



Chorus UFB Services Agreement
Bitstream Services: Service Description for
NGA Tail Extension

February 2017

1 Interpretation

- 1.1 This Service Description is part of the Agreement as that term is defined in the Chorus Reference Offer.
- 1.2 The purpose of this Service Description is to detail the terms and conditions under which NGA Tail Extension Service will be provided.
- 1.3 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.
- 1.4 Except to the extent modified by this Service Description, the following Chorus Reference Offer documents apply to the provision of the NGA Tail Extension Service:
- 1.4.1 General Terms; and
- 1.4.2 Bitstream Service – Operations Manual.
- 1.5 The General Terms in the Chorus Reference Offer are modified:
- 1.5.1 As set out in clause 1.6 below; and
- 1.5.2 To the extent that is necessary to ensure the General Terms are appropriate to the provision of the NGA Tail Extension Service as notified by the LFC to the Service Provider on 40 Business Days' notice.
- 1.6 The NGA Tail Extension Service:
- 1.6.1 is not a Base Wholesale Service as defined in clause 1.3 of the General Terms;
- 1.6.2 may be withdrawn by the LFC on 12 months' notice. Clause 5.2 (a) and 5.2 (b) of the General Terms do not apply to the withdrawal of the NGA Tail Extension Service. Any instance of the NGA Tail Extension Service that is subject to a Minimum Service Term that expires after the 12 month notice of withdrawal, shall continue to be provided by the LFC on the terms of the relevant Service Order until the expiry of that Minimum Service Term.
- 1.6.3 is not subject to a Price Cap and the Charges may be changes, added to, deleted or replaced by Chorus by giving the Service Provider at least 60 Business Days' notice and the consultation under clause 24.4 (b) of the General Terms shall not apply. Changes to the NGA Tail Extension Service Core Charges and Ancillary Charges shall be treated as if the changes were under a Price Cap for the purposes of clause 24.4 (a) of the General Terms and therefore CFH approval for such changes is not required.
- 1.7 This Service Description may be changed by the LFC using the process for Agreement Changes set out in the General Terms except that:
- 1.7.1 the Change Management Forum's prior approval of any such proposed Agreement Change under clauses 24.1 and 25 of the General Terms is not required;
- 1.7.2 CFH approval of any such proposed Agreement Change will not be required under clauses 24.1(d)(ii) and 24.8 of the General Terms; and
- 1.7.3 the Service Provider may not propose any Agreement Change in relation to this Service Description in accordance with clause 24.1(b) of the General Terms.
- 1.8 The following term shall have the following meaning:
- 1.8.1 **Regional POI** means each POI specified as a Regional POI on Chorus' website for the purposes of this NGA Tail Extension Service.

2 The NGA Tail Extension Service

- 2.1 The NGA Tail Extension Service is an Ancillary Service that allows a Service Provider to aggregate UFB Bitstream Services from multiple UFB Candidate Areas on a single UFB Handover Connection Service located at a Regional POI. A table of the POI mapping for the NGA Tail Extension Service is set out in Appendix C.
- 2.2 A diagram of the configuration for the NGA Tail Extension Service is set out in Appendix A. The NGA Tail Extension Service extends a UFB ATA Voice or Bitstream Service (Operator Virtual Circuit, OVC) to a UFB Handover Connection Service located at the Regional POI that enables a Service Provider to access and interconnect with the LFC Network.
- 2.3 A Regional POI can be the same POI that the Service Provider uses for Bitstream Services in the local Candidate Area.
- 2.4 NGA Tail Extension supports the following OVC types:
- 2.4.1 Access-EVPL, as defined in the Bitstream 2 and Bitstream 2 Accelerate Service Descriptions;
 - 2.4.2 Access-EPL, as defined in the Bitstream 3, Bitstream 3A, Bitstream 3 Accelerate and Bitstream 3A Accelerate Service Descriptions; and
 - 2.4.3 Voice-EVPL, as defined in the ATA Voice Service Description.
- 2.5 The NGA Tail Extension 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.
- 2.6 The NGA Tail Extension Service has the following key characteristics:
- 2.6.1 Acts as an additional service attribute to ATA Voice, Bitstream 2, Bitstream 3, and Bitstream 3a Services including Accelerate variants;
 - 2.6.2 Transparently retains the bandwidth and service characteristics of the Bitstream service being extended; and
 - 2.6.3 Applies to all existing private and public UFB Service Templates for the above Bitstream Services.

