delivered over Active Optical Network (P2P) fibre that allows up to 4093 VLANs to be passed transparently from the End User Premises or Service Provider Premises or NBAP (as applicable) or the Service Provider's co-location space to the Service Provider's UFB Handover Connection at the POI.
  - 2.4.2 A range of standard service plans are offered.
  - 2.4.3 Supports tagged or untagged frames at the UNI.
  - 2.4.4 Can be delivered to a commercial Shared Handover Connection at the POI or (using Tail Extension) another handover point.
  - 2.4.5 Complies with the Business Premium service specified in the *TCF Ethernet Access Service Description v24, 19 January 2011*.

### 3 Bitstream 4 Service and Implementation Activities

#### *Installation Services*

- 3.1 The Bitstream 4 Service includes a Standard Install as set out in the Operations Manual.<sup>1</sup> The LFC will provide Non-Standard Installs as an ancillary service.
- 3.2 If the Service Provider elects to take delivery of the Bitstream 4 Service at the Service Provider's co-location Footprint taken pursuant to the Central Office and POI Co-location Service, a Standard Install includes connection of the Bitstream 4 Service to an LFC NID (if required) installed in the Service Provider's co-location Footprint.

#### *Termination Point*

- 3.3 The Bitstream 4 Layer 1 and Layer 2 termination points are set out in the Operations Manual.

#### *Testing*

- 3.4 The LFC will test the Fibre Lead-in from the termination point at the Premises, as referred to in the Operations Manual, 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.
- 3.5 The LFC will complete a functional test of the Bitstream 4 Service at the Layer 2 termination point at the Premises referred to in the Operations Manual.

#### *Additional Services*

- 3.6 If the Service Provider requires additional services such as:
- (a) a Non-Standard Install which includes (where required):
    - (i) the installation of the Fibre Lead-in where there is no existing fibre cabling and the installation is outside the parameters set out in the Operations Manual; or
    - (ii) installation of specialised termination equipment in an NBAP; or
    - (iii) installation of Fibre-Lead-in diversity at an End User Premises, Service Providers Premises or NBAP (as applicable) (from the FAP to the ETP or OFDF as applicable);
  - (b) provision of diversity to End User Premises or Service Provider's Premises or NBAP (as applicable) (when the second or subsequent instance of the Bitstream 4 Service is purchased);
  - (c) any Premises' wiring services; or
  - (d) installation and testing of Service Provider equipment and services,

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<sup>1</sup> Standard Install parameters may differ between LFCs

then the LFC may be able to provide items (c) and (d) on request subject to terms to be agreed between the LFC and the Service Provider. Items (a) and (b) are available on terms as set out in this Agreement.

*Core Bitstream 4 Service*

3.7 The core bitstream services provided as part of the Bitstream 4 Service are as follows:

- 3.7.1 An Ethernet E-APL Service that supports transparent pass-through of 802.3 and 802.1Q frames on a designated UNI on the NID at the End User premises, Service Provider Premises or NBAP (as applicable) (or Service Provider’s co-location space, as the case may be ).
- 3.7.2 Delivered over a single 802.1ad SVLAN on the E-NNI at the POI.
- 3.7.3 All tagged and untagged traffic sent from the End User is treated as High Priority.
- 3.7.4 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.

Access Rate	100/100 Mbps		1/1 GigE		10/10 GigE	
<b>Service Bandwidth (High Priority)</b>			100 Mbps	100 Mbps	1 Gbps	1 Gbps
			150 Mbps	150 Mbps	2 Gbps	2 Gbps
			200 Mbps	200 Mbps	3 Gbps	3 Gbps
			300 Mbps	300 Mbps	4 Gbps	4 Gbps
			500 Mbps	500 Mbps	5 Gbps	5 Gbps
	10 Mbps	10 Mbps	700 Mbps	700 Mbps	6 Gbps	6 Gbps
			1 Gbps	1 Gbps	7 Gbps	7 Gbps
	20 Mbps	20 Mbps			8 Gbps	8 Gbps
	30 Mbps	30 Mbps			9 Gbps	9 Gbps
	50 Mbps	50 Mbps			10 Gbps	10 Gbps
	70 Mbps	70 Mbps				
	100 Mbps	100 Mbps				

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

Attribute	Bitstream 2	Bitstream 3	Bitstream 3a	Bitstream 4
Bitstream	E-AVPL	E-APL	E-APL	E-APL
High Priority	Yes	Yes	Yes	Yes
Low Priority	Yes	No	Yes	No
Service Bandwidths*	From 30/10 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	From 100 Mbps up to 10 GigE
MTU	2000 Bytes	2000 Bytes	2000 Bytes	9100
MAC addresses	16	64	64	Unlimited
Number of available UNIs	4 standard	4 standard	4 standard	1 with a second UNI available on request
L2CP support	No	No	No	Limited
Diversity	On request with limited availability	On request with limited availability	On request with limited availability	Available to Priority Users in selected areas

\* Bandwidth options for each Bitstream Service are detailed in each Bitstream Service Description and further options can be developed using the Product Development Process.

