

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

March 2020

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- 1.6.2 may be withdrawn by the LFC on 12 months' notice.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.
- 1.8.2 **National UFB Handover Connection** means a UFB Handover Connection that has been designated as able to aggregate UFB Bitstream Services nationally.
- 1.8.3 **Handover** means the UFB Handover Connection, POI or Coverage Area where E-NNI is located and the extended Bitstream Service is handed over to the Service Provider.

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 Coverage Areas on a single UFB Handover Connection.
- 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 valid UFB Handover Connection Service that enables a Service Provider to access and interconnect with the LFC Network.
- 2.3 NGA Tail Extension supports the following OVC types:
- 2.3.1 Access-EVPL, as defined in the Bitstream 2 and Bitstream 2 Accelerate Service Descriptions;
 - 2.3.2 Access-EPL, as defined in the Bitstream 3, Bitstream 3A, Bitstream 3 Accelerate and Bitstream 3A Accelerate, Bitstream 4 and Mobile Access Service Descriptions; and
 - 2.3.3 Voice-EVPL, as defined in the ATA Voice Service Description.
- 2.4 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.
- 2.5 The NGA Tail Extension Service has the following key characteristics:
- 2.5.1 Acts as an additional service attribute to ATA Voice, Bitstream 2, Bitstream 3, Bitstream 3a, Bitstream 4 and Mobile Access Services including Accelerate variants;
 - 2.5.2 Transparently retains the bandwidth and service characteristics of the Bitstream service being extended; and
 - 2.5.3 Applies to all existing private and public UFB Service Templates for the above Bitstream Services.
 - 2.5.4 Supports multiple distance steps based on the distance between the Bitstream Service local Coverage Area and the Handover Coverage Area.

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 allows a UFB Handover Connection to be specified as Standard or National, as exercised by Service Request, where:
 - (a) UFB Handover Connections will be treated as Standard UFB Handover Connections by default, unless specified as a National UFB Handover Connection;
 - (b) A National UFB Handover Connection may not be allowed on a high-populated switch to avoid resource exhaustion;
 - 3.1.2 The NGA Tail Extension Service is an Ancillary Service that allows a Service Provider to aggregate UFB Bitstream Services from multiple UFB Coverage Areas on a single UFB Handover Connection, where
 - (a) A Standard UFB Handover Connection located at a Regional POI can aggregate UFB Bitstream Services from within the region, including local UFB Bitstream Services.
 - (b) A National UFB Handover Connection can aggregate UFB Bitstream Services from any UFB Coverage Area in New Zealand, including local and regional UFB Bitstream services.

- (c) A Standard UFB Handover Connection located outside Regional POIs can only aggregate local UFB Bitstream Services that are within the same UFB Coverage Area as the POI.
- 3.1.3 NGA Tail Extension has the regions specified on Chorus’ website, each of which has one or more Regional POIs. 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. A table of the POI mapping for the NGA Tail Extension Service is set out in Appendix C.
- 3.1.4 NGA Tail Extension supports the following distance steps, based on the Bitstream Service originating Coverage Area and the UFB Handover Connection POI:
 - (a) Step S: The UFB Bitstream Service is connected to a Standard or National UFB Handover Connection within the local UFB Coverage Area;
 - (b) Step A: The UFB Bitstream Service is connected to a Standard or National UFB Handover Connection within a UFB Coverage Area associated with the same Region;
 - (c) Step B: The UFB Bitstream Service is connected to a National UFB Handover Connection within the same Island, i.e. North Island or South Island;
 - (d) Step C: The UFB Bitstream Service is connected to a National UFB Handover Connection in a different Island, i.e. South Island or North Island.

Where the shortest step that is applicable is used.

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 4	Mobile Access	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 a Primary or a Secondary Service Template;
 - 3.3.2 NGA Tail Extension Service is requested by selecting the desired Standard or National 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; or
 - (b) If this UFB Handover Connection Service is in a remote POI, then Tail Extension with the distance step as per 3.1.4 will apply.
 - 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 an 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 E-NNI must be associated with a valid UFB Handover Connection for that location, i.e. a valid local or regional Standard UFB Handover Connection, or a National UFB Handover Connection.
- 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 Handover 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 Handover 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 Handover POI; or
- 3.7.4 by using the Direct Fibre Access Service to connect the UFB Handover Connection to Service Provider equipment at a remote location within the Handover POI Central Office area.

