GOVERNMENT OF BERMUDA
Ministry of Energy, Telecommunications and E-Commerce
The Department of Telecommunications

Access and Interconnection in Bermuda

Consultation Paper

Ministry of Energy, Telecommunications & E-Commerce

[6th October 2009]

Closing Date for Responses [17th November 2009]

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1 Introduction

In anticipation of forthcoming legislation that will establish a new regulatory framework in Bermuda, the Ministry of Energy, Telecommunications and E-Commerce (METEC) is launching a series of initiatives that will pave the way for the transition.

Access and interconnection (A&I) is one of several regulatory building blocks that form the basis for the telecommunications reform programme. Other blocks include the Dominance Framework (a consultation paper was issued in August 2008[1]), Retail Price Regulation and Consumer Protection.

An initial data collection exercise regarding access & interconnection was carried out in the autumn of 2008. METEC is now launching a consultation to explore in more detail the key aspects of access and interconnection and invites all interested parties to submit their views.

2 Scope of Consultation

Subsequent chapters of this consultation paper address the following:

- Background of this consultation;
- Defining of access and interconnection services;
- Extent of any access and interconnection obligations on non-dominant carriers;
- Access and interconnection charging;
- Reference Access & Interconnect Offer (RAIO).

Reference is made, in exploring the issues surrounding each of these topics; to the experience of other jurisdictions including Anguilla, Barbados, Cayman Islands, Jamaica and Trinidad & Tobago (background details for the respective regulatory decisions are contained in Annex A). They are included, not because they necessarily provide a template for what is most appropriate in Bermuda, but because they help to illustrate the issues faced and the solutions that have been adopted elsewhere.

3 Consultation Procedure

This consultation is being run in accordance with the Consultation Process documented in METEC's publication of the same name dated 28 November 2008 (available on METEC's web portal[2]).

1 A Dominance Framework for Bermuda, Consultation Paper, METEC, 20th August 2008.

2 http://www.mtec.bm/portal/server.pt?

The consultation period will run from 6th October, 2009 to 17th November, 2009. Written comments should be submitted before 5pm on 17th November, 2009.

Please submit your responses in MS Word or Adobe Acrobat format by email to gtelecom@gov.bm and a hard copy delivered by hand to:

Michael Wells
Acting Director of Telecommunications
Department of Telecommunications
F.B Perry Building
2nd Floor
40 Church Street
Hamilton HM 12
Bermuda

All comments should be clearly marked "Comments on Access and Interconnection in Bermuda: Consultation Document"

The Minister intends to make responses to this consultation available on the Government of Bermuda website. Any material that a respondent considers to be commercially sensitive should be put into an Annex and clearly marked "IN COMMERCIAL CONFIDENCE. Further details on the submission of confidential information are provided in the Consultation Process document available on the web portal.

The Minister regrets that he is not in a position to respond individually to the responses to this consultation.

This document does not constitute legal, technical or commercial advice; the Minister is not bound by this document and may amend it from time to time. This document is without prejudice to the legal position or the rights and duties of the Minister to regulate the market generally.

4 Background to this Consultation

This consultation explores the scope of access and interconnection remedies that could be imposed in situations where the regulator considers this proportionate to prevent market failure. The access and interconnection services described in this consultation are not exhaustive; other remedies may be applied by the regulator depending on market conditions.

The results of detailed market analysis will be used to decide on the most appropriate remedy to impose on the dominant carrier(s).

It should not be assumed that the full scope of access and interconnection remedies presented in this consultation document will be used. In addition not all remedies will apply to all carriers. Any obligation to introduce a remedy would be applied based on market analysis.

Without prejudice to future market reviews, local market characteristics are introduced in this consultation document to help convey the implications of applying international best practices regulation and remedies to access and interconnection remedies in Bermuda.

4.1 Regulatory Objectives

Through its Regulatory Objectives, it remains the steadfast aim of the Government[3] to encourage the development of the electronic communications sector to the benefit of the people and the economy of Bermuda. These objectives are:

- to ensure that the people of Bermuda are provided with reliable and affordable access to quality public communications services
- to enhance Bermuda's competitiveness in the area of communications so that Bermuda is well positioned to compete against its "real" global competitors in the tourism and international business markets
- to encourage the development of a public communications sector which is responsive to the requirements of users (both individuals and businesses) and which provides its users with choice, innovation, efficiency and affordability
- to encourage the development and rapid migration of innovative technologies to Bermuda
- to promote the orderly development of Bermuda's public communications sector
- to encourage sustainable competition and create an invigorated public communications sector which would lay the groundwork for the further development of communications reliant industries
- to encourage the development and maintenance of resilient and fault-tolerant infrastructures

3 Telecommunications Regulatory Reform Policy, 18th November 2008, http://www.gov.bm/portal/server.pt/gateway/PTARGS_0_2_7286_330_1813_43/http%3B/ptpublisher.gov.bm%3B7087/publishedcontent/publish/min__telecom__and_e_commerce/telecommunications/telecommunication_regulatory_reform/telecommunications_regulatory_reform_policy_0.pdf

- to promote investment in the public communications sector and in the communications reliant industries thereby stimulating the economy and employment; and
- to promote Bermudian ownership and Bermudian employment at all levels of the communications industry.