#### UNI – NNI characteristics

- 3.7.6 The Bitstream 4 Service requires a dedicated UNI.
- 3.7.7 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.

#### Operations, Administration and Maintenance

- 3.8 The Bitstream 4 Service will support Service Provider remote access to the NID via a service management gateway for appropriate management. A Service Provider may request particular management attributes via the Product Development Process.

#### Service Requirements

- 3.9 To use the Bitstream 4 Service the Service Provider must have the capability to access and interconnect with it, by one of the following:
- 3.9.1 co-locating Service Provider equipment at the POI using the either a UFB Handover Connection Service or a Shared Handover Connection and Central Office and POI Co-location Service;
  - 3.9.2 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;
  - 3.9.3 connecting to a backhaul service at the POI; or
  - 3.9.4 by using the Direct Fibre Access Service to connect to Service Provider equipment at a remote location within the Central Office area.

The location of the POIs is detailed in the Operations Manual appendices.

*Additional Service Characteristics*

- 3.10 The technical specification of the Bitstream 4 Service is set out in Appendix B.
- 3.11 The LFC will provide certain support and other assistance as part of the Bitstream 4 Service including:
- 3.11.1 an automated facility for Service Requests;
  - 3.11.2 an automated facility for fault notifications; and
  - 3.11.3 a tool to assist the Service Provider in determining the location and availability of the Bitstream 4 Service (pre-qualification),
- each is more particularly set out in the Operations Manual.
- 3.12 The Bitstream 4 Service specifically excludes:
- 3.12.1 the UFB Handover Connection Service;
  - 3.12.2 provision or maintenance of any cabling or connection or active device:
    - (a) beyond the Service Demarcation Points described in clauses 4.1 and 5.1;
    - (b) between the jack terminating the LFC provided Fibre Lead-in and the NID 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;
  - 3.12.3 configuration, monitoring, operation, on-going support or maintenance of Service Providers' or End Users' applications, equipment or networks; and
  - 3.12.4 supply of AC mains & UPS power, accommodation space, heating, ventilating, and air conditioning at the POI or End User Premises or Service Provider Premises or NBAP (as applicable).
- 4 Service Demarcation Point at End User Premises or Service Provider Premises or NBAP (as applicable)**
- 4.1 The Service Demarcation Point at the End User Premises, Service Provider Premises or NBAP (as applicable) is, as applicable, either:
- 4.1.1 for an RJ45 electrical interface the 100/1000/10GBase-T UNI on the NID; or
  - 4.1.2 for an optic fibre glass only interface the 100Base-FX /1000GBase-LX Layer 1 termination point described in paragraph 3.3, as applicable.
- 4.2 The Bitstream 4 Service excludes the End User Premises', Service Provider Premises' or NBAP's (as applicable) wiring. If a fault reported by the Service Provider is found to be caused by the End User Premises', Service Provider Premises' or NBAP's (as applicable) equipment (CPE) or the wiring at the End User Premises, Service Provider Premises or NBAP (as applicable) beyond the Service Demarcation Point, then the Service Provider may be charged the "No fault found" Ancillary Charge 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 or, using Tail Extension, at another handover point.
- 5.2 The physical service demarcation point is the MOFDF in the POI which is part of the UFB Handover Connection Service, or where Tail Extension is used, another handover point.
- 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 an 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.

