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A Section 9A Backhaul Study

Preliminary questions in understanding domestic backhaul services

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Glossary

ACCC	Australian Competition and Consumer Commission.
CFH	Crown Fibre Holding Limited.
Designated service	A service described in Part 2 of Schedule 1. Includes both price and non-price terms for access.
DSLAM	Digital subscriber line access multiplexer.
DMR	Digital microwave radio.
DWDM	Dense wavelength division multiplexing
FDS	First data switch.
FWA	Fixed-wireless access.
GPON	Gigabit passive optical network.
IP	Internet protocol.
Layer 1	The 'physical link' layer of the OSI Model.
Layer 2	The 'data link' layer of the OSI Model.
LFC	Local fibre company.
MPLS	Multiprotocol Label Switching.
ODF	Optical Distribution Frame.
OSI Model	The Open systems interconnection model.
POI	Point of interconnection.
POP	Point of Presence.
RBI	Rural Broadband Initiative is the name given to the Government's initiative to roll-out a higher-speed broadband access network to rural households.
RSP	Retail service provider.
SDH	Synchronous digital hierarchy.

SONET	Synchronous optical networking.
Specified service	A service described in Part 3 of Schedule 1, which excludes the price payable for access to a specified service.
STD	Standard terms determinations are the Commerce Commission's primary mechanism for regulating telecommunications services under the Telecommunications Act 2001.
UBA	Unbundled Bitstream Access services.
UCLF	Unbundled Copper Low Frequency service.
UCLL	Unbundled copper local loop service.
UFB	Ultra-Fast Broadband.

Introduction

Purpose of this paper

1. This paper sets out and seeks views on the following:
 - 1.1 the scope of domestic backhaul services in this study;
 - 1.2 how domestic backhaul services are supplied and purchased; and
 - 1.3 approach to assess competition in the provision of domestic backhaul services.

Purpose of this section 9A study

2. This paper is part of a study into domestic backhaul services under section 9A of the Telecommunications Act (Act).¹
3. This study follows on from our recent review under clause 1(3) of Schedule 3 of the Act (Schedule 3 review).² As we noted in the Schedule 3 review:³

...access to backhaul services is likely to become increasingly important as higher-speed broadband services are deployed particularly outside of the main urban centres, because of the RBI and UFB initiatives.

...we intend to explore the demand for backhaul services more generally by undertaking an inquiry under s 9A. This may lead us to consider whether there are reasonable grounds to investigate either amending the existing designated backhaul services or replacing them with a new backhaul service under Schedule 3. We expect to produce an issues paper towards the end of 2016 in relation to our backhaul inquiry to obtain further information and industry views on this matter.

4. Under this section 9A study, we are seeking to gain an improved understanding of the following key issues:
 - 4.1 how domestic backhaul services have evolved in today's telecommunication environment and what they might look like in future;
 - 4.2 Consider what, if any, change may be required to the regulatory framework around domestic backhaul services to best promote competition for the long term benefit of end-users.

¹ We consider that domestic backhaul services are backhaul services supplied within New Zealand, excluding any international links. The scope of domestic backhaul services are defined in more detail at Figure 1.

² Clause 1(3) of Schedule 3 of the Act requires us to consider whether there are reasonable grounds for commencing an investigation into omitting any of the relevant services in Schedule 1 from the Act.

³ Commerce Commission "Review of Designated and Specified Services under Schedule 1 of the Telecommunications Act 2001 - Reasons for final decision on whether to commence an investigation under clause 1(3) of Schedule 3 of the Telecommunications Act 2001" (30 June 2016) at [128], [141] and [142].

5. Decisions on what and how any regulatory changes (if any) should be implemented are outside the scope of the study and would be undertaken (if required) subsequently in accordance with the relevant statutory processes (30R review or a Schedule 3 investigation).^{4 5}

We invite your comments and views on the questions and issues raised in this paper

6. We are interested in your views on the questions and issues raised in this paper. The questions are also brought together in **Attachment A**.
7. Please send your views to us by 5pm on 23 September 2016, and address your submission to Robert Deuchars, c/o telco@comcom.govt.nz.
8. Some of the questions in this paper are targeted, and depending on the nature of submissions and the level of detail we receive in submissions to this paper, we may need to issue further information requests to help us understand domestic backhaul services.
9. We encourage full disclosure of submissions so that all information can be tested in an open and transparent manner. However, if it is necessary to include confidential material in a submission, we offer the following guidance:
 - 9.1 Both confidential and public versions of the submission should be provided; and
 - 9.2 The responsibility for ensuring that confidential information is not included in a public version of a submission rests entirely with the party making the submission.
10. We request that you provide multiple versions of your submission if it contains confidential information, and a clearly labelled “confidential version” and “public version”. This is because we intend to publish all public versions on our website.

Next steps following this paper

11. We will define the next steps after we assess the responses to this paper (including the need to issue a subsequent issues paper). At this stage, we are planning to publish a draft report in February 2017, receive submissions to the draft report in March 2017 and publish the final report no later than June 2017 in case we decide it is important to further engage with interested parties on the issues raised in this paper. In any case, we will publish a final report that will address the questions we have described as the purpose of this study.

⁴ Under section 30R we can “commence a review, at any time, of all or any of the terms specified in a standard terms determination”, and we can “replace a standard terms determination or vary, add, or delete any of its terms”, if we consider it necessary to do so after conducting a review.

⁵ Clause 1(1) of Schedule 3 empowers us to commence an investigation on our own initiative into whether Schedule 1 of the Act should be altered in any of the ways set out in sections 66 and 67.

12. We have separated the issues and questions into five sections:
 - 12.1 technical features of domestic backhaul or transmission capacity services;
 - 12.2 understanding supply of domestic backhaul services;
 - 12.3 understanding demand for domestic backhaul services;
 - 12.4 understanding how domestic backhaul services are priced; and
 - 12.5 assessing competition in the provision of domestic backhaul services.

What are domestic backhaul services?