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 Standard or National 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 Service Demarcation Point at the Handover POI is:
- 4.1.1 Physically, the MOFDF in the Handover POI, which is part of the UFB Handover Connection Service; and
 - 4.1.2 Logically, the VLAN per service on the Standard or National UFB Handover Connection located at the Handover 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);
- 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 between the UNI and the E-NNI.

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://sp.chorus.co.nz>
- 7.2 No transactional charges apply specifically to the NGA Tail Extension Service as the service is always provisioned, changed or relinquished contemporaneously with an 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 target 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 will be delivered to the POI within the following Benchmark Service Levels, measured over each five-minute interval (24 hours per day):

Distance	Benchmark		High-Primary Path			High-Secondary Path			Low		
	POI 1	POI 2	FD	FDV	FL	FD	FDV	FL	FD	FDV	FL
A	Gisborne	Wellington	≤ 7ms	≤ 2 ms	≤ 0.01%	≤ 10 ms	≤ 2 ms	≤ 0.01%	Not specified	Not specified	≤ 2 %
B	Kaikohe	Wellington	≤ 12ms	≤ 3 ms	≤ 0.01%	≤ 17 ms	≤ 4 ms	≤ 0.01%	Not specified	Not specified	≤ 2 %
	Nelson	Invercargill	≤ 14ms	≤ 3 ms	≤ 0.01%	≤ 20 ms	≤ 4 ms	≤ 0.01%	Not specified	Not specified	≤ 2 %
C	Invercargill	Auckland	≤ 19ms	≤ 3 ms	≤ 0.01%	≤ 27 ms	≤ 4 ms	≤ 0.01%	Not specified	Not specified	≤ 2 %
	Invercargill	Kaikohe	≤ 22ms	≤ 3 ms	≤ 0.01%	≤ 31 ms	≤ 4 ms	≤ 0.01%	Not specified	Not specified	≤ 2 %

Where

- 8.3.1 These are design targets, to provide guidance for Service Providers to develop services using NGA Tail Extension. The Benchmark sites are examples based on long paths within each step.
- 8.3.2 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 Handover POI.
- 8.3.3 Frame Loss is cumulative with the Access Service, i.e. applies between the UNI and the Handover POI.
- 8.3.4 The High Primary measures apply unless the primary backhaul link between the Local and the Handover POI has failed and the traffic has been transferred to a secondary link in which case the High Secondary measures apply.
- 8.3.5 High Secondary measures will apply for a maximum of 96 hours following the failure of the primary backhaul link between the Local and the Handover POI.
- 8.3.6 Chorus operates a Congestion Free Network, and Low Traffic Class Frame Loss is expected to be much lower than this target.
- 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;

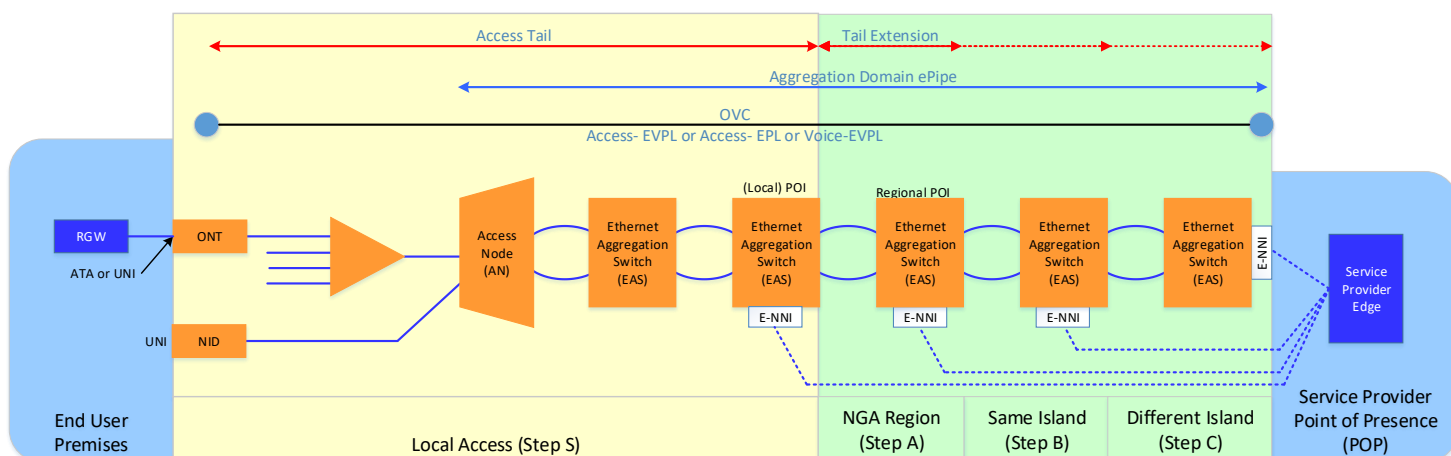
NGA Tail Extension Service Availability Service Levels