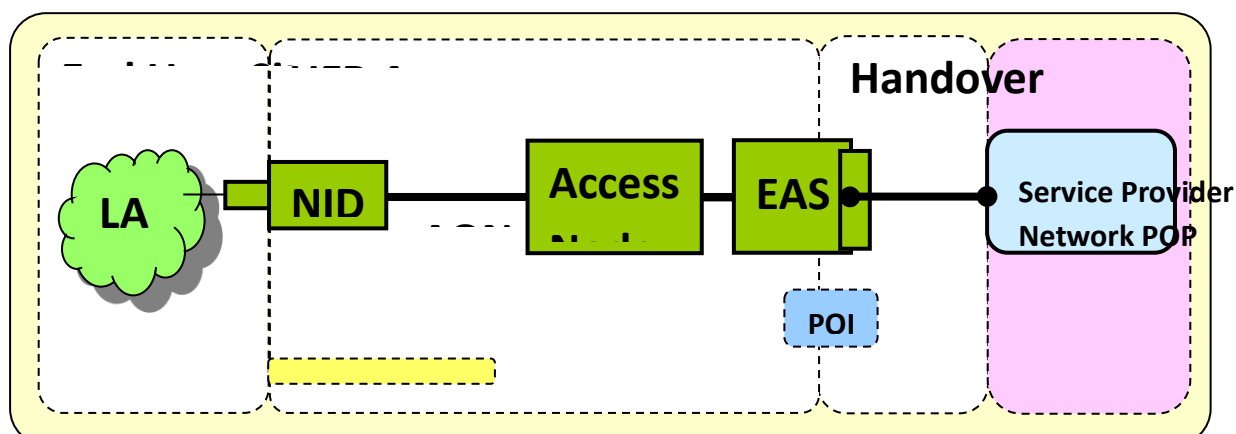
**7 Fibre Diversity**

- 7.1 The Bitstream 4 Service provides a single fibre between the LFC Central Office and the End User Premises, Service Provider Premises or NBAP (as applicable).
- 7.2 Diversity (a second or subsequent instance of the Bitstream 4 Service between the Fibre Access Point and the Central Office) will be available to Priority Users on request for Premises located in major health-care facilities, secondary or tertiary education centres, central business districts, industrial parks, business parks and strip malls. Diversity, as a standard product, may not be available to Premises outside of these areas. Standard Installation Charges and Service Levels do not apply to the provision of diversity products that involve diverse access to the End User Premises, Service Provider Premises or NBAP (as applicable) or access to a Central Office that is not the local Central Office. Each instance of the Bitstream 4 Service, primary and diverse, 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 if requested in separate cable routes. The diverse cable routes will 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 End User Premises, Service Provider Premises or NBAP (as applicable), or access to diverse Central Offices as part of a Non-Standard Install; however this will not be available in all cases.
- 7.5 Where practicable the LFC will also provide diversity in situations other than those listed in clause 7.2 on request as an additional service.
- 7.6 There may be practical limitations to providing full physical diversity to some sites. 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.

## Appendix A – Diagram



This is a generic diagram showing the standard configuration and Service Demarcation Points. It is 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.
- The Service Provider can request Tail Extension to extend the Bitstream 4 Service to a remote POI.
- 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 4093 VLANs</li> </ul>
UNI	<ul style="list-style-type: none"> <li>• RJ45 <ul style="list-style-type: none"> <li>○ 100 Mbps = 100BaseT</li> <li>○ 1 Gbps = 1000Base-T</li> <li>○ 10 Gbps = 10GBase-T</li> </ul> </li> <li>• Glass Only <ul style="list-style-type: none"> <li>○ 100 Mbps 100Base-FX <ul style="list-style-type: none"> <li>- Dual Fibre working <ul style="list-style-type: none"> <li>• 1310 nm</li> </ul> </li> <li>- Single Fibre Working (customer end) <ul style="list-style-type: none"> <li>• TX 1310 nm</li> <li>• RX 1490 nm</li> </ul> </li> </ul> </li> <li>○ 1 Gbps 1000Base-LX <ul style="list-style-type: none"> <li>- Dual Fibre working <ul style="list-style-type: none"> <li>• 1310 nm</li> </ul> </li> <li>- Single Fibre Working (customer end) <ul style="list-style-type: none"> <li>• TX 1310 nm</li> <li>• RX 1490 nm</li> </ul> </li> </ul> </li> </ul> </li> </ul> <p>MTU</p> <ul style="list-style-type: none"> <li>○ 9100 Bytes</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 (E-APL)</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 or 657A.  Internal building fibres cables must meet appropriate fire regulations i.e. be Flame-Retardant, Non Corrosive, Low Smoke, Zero Halogen (FRNC/LSZH).</p> <p>Fibre terminations must be SC/APC type connectors (complying with the IEC 61754-4 standard) or alternatively LC/APC also known as LCA type connectors (complying with the IEC 61754-20 standard) as appropriate.</p> <p>Laser types and path characteristics expected to be designed to a minimum standard which are contained in either IEEE 802.3 Section 5 standard or ITU-T G.984 standards.</p> <p>Testing for power loss will be at either 1310 or 1550 nm  1625 nm reserved for network maintenance testing purposes compliant with ITU-T L.41.</p>