13. This section first considers the scope of regulated and unregulated backhaul services. In defining backhaul services, the questions will focus on:
 - 13.1 the scope and key dimensions of domestic backhaul services; and
 - 13.2 the constraints placed on the current regulated backhaul services.
14. Backhaul services underlie almost every telecommunications service. Backhaul services are a wholesale input into many retail telecommunications services. There are both regulated and commercial (unregulated) domestic backhaul services.
15. Schedule 1 of the Act currently contains three designated backhaul services supplied by Chorus:⁶
 - 15.1 Chorus' UBA backhaul service, which provides transmission capacity between the trunk side of a first data switch (where the UBA service terminates) and the access seeker's nearest available point of interconnection.
 - 15.2 Chorus' UCLL backhaul service (distribution cabinet to telephone exchange), which provides transmission capacity between Chorus' distribution cabinet and Chorus' local exchange for the purposes of providing access to Chorus' UCLL network.⁷
 - 15.3 Chorus' UCLL backhaul service (telephone exchange to interconnect point), which provides transmission capacity between Chorus' local exchange and the access seeker's nearest available point of interconnection, for the purposes of providing access to Chorus' UCLL network and Chorus' UCLF service.

⁶ Appendix B provides links to the Standard Terms Determinations (STDs) of the regulated backhaul services. The STDs include a service description (schedule) for each regulated backhaul service.

⁷ The UCLL backhaul service (distribution cabinet to telephone exchange) is often referred to as sub-loop backhaul.

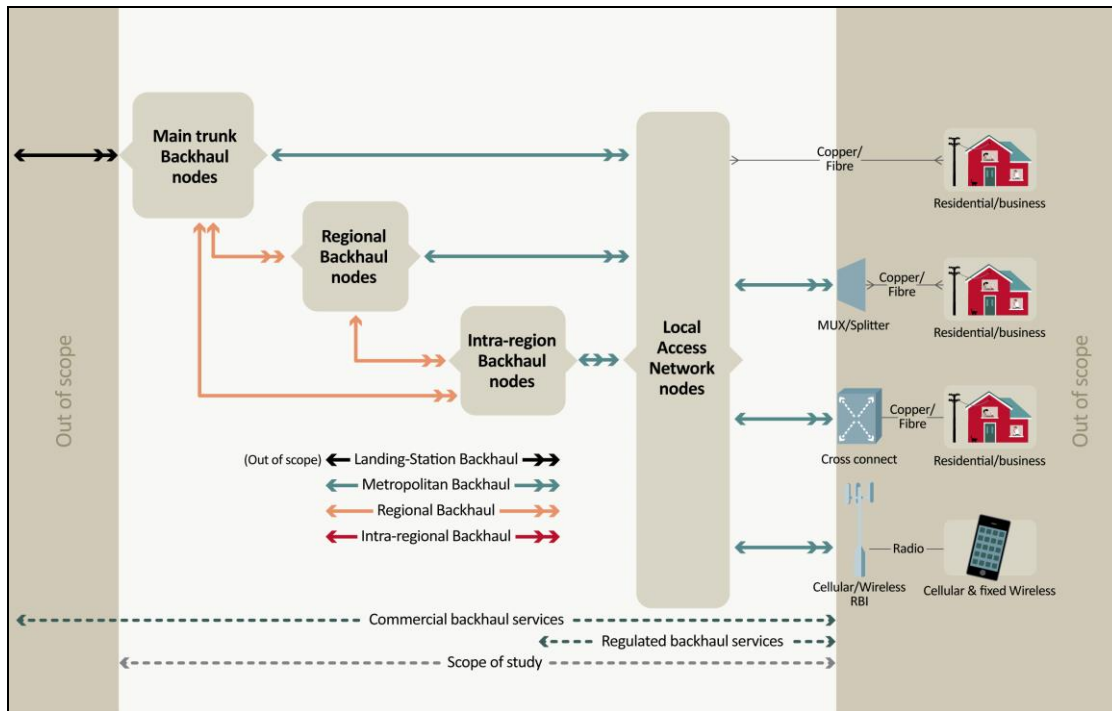
The scope and key dimensions of domestic backhaul services

16. We understand that backhaul may be defined in geographic and technical terms. Collectively, such terms define the attributes of a backhaul service, whether it is a commercial or regulated service offering.

The scope of backhaul services

17. The type of backhaul transmission required by a service provider or network operator will depend upon the geographic reach of their core network and the location and type of local access nodes they wish to connect with.
18. A RSP with infrastructure centralised in Auckland may, for example, require a layer 2 service of national, regional or of metropolitan reach whereas another RSP with distributed network assets may only require regional and metropolitan transmission services. Alternatively, a fixed-line or mobile network operator seeking to extend their networks may require a layer 1 or layer 2 transmission services eg, dark fibre or Ethernet.
19. This leads us to the view that our study needs to take a holistic approach to the provision of domestic backhaul services. Figure 1 illustrates the backhaul services we consider to be within the scope of this study.

Figure 1. The scope of New Zealand domestic backhaul services



Source: Commerce Commission's own analysis

The geographic dimension of backhaul services

20. Figure 1 shows backhaul services may be classified by their geographic reach, irrespective of underlying transmission technology or purpose to which they are applied.
- 20.1 main trunk (national) backhaul services (routes) - the set of long distance transmission services between the major national and international network nodes that are located in the central business districts of Auckland, Hamilton, Wellington, Christchurch, and Dunedin.
 - 20.2 regional backhaul services - the set of medium distance transmission services between the network nodes of the major main trunk centres and a set of local access nodes located in the central business districts of the larger provincial centres, such as: Whangarei, Tauranga, Palmerston North and Nelson.
 - 20.3 intra-regional backhaul services - the set of transmission services within larger provincial centres and between the provincial towns associated with larger provincial centres, such as Kaitaia, Fielding and Blenheim.
 - 20.4 Metropolitan backhaul services - the set of transmission services used to interconnect local access nodes (exchanges, cabinets, DSLAMs, and UFB/RBI handover points) within each of the major cities and towns.