3 NGA Tail Extension Service and implementation activities

Core NGA Tail Extension Service

- 3.1 The core Bitstream Services provided as part of the NGA Tail Extension Service are as follows:
- 3.1.1 NGA Tail Extension has the regions specified on Chorus' website, each of which has one or more Regional POIs.
 - 3.1.2 A UFB Handover Connection in a Regional POI can support Bitstream Service End Users located in any of the local Candidate Areas within that region.
 - 3.1.3 A Service Provider can provide national NGA services with a minimum of one UFB Handover Connections in each of the regions.
 - 3.1.4 Chorus may add Regional POIs with associated local Candidate Areas and/or change configurations of Regional POIs with associated local Candidate Areas by giving the Service Provider 30 days' notice and will update Chorus' website accordingly.

3.2 The NGA Tail Extension Service is available as an additional service attribute within the UFB family of services as identified below:

Attribute	Bitstream 2 Bitstream 2 Accelerate	Bitstream 3 Bitstream 3 Accelerate	Bitstream 3a Bitstream 3a Accelerate	Bitstream 4	ATA Voice	Multicast
OVC Type	Access-EVPL	Access-EPL	Access-EPL	Access-EPL	Access-EVPL	Multicast Domain
Tail Extension	Yes	Yes	Yes	Yes	Yes	No

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

3.3 NGA Tail Extension Service can be requested per OVC through an Add, Modify, Transfer or Move service request as follows:

3.3.1 NGA Tail Extension Service can be requested for Primary or a Secondary Service Template;

3.3.2 NGA Tail Extension Service is requested by selecting the desired UFB Handover Connection Service for each OVC as part of the Add, Modify, Transfer or Move service request;

- (a) If this UFB Handover Connection Service is in the local POI then Tail Extension will not apply;
- (b) If this UFB Handover Connection Service is in a remote Regional POI then Tail Extension will apply; or
- (c) A Regional POI is also a local POI for End Users within the POI local Candidate Area.

3.3.3 A multi-OVC Service Template may have the NGA Tail Extension Service applied per OVC, e.g. for Service Templates that include both a Bitstream and a ATA Voice service, 0-2 Tail Extensions may apply:

Option	Extend Bitstream	Extend Voice	Tail Extension
1	x	x	-
2	x	✓	1 x Voice Tail Extension
3	✓	x	1 x Bitstream Tail Extension
4	✓	✓	1 x Voice Tail Extension 1 x Bitstream Tail Extension

3.4 NGA Tail Extension Service will be available for any additional Service Templates requested by the Service Provider using combinations of one more standard building blocks, as defined in the relevant Bitstream Service Description.

UNI – NNI characteristics

3.5 All Bitstream Services (Access-EVPLs, Access-EPLs or Voice-EVPL) on a UNI must belong to the same Service Provider and must connect to an E-NNI belonging to that Service Provider.

3.5.1 However each Bitstream Service can connect to a different E-NNI at the same or different POI;

3.5.2 The POI must be a valid POI for that location, i.e. a valid local or regional POI.

- 3.6 The sum of High and Low Priority traffic profiles of all local or remote services delivered at a UFB Handover Connection Service can exceed the UFB Handover Connection Service line rate. If there is insufficient line rate to deliver the traffic then frames will be randomly discarded, based on their Class of Service precedence, and Service Levels for that Class of Service do not apply for all services on that UFB Handover Connection Service. It is therefore the Service Provider's responsibility to shape and queue traffic appropriately.

Service Requirements

- 3.7 To use the NGA Tail Extension Service the Service Provider must have the capability to access and interconnect with it, by one of the following:
- 3.7.1 co-locating Service Provider equipment at the Regional POI using the UFB Handover Connection Service and the Central Office and POI Co-location Service;
 - 3.7.2 connecting to third party co-location space at the Regional POI using the UFB Handover Connection Service, and with the third party taking the Central Office and POI Co-location Service;
 - 3.7.3 connecting to a backhaul service at the Regional POI; or
 - 3.7.4 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 Regional POIs are detailed in the Operations Manual appendices.

Additional Service Characteristics

- 3.8 The technical specification of the NGA Tail Extension Service is set out in Appendix B.
- 3.9 The NGA Tail Extension Service specifically excludes:
- 3.9.1 The Bitstream Service being extended;
 - 3.9.2 the UFB Handover Connection Service;
 - 3.9.3 provision or maintenance of any cabling or connection or active device;
 - 3.9.4 configuration, monitoring, operation, on-going support or maintenance of Service Providers' or End User's applications, equipment or networks; and
- 3.10 Supply of AC mains & UPS power, accommodation space, heating, ventilating, and air conditioning and facilities at the POI or End User Premises or End User Tenancy or NBAP (as applicable).