- 8.6 NGA Tail Extension Service Availability service level targets are based on protected (primary + secondary) links between Local and Handover 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:

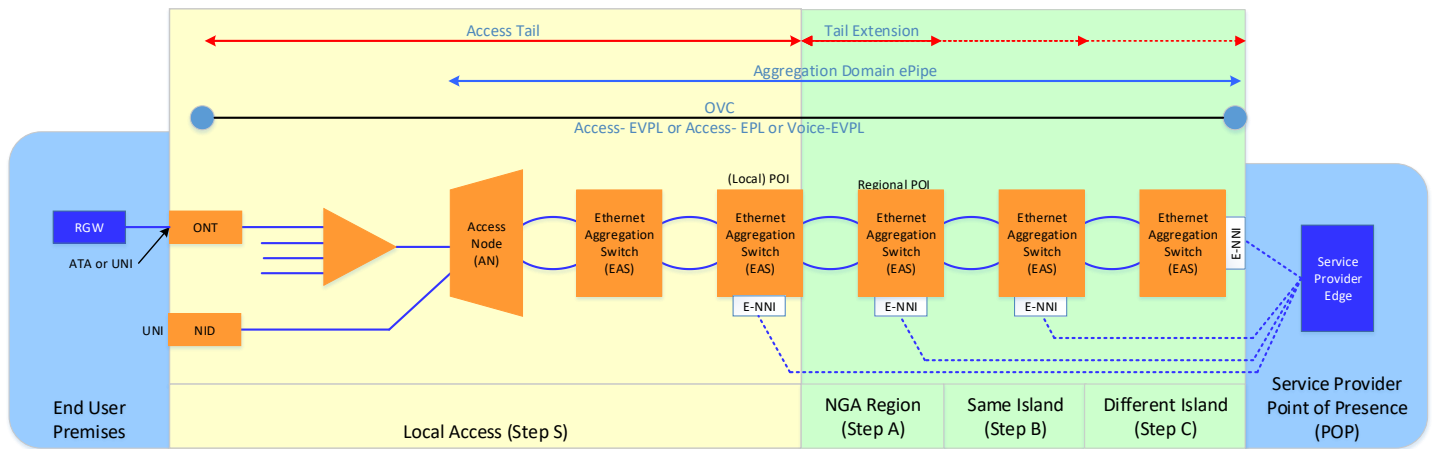
- The NGA Tail Extension Service Levels and Charges apply from the Local POI to the Handover POI.
- The Handover POI may be:
 - A local POI in the same Coverage Area as the Bitstream Service. The UFB Handover Connection can be a Standard UFB Handover Connection or a National UFB Handover Connection.
 - A Regional POI in the same Region as the Bitstream Service local Coverage Area. The UFB Handover Connection can be a Standard UFB Handover Connection or a National UFB Handover Connection.
 - A POI in a different Region as the Bitstream Service local Coverage Area. The UFB Handover Connection must be a National UFB Handover Connection.
- Interconnection between the Local POI and the Handover POI 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, Mobile Access or ATA Voice Service Descriptions (including accelerate variants).

The E-NNI Interfaces are as defined in the relevant 1Gbps, 10Gbps or 100Gbps UFB Handover Connection Service Descriptions.

Appendix C: Initial Regional POIs and Local Candidate Areas

The list of Local and Regional POIs and associated candidate areas:

	Local POI	Regional POI	Region
1	Whangarei Kensington Mayoral Drive Glenfield Forrest Hill Mt Eden Ponsonby	Mayoral Drive Glenfield Mt Eden Forrest Hill Ponsonby	Auckland
2	Rotorua Taupo Tauranga Whakatane Hamilton Frankton Tokoroa New Plymouth	Hamilton Frankton	Hamilton
3	Palmerston North Feilding Levin Wanganui Napier Marewa Hastings Gisborne Masterton Paraparaumu Wellington Courtenay Place Porirua	Wellington Porirua Courtenay Place	Wellington
4	Nelson Blenheim Ashburton Christchurch Greymouth Timaru	Christchurch	Christchurch
5	Dunedin Dunedin South Oamaru Queenstown Invercargill Waikiwi	Dunedin Dunedin South	Dunedin

Additional POIs will be added from time to time.