20.5 International landing station backhaul - the set of transmission services between submarine and satellite landing stations and downtown peering and tele-housing (exchange) facilities in the main trunk centres.⁸

21. We believe the above geographic classifications, with the exception of international landing station backhaul, should be the scope of our study.

The transmission technology dimension of telecommunications backhaul

22. We understand the following transport technologies may be used to provision backhaul services, although these may not be available everywhere and may not be suitable for every use of backhaul:

22.1 Layer 1 technologies, including:

22.1.1 Digital Microwave Radio (DMR);

22.1.2 Dark Fibre;

22.1.3 DWDM (Wavelength)

22.2 Layer 2 technologies, including:

22.2.1 SDH/SONET;

22.2.2 MPLS;

22.2.3 Ethernet.

23. We believe Ethernet may have become the technology of choice for backhaul transport, especially for applications closer to the edge of the network. However, it is unclear whether Ethernet is becoming the technology of choice for all backhaul services.

Questions

1. In your view, have we adequately defined the scope of our domestic backhaul services study? Please explain your view.
2. Do you agree with the geographic classification for domestic backhaul services? Please explain any proposed changes.
3. Please comment on backhaul technologies. In particular, in your view: (i) have we overlooked any current or emerging backhaul transmission technologies at any layer? (ii) are there any material technological or geographical constraints on where the technologies could not be used to provide backhaul services? (iii) is Ethernet

⁸ For information on backhaul providers to the Southern Cross Cable Network's New Zealand landing stations, see <https://www.southerncrosscables.com/home/network/backhaulers#>

becoming the default technology of choice for backhaul services from main trunk to metropolitan? If so, why?

24. For the purpose of this study, we want to understand the impact of the constraints placed on regulated backhaul services in terms of traffic carriage and the bandwidth options available.
- 24.1 Each of the backhaul services contained in Schedule 1 of the Act can only be used for the purposes of connecting to a specific regulated access service. For example, the UBA backhaul service provides transmission capacity which can only be used to support the UBA service. Similarly, the UCLL backhaul service can only be used for the purposes of connecting to the UCLL service. Therefore, UCLL traffic and UBA traffic cannot be carried over the same regulated backhaul service.⁹
- 24.2 Under UCLL Backhaul STD (Schedule 1 Service Description), the UCLL Backhaul service provides Ethernet-based transmission capacity at 100Mbit/s and 1Gbit/s. The UBA Backhaul service provides Ethernet-based transmission capacity at 50Mbit/s, 100Mbit/s, 200Mbit/s, and 1Gbit/s.^{10, 11}
25. We note submissions to our review of Schedule 1 services raised some issues related to the current regulated backhaul services.
- 25.1 Spark said that each of the designated backhaul services is tied to specific access services, and that this makes it impossible to use these links efficiently, resulting in little or no take-up of the regulated backhaul services. In Spark's view, there is also a limited range of capacity options available for the regulated backhaul services.^{12, 13}
- 25.2 Chorus submitted that any amendment of the regulated backhaul services is unnecessary, as these services were designed to support the take-up of copper access services. According to Chorus, regulation should not be expanded in the absence of clear evidence of a regulatory concern.¹⁴

⁹ This feature of the regulated backhaul services in New Zealand differs from regulated transmission capacity services in other jurisdictions. For example, in Australia, the Domestic Transmission Capacity Service (DTCS) is a regulated service, which can be used by access seekers for backhaul in relation to fixed and mobile services. See ACCC "Domestic Transmission Capacity Service: An ACCC Final Report on the review of the declaration for the Domestic Transmission Capacity Service", March 2014, page 28.

¹⁰ Standard Terms Determination for Chorus' Unbundled Copper Local Loop and Unbundled Copper Low Frequency Network Backhaul (Telephone Exchange to Interconnect Point) Service Schedule 1 UCLL and UCLF Backhaul Service Description", 27 June 2008 (updated 30 November 2011).

¹¹ Standard Terms Determination for Chorus' Unbundled Bitstream Access Backhaul Service Schedule 1 UBA Backhaul Service Description", (updated 17 May 2012).

¹² Spark "Submission on Draft decision on the review of schedule 1 services" (23 May 2016), paragraph 8.

¹³ *ibid*, paragraphs 51, 52.

¹⁴ Chorus "Submission on Draft decision on the review of schedule 1 services" (23 May 2016), paragraph 27.

Questions

4. We invite comments on the regulated backhaul services. We are particularly interested in your view on whether the choice of backhaul transmission service depends in any way on the type of traffic that is to be conveyed ie, (i) whether transmission requirements for UCLL differ from those for UBA, whether transmission requirements for UCLL differ from those required for mobile backhaul; and any other relevant potential application for domestic backhaul services; (ii) what bandwidth options are required to meet future demand?
5. We are also interested in your view on whether there are backhaul services which are not subject to competition that should be regulated? Please explain how your view is consistent with the section 18 purpose statement.

What is the purpose of backhaul in telecommunications networks?

26. A definition of backhaul often given in industry is:¹⁵

In a telecommunications network the backhaul portion of the network comprises the links between the core network and access nodes – the “edges” of the network
27. This high-level description of backhaul does not specify the nature or ownership of the core network, the access nodes, or the transmission links. Furthermore, it is silent on the type of traffic that may be carried over the backhauls links. Specifically:
 - 27.1 the core network may be that of a service provider (i.e. retail service provider (RSP) or that of a fixed-line or mobile (wireless) network operator;
 - 27.2 the access node may be a point of physical or logical interconnection (handover) with a local access network (i.e. ODF, Data switch or cell site);
 - 27.3 the ‘links’ may be one of a range of possible transmission technologies that (presumably) may be sourced from a number of commercial and regulated providers; and
 - 27.4 though silent on the type of traffic carried between the core networks and the local access nodes, we believe it to be aggregate traffic flow(s) of one or more applications eg, voice, data, streaming video etc.
28. The above high-level description of backhaul is mostly consistent with the descriptions of regulated backhaul services given in the Act.¹⁶ Generally speaking, the description of regulated backhaul services in the Act is that of a service, including its associated functions and operational support systems that provides transmission capacity between the handover point of a local access network (e.g. UCLL, UCLF and UBA nodes) and a point of interconnection with an access seeker’s network (core

¹⁵ Ericsson, Press backgrounder, February 2016 “What is Backhaul? How will backhaul evolve?”