4 Service Demarcation Point

- 4.1 The Regional POI Service Demarcation Point is:
- 4.1.1 Physically, the MOFDF in the regional POI, which is part of the UFB Handover Connection Service; and
 - 4.1.2 Logically, the VLAN per service on the UFB Handover Connection located at the regional POI.
 - (a) For Access-EVPLs, a single 802.1ad VLAN (S-VID/C-VID);
 - (b) For Access-EPLs, a transparent VLAN (S-VID);
 - (c) For Voice-EVPLs, a single 802.1ad VLAN (S-VID/C-VID);
 - (d) For Multicast Connection, a single 802.1ad VLAN (S-VID or S-VID/C-VID);
- 4.2 The local Candidate Area Service Demarcation Point where the access Bitstream Service logically terminates and the NGA Tail Extension Service logically commences is the middle of the Ethernet Aggregation Switch at the local POI. There is no physical demarcation point and the Access-EPL is provisioned as a single entity.

5 Service Prerequisites

- 5.1 The UFB Handover Connection Service is a separate service and is a prerequisite to the supply of the NGA Tail Extension Service i.e. Service Provider's must first purchase and then continue to maintain a UFB Handover Connection Service at all times while taking the NGA Tail Extension Service.

6 LFC and Service Provider Responsibilities

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

7 Price List

- 7.1 The reoccurring charges for the NGA Tail Extension Service are available on the Chorus website at <https://customer.chorus.co.nz/nga-evolve/nga-pricing>.
- 7.2 No transactional charges apply specifically to the NGA Tail Extension Service as the service is always provisioned, changed or relinquished contemporaneously with a NGA Bitstream Service.

8 NGA Tail Extension Service Levels

Access Bitstream Service Levels

- 8.1 The Bitstream Services levels for the access Bitstream Service will continue to apply to that access Bitstream Service, with any Traffic and Availability Service Levels applying between the Demarcation Points for that access Bitstream Service.

NGA Tail Extension Service Levels

- 8.2 NGA Tail Extension Service Levels for performance apply between the Service Demarcation Points set out in clauses 4.1 and 4.2 and are as follows.

NGA Tail Extension Service Layer 2 Traffic Service Levels

- 8.3 Each End User's traffic for point to point services must be delivered to the Regional POI within the following Service Levels, measured over each five minute interval (24 hours per day):

Traffic Class	Frame Delay	Frame Delay Variation	Frame Loss
High Primary	≤ 7ms	≤ 2 ms	≤ 0.01 %
High Secondary	≤ 10ms	≤ 2ms	≤ 0.01 %
Low	Not specified	Not specified	≤ 2 %

Where

- 8.3.1 Frame Delay and Frame Delay Variation apply to Tail Extension only and are incremental to the Access Service, i.e. apply between the Local and the Regional POI.
- 8.3.2 Frame Loss is cumulative with the Access Service, i.e. applies between the UNI and the Regional POI.
- 8.3.3 The High Primary measures apply unless the primary backhaul link between the Local and the Regional POI has failed and the traffic has been transferred to a secondary link in which case the High Secondary measures apply.
- 8.3.4 High Secondary measures will apply for a maximum of 96 hours following the failure of the primary backhaul link between the Local and the Regional POI.

8.4 The traffic will be within these Service Levels for at least 99% of the time within the five minute measurement interval, otherwise the service is to be considered unavailable for that five minute interval.

8.5 Compliance will be verified using the Service Performance Compliance measurement and reporting regime for the access Bitstream Service;

NGA Tail Extension Service Availability Service Levels

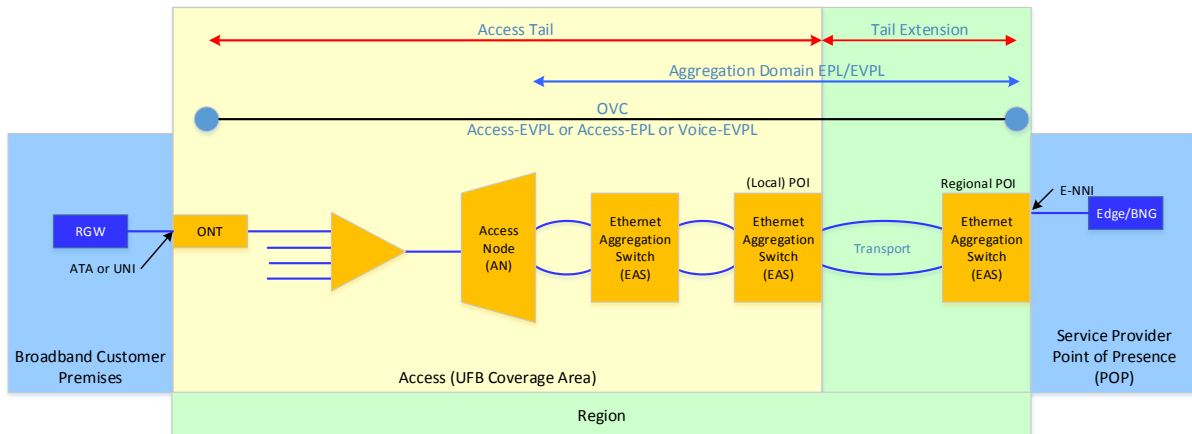
8.6 NGA Tail Extension Service Availability service level targets are based on protected (primary + secondary) links between Local and Regional POIs.