¹⁶ Schedule 1, Part 2, Subpart 1.

network). The key difference is that the description in the Act limits the backhaul services to one of the regulated services on the copper network.

The local access network nodes

29. We want to understand the extent to which backhaul services are provided from local access network nodes (sites) other than Chorus exchanges and cabinets.
30. The local access network nodes to which backhaul services may be required include:
 - 30.1 Chorus' UCLL and UCLF service handover points;
 - 30.2 Chorus' UBA First Data Switches and points-of-interconnection (POIs);
 - 30.3 The RBI and UFB handover points as determined by the RBI and UFB programmes
 - 30.4 the network nodes of providers of main trunk and regional backhaul services, for example Vocus and Spark; and
 - 30.5 the network nodes and peering points of non-UFB metropolitan local access fibre providers, for example CityLink Limited;
31. Although many of these local access network nodes will appear in the same city or town, they may not be co-located. As a consequence, access seekers and network operators may require access to complementary co-location and metropolitan (layer 1-2) access services to interconnect these nodes.

Question

6. Have we adequately captured and described the local access nodes which are of interest to access seekers and network operators? If not, what additions, or alterations would you recommend?
32. In the subsequent sections we look to understand the supply and demand of domestic backhaul services in more detail.

Understanding supply of domestic backhaul services

33. The questions in this section will focus on:
 - 33.1 existing suppliers and expansion conditions;
 - 33.2 how domestic backhaul services are supplied;
 - 33.3 the impact of UFB on the supply of domestic backhaul services; and
 - 33.4 the impact of RBI on the supply of domestic backhaul services.

Existing suppliers and expansion conditions

34. Backhaul services are supplied by firms such as Chorus to other service providers as inputs into the provision of a range of telecommunication services.
35. We understand that Chorus is the largest supplier of backhaul in New Zealand. Chorus supplies a range of backhaul service offerings. Outside of Chorus' regulated services, Chorus provides commercial backhaul options to primarily support its access products.
36. In addition to Chorus, there are a number of other network operators who provide or are capable of providing transmission capacity. For example,
 - 36.1 Vodafone has core fibre and points of presence (POPs) around New Zealand, though not ubiquitously aligned with Chorus exchanges and cabinets.
 - 36.2 FX Networks, now part of Vocus, has also deployed and operates a national fibre optic network, spanning in excess of 4,200 km.¹⁷
 - 36.3 Vector Communications operates metropolitan fibre networks in Auckland and Wellington, and offers wholesale backhaul services from Chorus exchanges throughout the Auckland region.
 - 36.4 There are a number of other network operators who own regional networks, including CityLink and the Local Fibre Companies (Northpower, Ultra-fast Fibre, and Enable).
 - 36.5 Finally, as part of structural separation, Spark was allocated a share of the former Telecom's fibre cables which are connected to Chorus and Spark exchanges.
37. These key suppliers own significant transport network assets. The transmission capacity is used to either supply other access seekers on a wholesale basis, to support their own retail requirements, or both.

¹⁷ <http://www.vocus.co.nz/new-zealand>

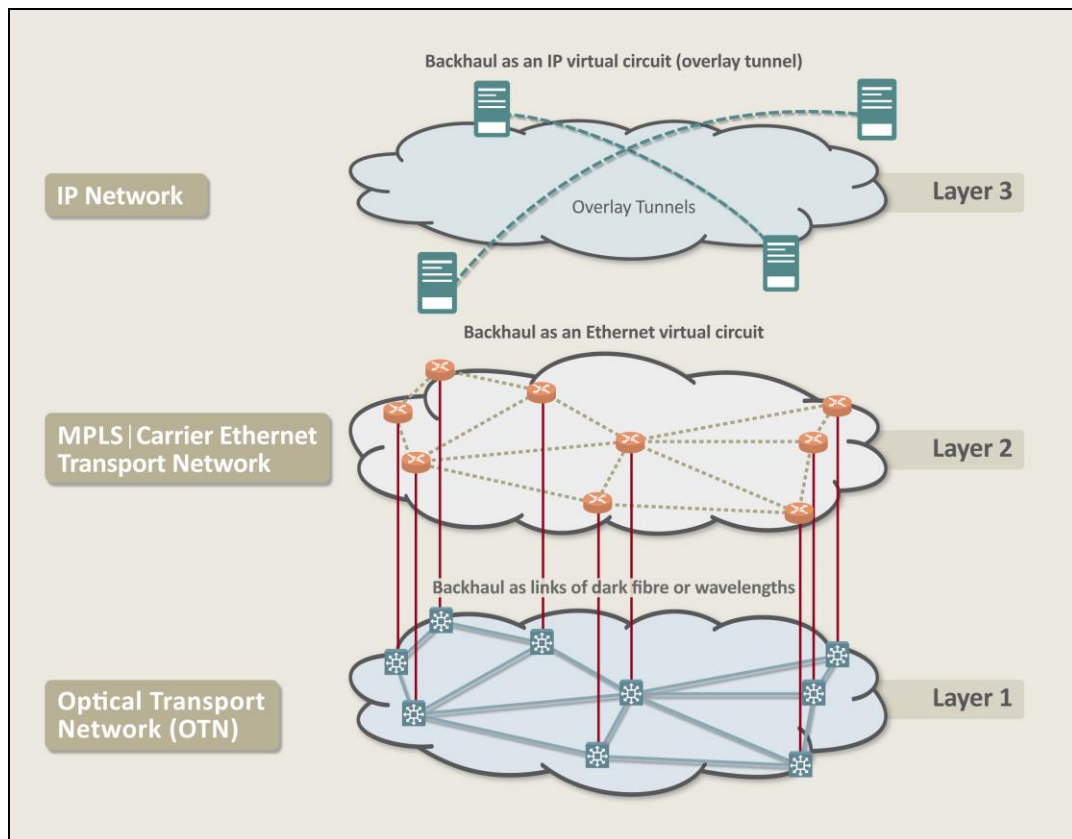
Questions

7. We invite any comments on the existing suppliers of domestic backhaul services. We are particularly interested in the following: (i) the extent to which existing suppliers self-supply backhaul services; and (ii) any major changes that have recently occurred, or are expected to occur in the foreseeable future, in the provision of domestic backhaul services?
8. We also invite comments on expansion conditions in the provision of domestic backhaul services. We are particularly interested in: (i) any factors that could impede expansion in the provision of domestic backhaul services; (ii) whether excess capacity is available, and where; (iii) whether there is a lack in capacity for backhaul services such as mobile backhaul services (iv) and how long expansion to add capacity incrementally takes.

Understanding how backhaul services are supplied

38. As part of this study, we want to understand whether changes are occurring in the supply of backhaul services.
39. Backhaul services are supplied in a number of ways:
 - 39.1 On the one hand, backhaul services are supplied and priced on a link-by-link basis;
 - 39.2 On the other hand, backhaul services may be offered on the basis of an outsourced wide area network (WAN) service - in essence a Network-as-a-service (NaaS). Network service providers offer a virtual anywhere-to-anywhere layer 2/ 3 transport service, as indicated by Figure 2 :

Figure 2. Backhaul transmission technologies



Source: Commission's own analysis

Questions

9. Please explain (i) to what extent are transmission services currently supplied on a link-by-link basis, and to what extent are transmission services supplied as a national service? (ii) what are the drivers to supply backhaul services as a national service rather than the traditional link-by-link basis?; and (iii) whether there is a developing trend towards supplying domestic backhaul on the basis of a national service rather than on a link-by-link basis
10. In the instance when a RSP requires a national deal from a non-Chorus provider, would that non-Chorus provider have to deal with Chorus to provide transmission capacity on a national level?

The impact of UFB and RBI on the supply of backhaul services

40. We think the likely key effects of UFB on the supply of backhaul services are:
 - 40.1 UFB will increase the volume of traffic on backhaul routes;
 - 40.2 even if a supplier of backhaul or fibre local access has a significant network footprint it may still need to purchase backhaul capacity from another network provider to extend the reach of its network to UFB locations (POI) where it does not have a presence;

- 40.3 network operators may purchase capacity from another provider as protection for an otherwise unprotected route; the objective being to mitigate the risk of a prolonged outage on an unprotected path;
- 40.4 we understand UFB providers are required to backhaul traffic to and from their UFB candidate area to an existing UFB point of interconnection.¹⁸ The cost of providing this backhaul is an input to the UFB services, against the national UFB price caps.
41. We think the likely key effects of RBI on the supply of backhaul services are:
- 41.1 it will increase the volume of traffic on backhaul routes;
- 41.2 it will create more demand for services in areas where today there is only a single supplier of backhaul.

Question

11. In your view, what is the likely impact of RBI and UFB on backhaul services eg, demand, supply, capacity, coverage and price?

Understanding demand for domestic backhaul services

42. The questions in this section will focus on:
- 42.1 service attributes important to customers; and
- 42.2 how customers purchase domestic backhaul services.

Service attributes important to customers

43. With the expected significant year-on-year increases in demand for broadband services, and in turn, backhaul services, it is important to understand what non-price service attributes are important to customers in their demand for domestic backhaul services. Key attributes of the backhaul services may include low contention, (utilisation), guaranteed bandwidth, high capacity, and low latency.

Questions

12. In your view, what non-price service attributes are important to demand for domestic backhaul services? Please explain your reasons.
13. In your view, what are the major recent changes and expected changes in the foreseeable future in the demand for domestic backhaul services?

How customers acquire domestic backhaul services

44. We want to understand how parties purchase backhaul services. In particular, we want to understand the options available to customers who wish to purchase transmission capacity.
45. Our current understanding is that the following options are potentially available:
 - 45.1 **Build own capacity:** A party can acquire capacity by electing to directly invest in building layer 1 local access or transmission infrastructure. Once built it can then sell or trade (swap) infrastructure (dark fibres), and offer infrastructure based wholesale services, i.e. backhaul transport services. In this case, one party funds the investment and therefore takes the risk/rewards
 - 45.2 **Build and share capacity:** Parties can enter into a joint-partnership to build and operate transmission infrastructure which they may then self-consume and wholesale to others. In this case, parties (two or more) jointly invest and plan the build and then share ownership, risks and rewards.
 - 45.3 **Buy a fixed amount of transmission capacity on a fixed term contract (long-term or short-term) –** under this ‘traditional’ approach to the marketing of transmission capacity a party purchases a fixed amount of capacity over a specified route on a fixed term, fixed fee contract. Under this model the acquiring party assumes the demand-side risk by having to purchase capacity ahead of actual demand.
 - 45.4 **Buy a variable amount of capacity on a “pay-as-you-go” or “pay-as-you-grow” basis –** under this model the acquiring party purchases transport-as-a-service electing to have a virtual network with distributed nodes (ports) with traffic between those rated on measured (Peak 95th percentile) traffic volumes.
 - 45.5 **IP transit and peering -** rather than acquiring transport capacity a service provider may in the case of internet traffic rely on IP transit and peering agreements to facilitate the exchange of traffic with domestic and international content providers e.g. Trade Me.

Question

14. For each of the options described, we invite comments, and evidence to support your comments, on: (i) whether you agree with our description of the options available to purchase domestic backhaul; (ii) in your view, what drives the choice of each option; (iii) the differences (if any) in the customers buying each of the options; (iv) In your view what relative share of the backhaul market is purchased under each of the above options?

Understanding how domestic backhaul services are priced

46. In this section we seek to understand how domestic backhaul services are priced. Key considerations we seek to gain a better understanding of are:

46.1 has there been a change in the pricing structure in the provision of backhaul services; and

46.2 what are the observable price trends?

Is there a change in the pricing structure for commercial backhaul services?