8.7 The target availability service levels for the NGA Tail Extension Service are:

Mean Down Time per annum	Availability	Probability of a single total service failure per annum	Probability of a single total service failure per month	MTTR
5 minutes	≥ 99.999%	2.2%	0.18%	3.66 hours

Where a total service failure is the simultaneous failure of both primary and secondary backhaul links.

Appendix A – Diagram



This is a generic diagram showing the standard configuration and service demarcation points for an access with Tail Extension. It is not intended to represent every situation or detailed physical architecture. The following points should be noted:

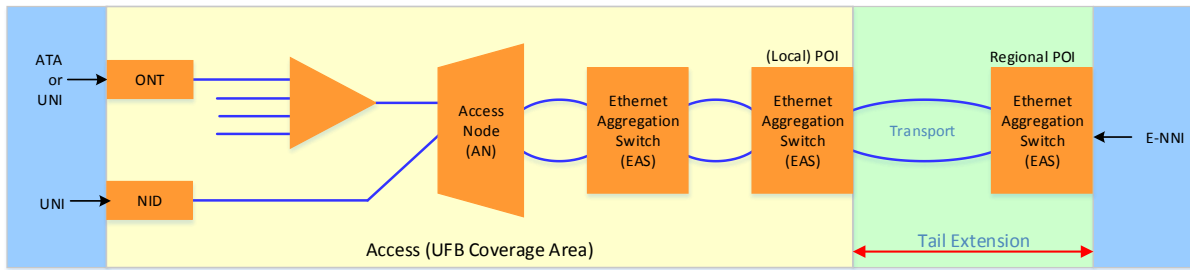
- The NGA Tail Extension Service and Charges apply from the Local POI to the Regional POI.
- Interconnection between the Local POI and the Regional POI may use redundant links to meet Service Level requirements.

The Bitstream Services support simultaneous delivery of multiple Service Templates from the same or multiple service providers as follows:

- Multiple Access-EVPLs can be delivered to the same UNI.
- An Access-EPL service requires a dedicated UNI.
- Primary Service Templates include one ATA Port and one UNI.
- Secondary Service Templates include one UNI
- All services delivered to a UNI must belong to the same Service Provider but can be mapped to the same or different E-NNIs, with or without Tail Extension. The E-NNIs must belong to the same Service Provider as the services.

Appendix B – Technical Specification

This section describes the technical specifications needed to connect End User or Service Provider equipment to NGA.



Technical Interfaces

ATA and UNI Interfaces are as defined in the relevant Bitstream 2, Bitstream 3, Bitstream 4 or ATA Voice Service Descriptions (including accelerate variants).

E-NNI Interface	
E-NNI	<p>Ethernet 802.1ad VLAN (SVID, CVID); or Double tagged Q in Q; or Other Ethertype as agreed with Service Provider.</p> <p>E-NNI</p> <ul style="list-style-type: none"> • 1 GigE <ul style="list-style-type: none"> ○ Single fibre working Service Provider interface 1000BASE-BX10-U or BX40-U depending on distance (default) <ul style="list-style-type: none"> ▪ TX 1310 nm ▪ RX 1490 nm ○ Dual fibre working 1000BASE-LX <ul style="list-style-type: none"> ▪ 1310 nm • 10 GigE 10GBase-LW/LR <ul style="list-style-type: none"> ○ Dual fibre working <ul style="list-style-type: none"> ▪ 1310 nm • 10 GigE 10GBase-EW/ER <ul style="list-style-type: none"> ○ Dual fibre working <ul style="list-style-type: none"> ▪ 1550 nm
Network Testing Layer 2	Network test results will meet the performance criteria listed in this document.

Appendix C: Initial Regional POIs and Local Candidate Areas

The list of Regional POIs and associated candidate areas will be published in the Bitstream Operations Manual. The following table provides the initial view:

	Region	Regional POIs*	Local Candidate Areas
1	Auckland	Mayoral Drive Glenfield Mt Eden	Whangarei Auckland Waiheke Island Waiuku Pukekohe
2	Hamilton	Hamilton	Rotorua Taupo Tauranga Whakatane Hamilton New Plymouth
3	Wellington	Wellington Porirua	Palmerston North Levin Wanganui Napier/Hastings Gisborne Masterton Paraparaumu Wellington
4	Christchurch	Christchurch	Nelson Blenheim Ashburton Christchurch Greymouth Timaru
5	Dunedin	Dunedin South Dunedin	Dunedin Oamaru Queenstown Invercargill