47. We understand that commercial domestic backhaul services have traditionally been priced on an individual link-by-link basis according to distance and capacity (see 45.3). Under this approach, services are charged on a fixed monthly recurring fee basis with the total cost increasing in fixed bandwidth increments along with distance, regardless of how much capacity is actually consumed.

48. We understand there is an alternative to the traditional pricing model. Suppliers are now offering domestic backhaul services based on a variable charging model. Under this variable, 'pay-as-you-grow', pricing model a purchaser in effect leases their network from a network operator by electing to take ports at locations on the operator's network where they wish to have a network presence (i.e. POI). The final charge is based on total number of ports and measured peak traffic capacity.

Question

15. Explain whether pricing structures are moving away from the traditional pricing model. If so, please explain the new alternative pricing structure(s) and the rationale for adopting new pricing structures.

Observable price trends in regulated and commercial backhaul

49. Prices for regulated backhaul services may be dated, and may be too high.¹⁹ The prices for regulated backhaul services were last set in 2008.²⁰

50. The Initial Pricing Principle for the regulated backhaul services is benchmarking comparable countries that use a forward-looking cost-based pricing method.²¹ For

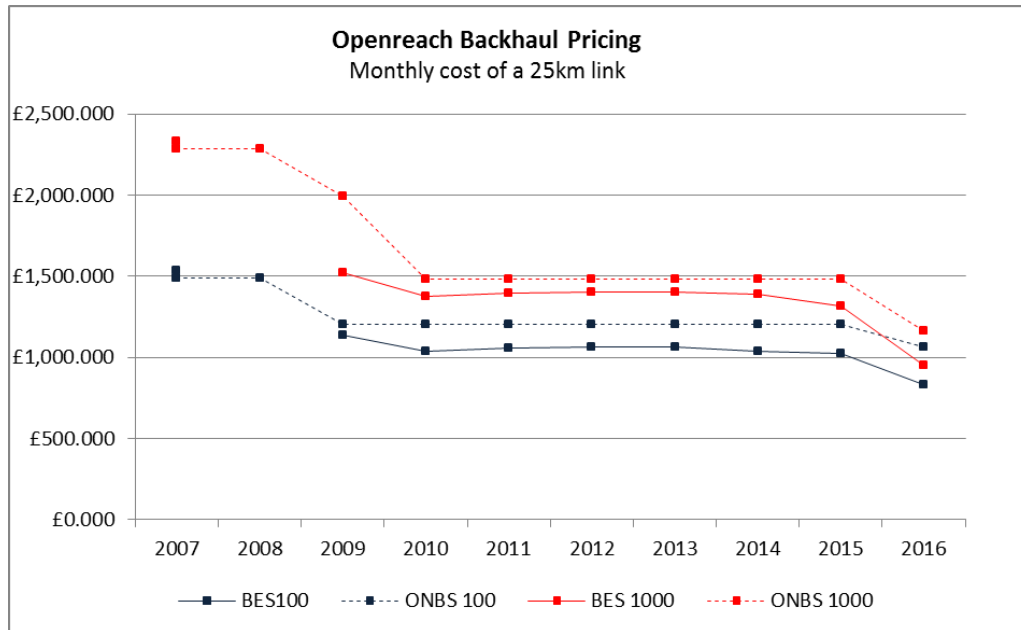
¹⁹ For example, in the Commission's recent Schedule 3 review, spark submitted that the current pricing for the regulated backhaul services could be too high. [Spark "Submission on Draft decision on the review of schedule 1 services" \(23 May 2016\)](#), paragraph 51, 52.

²⁰ We set the price and non-price terms of access for the regulated backhaul services in a number of STDs on 27 June 2008. Commerce Commission Decision 626 in the case of the UCLL backhaul service and Commerce Commission Decision 627 in the case of the UBA backhaul service. On 18 June 2009, we set the price and non-price terms of access for the regulated sub-loop backhaul service (Decision 672).

UBA backhaul, we used France Telecom as a benchmark, and for UCLL backhaul we used Telekom Austria and BT Openreach in the UK as benchmarks to set the regulated backhaul prices.

51. We observe that there has been a declining trend in the prices for the benchmarks used in 2008. For example, Figure 3 illustrates that since 2008 the prices for BT Openreach backhaul services have dropped.

Figure 3. Price trend for domestic backhaul services in the UK



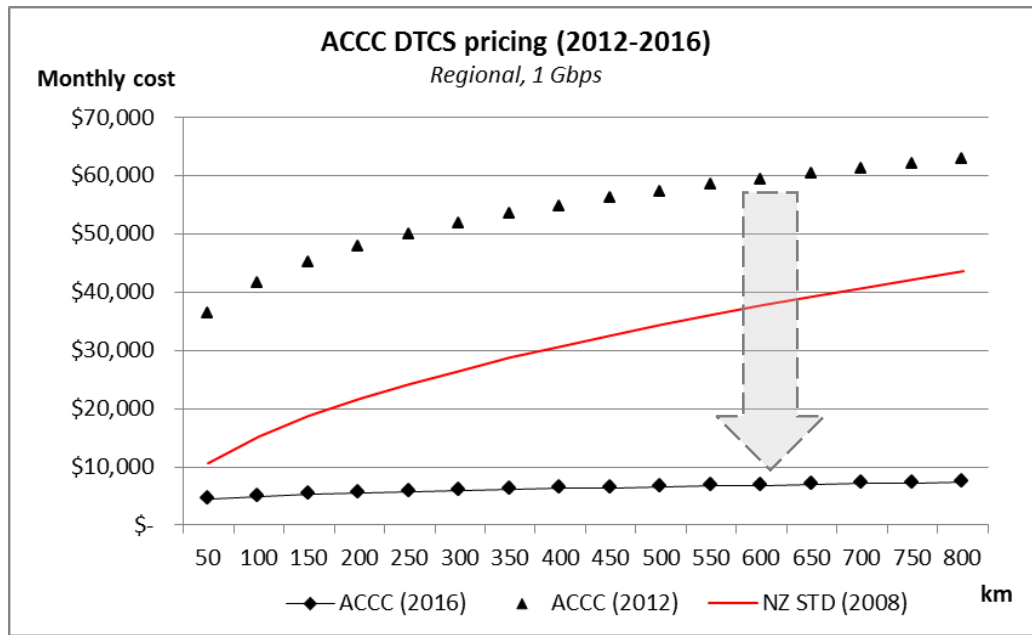
Source: Commission's own analysis

52. There is a declining trend of prices internationally. For example, the Australian Competition and Consumer Commission (ACCC) recently cut regulated prices for domestic backhaul services by 76%.²² This cut is illustrated in Figure 4. Figure 4 also compares this cut to our current regulated prices.

²¹ See Commerce Commission Decision 626, paragraph 138 and Commerce Commission Decision 672, paragraph 64.

²² See <https://www.accc.gov.au/media-release/accc-releases-final-decision-on-prices-for-regulated-transmission-services>

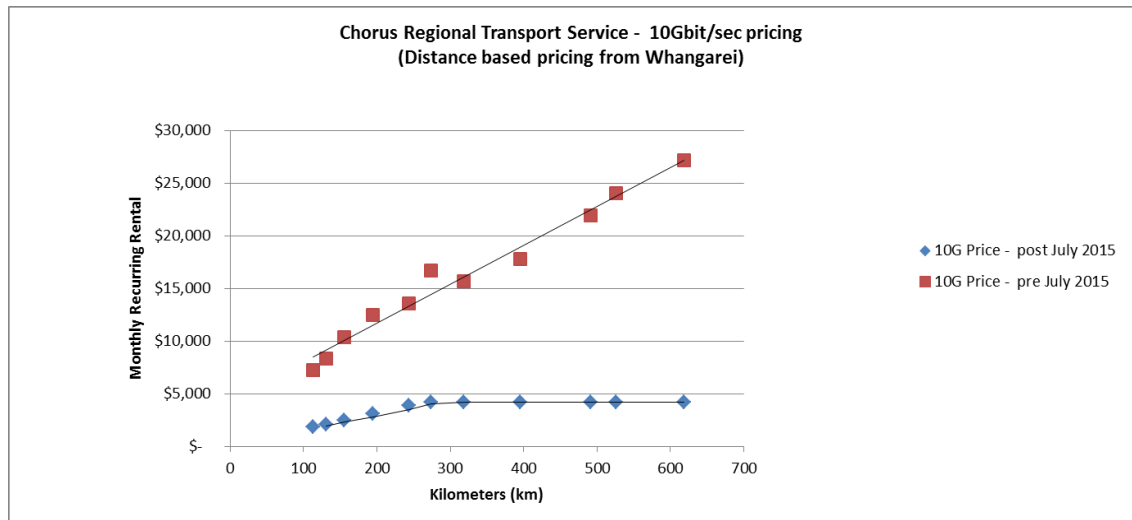
Figure 4. ACCC recently cut regulated prices for backhaul (DTCS) in Australia



Source: Commission's own analysis

53. It seems that this trend of declining prices is also observable in domestic unregulated backhaul services. For example, in August 2015, Chorus introduced a sharp price reduction. Figure 5 illustrates this reduction based on Chorus' pricing for unregulated backhaul services from Whangarei.

Figure 5. Chorus' pricing for unregulated backhaul services from Whangarei



Source: Commission's own analysis

54. We want to better understand backhaul pricing, and whether there are differences between prices in competitive areas and uncompetitive areas. We note that submissions to our recent Schedule 3 review provided contradictory views:

- 54.1 Spark submitted that there have been substantial price reductions for transport services on routes where there has been competitive entry, but no material price changes on routes without such entry.²³
- 54.2 Chorus argued that prices are set on a national basis. In particular, Chorus argued that the backhaul market is national, and that this acts as a constraint on pricing in any pockets where Chorus may still be the only provider.²⁴

Questions

16. In your view, what are the drivers of the significant drop in commercial backhaul prices in New Zealand?
17. Are you concerned about any pricing behaviour in the provision of backhaul that may raise potential competition concerns?
18. Please provide evidence on any price differentials between routes that you would deem to be competitive and uncompetitive.

Assessment of competition for the supply of domestic backhaul services

55. RSPs purchase backhaul services from a supplier of backhaul services as an input into the supply of downstream services to their retail, wholesale, business and mobile customers. Competition in these downstream markets depends on access to backhaul or transmission services.
56. There are however, constraints on potential competition, including barriers to entry and expansion, including the asymmetries between incumbents' sunk costs versus potential entrants' cost of building transmission infrastructure. The likelihood of entry and expansion is a function of alternative suppliers' expectations of positive financial benefits.
57. For the purposes of deciding which backhaul links should be deregulated, our approach in previous competition assessments was to consider a backhaul link to be competitive if there was a presence of existing network competitors connected to the Chorus exchange or first data switch, or being sufficiently close so as to exercise a competitive constraint.²⁵
58. A supplier was considered as a competitor if the supplier met the following near entrant criterion:²⁶

²³ [Spark "Submission on Draft decision on the review of schedule 1 services" \(23 May 2016\)](#), paragraph 50.

²⁴ [Chorus "Submission on Draft decision on the review of schedule 1 services" \(23 May 2016\)](#), paragraph 19.

²⁵ [Commerce Commission, "Review of the designated backhaul services: Decision No. NZCC 29" \(5 October 2012\)](#).

²⁶ Ibid.

2 km from a Chorus exchange for a fibre-based network with existing inter-city coverage and 1 km from a Chorus exchange for smaller networks with localised coverage.

59. Internationally, regulators are currently using a much narrower range of distances. For example, the ACCC previously used a distance of 1km from Telstra exchanges, but is currently using a range of 150 metres.
60. In this study we will revisit all of the criteria previously used in our competition assessments to decide whether a backhaul link should be deregulated.²⁷ We note that the ACCC applied a more comprehensive competition assessment methodology to determine whether there is sufficient evidence of competition.²⁸

Question

19. We invite views on the criteria for assessment of competition for domestic backhaul services. We are particularly interested in your view on (i) the most appropriate criteria that should be used in future competition test assessments, and also what criteria should remain intact; (ii) how far is close enough to a Chorus exchange to be a competitive constraint on Chorus and why?

²⁷ *ibid*, paragraph 30. The criteria are: (a) subject to (d), Chorus does not face limited competition on Primary Links or Secondary Links where there are one or more other backhaul providers; (b) where a nearby fibre-based network meets the near entrant criteria, the network is considered a competitive constraint unless the operator has publically stated that it does not intend to, and will not in the near future, offer services to or from that local exchange; (c) for those markets found to be markets in which Chorus does not face limited competition, Chorus is not likely to face lessened competition, and (d) there are no additional market conditions present that may prevent effective competition from developing (for example, the absence of an appropriately specified and priced service that allows alternate backhaul providers to aggregate backhaul traffic from multiple access seekers from inside the exchange).

²⁸ ACCC, 2014 DTCS Declaration, section 3.4.1. The criteria applied are: (a) three independent fibre operators at or in very close proximity to the Telstra exchange; (b) whether the route is being served by 3 of the 4 largest transmission providers; (c) whether there is direct connectivity to major transmission hubs or CBDs; (d) whether there is sufficient demand to attract new investment and entry; (e) the level of price competition; (f) evidence of transmission services being supplied from the ESA.

Attachment A: Summary of questions

Purpose of this attachment

A1. This attachment summarises the questions asked in this paper.

Questions

A2. Below are all the questions listed in this paper.

1. In your view, have we adequately defined the scope of our domestic backhaul services study? Please explain your view.
2. Do you agree with the geographic classification for domestic backhaul services? Please explain any proposed changes.
3. Please comment on backhaul technologies. In particular, in your view: (i) have we overlooked any current or emerging backhaul transmission technologies at any layer? (ii) are there any material technological or geographical constraints on where the technologies could not be used to provide backhaul services? (iii) is Ethernet becoming the default technology of choice for backhaul services from main trunk to metropolitan? If so, why?
4. We invite comments on the regulated backhaul services. We are particularly interested in your view on whether the choice of backhaul transmission service depends in any way on the type of traffic that is to be conveyed ie, (i) whether transmission requirements for UCLL differ from those for UBA, whether transmission requirements for UCLL differ from those required for mobile backhaul; and any other relevant potential application for domestic backhaul services; (ii) what bandwidth options are required to meet future demand?
5. We are also interested in your view on whether there are backhaul services which are not subject to competition that should be regulated? Please explain how your view is consistent with the section 18 purpose statement.
6. Have we adequately captured and described the local access nodes which are of interest to access seekers and network operators? If not, what additions, or alterations would you recommend?
7. We invite any comments on the existing suppliers of domestic backhaul services. We are particularly interested in the following: (i) the extent to which existing suppliers self-supply backhaul services; and (ii) any major changes that recently occurred, or are expected to occur in the foreseeable future, in the provision of domestic backhaul services?
8. We also invite comments on expansion conditions in the provision of domestic backhaul services. We are particularly interested in: (i) any factors that could impede expansion in the provision of domestic backhaul services; (ii) whether excess capacity is available, and where; (iii) whether there is a lack in capacity for backhaul

services such as mobile backhaul services (iv) and how long expansion to add capacity incrementally takes.

9. Please explain (i) to what extent are transmission services currently supplied on a link-by-link basis, and to what extent is transmission services supplied as a national service? (ii) what are the drivers to supply backhaul services as a national service rather than the traditional link-by-link basis?; and (iii) whether there is a developing trend towards supplying domestic backhaul on the basis of a national service rather than on a link-by-link basis
10. In the instance when a RSP requires a national deal from a non-Chorus provider, would that non-Chorus provider have to deal with Chorus to provide transmission capacity on a national level?
11. In your view, what is the likely impact of RBI and UFB on backhaul services eg, demand, supply, capacity, coverage and price?
12. In your view, what non-price service attributes are important to demand for domestic backhaul services? Please explain your reasons.
13. In your view, what are the major recent changes and expected changes in the foreseeable future in the demand for domestic backhaul services?
14. For each of the options described, we invite comments, and evidence to support your comments, on: (i) whether you agree with our description of the options available to purchase domestic backhaul; (ii) in your view, what drives the choice of each option; (iii) the differences (if any) in the customers buying each of the options; (iv) In your view what relative share of the backhaul market is purchased under each of the above options?
15. Explain whether pricing structures are moving away from the traditional pricing model. If so, please explain the new alternative pricing structure(s) and the rationale for adopting new pricing structures.
16. In your view, what are the drivers of the significant drop in commercial backhaul prices in New Zealand?
17. Are you concerned about any pricing behaviour in the provision of backhaul that may raise potential competition concerns?
18. Please provide evidence on any price differentials between routes that you would deem to be competitive and uncompetitive.
19. We invite views on the criteria for assessment of competition for domestic backhaul services. We are particularly interested in your view on (i) the most appropriate criteria that should be used in future competition test assessments, and also what criteria should remain intact; (ii) how far is close enough to a Chorus exchange to be a competitive constraint on Chorus and why?

Attachment B: Service descriptions of the regulated backhaul services

Purpose of this attachment

B1. This attachment provides links to the Standard Terms Determinations (STDs) for the regulated backhaul services. The STDs include a service description (schedule) for each regulated backhaul service.

1. UCLL and UCLFS backhaul services: - <http://www.comcom.govt.nz/regulated-industries/telecommunications/regulated-services/standard-terms-determinations/unbundled-copper-local-loop-and-unbundled-copper-low-frequency-services/ucll-and-uclf-backhaul/>
2. Sub-loop backhaul services: - <http://www.comcom.govt.nz/regulated-industries/telecommunications/regulated-services/standard-terms-determinations/unbundled-copper-local-loop-and-unbundled-copper-low-frequency-services/sub-loop-services/>
3. UBA backhaul services: - <http://www.comcom.govt.nz/regulated-industries/telecommunications/regulated-services/standard-terms-determinations/unbundled-bitstream-access-uba-services/uba-backhaul/>