4.2 Requirement for a New Access and Interconnection Framework

The current access and interconnection framework in Bermuda has worked well in the current service-specific licensing framework. All licensees have an obligation to establish interconnection with all other carriers who request such interconnection, using reasonable terms and conditions. This obligation is not linked to dominance or any other measure.

Under the proposed licensing regime, the access and interconnection services and interfaces required are likely to increase as licensees, with different degrees of infrastructure, needing different access and interconnection interfaces, may enter all service markets. It is therefore unlikely that the current access and interconnection framework would meet the requirements under the new licensing regime.

In order to facilitate sustainable competition, a balance needs to be struck between providing regulated access to essential elements of the network infrastructure and associated facilities on the one hand and maintaining incentives for carriers to invest in their networks on the other. A dominance-based approach to regulation is being proposed whereby obligations to interconnect would be applied to licensees deemed dominant in that relevant market only. The new Regulatory Authority (RA) would be responsible for analysing the relevant markets and imposing appropriate and proportionate remedies on licensees found to be dominant in one or more access and interconnection markets.

Remedies that the RA could apply include, but are not limited to, the following:

- Development and publication of a Reference A&I Offer (RAIO).
- Non-discrimination on access and interconnection terms (commercial, legal, operational and technical).
- Obligation to provide transit interconnection services.
- Imputation of access and interconnection terms – e.g. the dominant licensee must prove that its own retail business is subject to the same terms for access and interconnection (underlying all its services) as other licensees.
- Development of cost-based tariffs for access and interconnection - the RA could specify the principles and parameters by which costing and pricing of access and interconnection services and interfaces should be conducted and dominant licensees would thus be obliged to comply with these requirements, if imposed.
- Development and launch of access and interconnection services to support new and innovative retail services, prior to the launch of the corresponding retail service.

- Obligation to negotiate new access and interconnection services and interfaces as requested by other licensees.
- Organizational separation between retail and wholesale sections of the dominant licensee's business to prevent information submitted by other licensees for access and interconnection purposes from being used anti-competitively by the dominant licensee's retail business.

The RA would be required to explain and justify the analysis undertaken and the remedies proposed and all such decisions would be subject to public consultation processes.

In order to understand precisely what is required of the new access and interconnection framework, and as a precursor to undertaking the market reviews, this consultation introduces several key issues and invites comments, especially from service providers who may require, or be required to provide, access and interconnection services:

- The range of access and interconnection services that might be applied to carriers found dominant in a relevant market (*Chapter 5)*
- Whether access and interconnection obligations should be placed on non-dominant carriers? *(Chapter 6)*
- Alternative approaches to charging for access and interconnection services *(Chapter 7)*
- The scope and format of Reference Access and Interconnection Offers (*Chapter 8)*

4.3 Terminology of Access and Interconnection

As defined by the European Commission in its Directive on Access and Interconnection (2000). In that Directive access and interconnection are defined as:

> **Access** is "*the making available of facilities and/or services, to another undertaking, under defined conditions, on either an exclusive or non-exclusive basis, for the purpose of providing electronic communications services*"
>
> **Interconnection** is "*the physical and logical linking of public electronic communications networks used by the same or different undertaking in order to allow the users of one undertaking to communicate with the users of the same or another undertaking, or to access services provided by another undertaking. Services may be provided by parties involved or other parties who have access to the network*"[4].

Interconnection is a type of access, therefore when the term 'access' is used the provisions may apply to interconnection as well as all other forms of access covered in this document.

4 Proposal for a Directive of the European Parliament and Council on access to, and interconnection of, electronic communications networks and associated facilities, European Commission, 2000/0186 COD
http://ec.europa.eu/archives/ISPO/infosoc/telecompolicy/review99/com2000-384en.pdf

5 Access and Interconnect Services

There are various access and interconnection services currently provided by carriers in Bermuda, which fall into the following categories (some examples of types of services are provided, although this list is not exhaustive).

- Traffic based services
  - Origination and termination of calls including domestic calls and local 800 service for fixed (both wire-line and wireless) and mobile network service providers
  - Origination and termination of International Message Toll Services (including toll-free calls and toll-free database access), ISDN and switched data, (e.g., switch 56)
  - Origination/termination access services for VoIP
- Connectivity based services
  - Dedicated analogue and digital leased lines
- Co-location based services
  - Co-location

The results of the access and interconnection data collection exercise conducted by METEC in the preparation of this consultation document, confirmed that currently all carriers in Bermuda interconnect directly with each other as required under the current Telecommunications Act ('Telecoms Act').

The Telecoms Act and Public Telecommunications Services (PTS) licences mandate that:

- Class A carriers must self-provide international network facilities
- Class B carriers must self-provide national network facilities
- Class C carriers must purchase network components from Class A and Class B carriers[5].

As a result of the different licence categories available, different carrier classes purchase different access and interconnection products.

The new regulatory framework will not require all carriers to interconnect directly. Carriers who are not directly connected will require access to a transit service in order to pass calls between them. For example a non-dominant carrier could decide to only interconnect directly with one or two larger carriers. The non-dominant carrier will need to exchange traffic with networks to which it is not directly interconnected and may therefore need the use of a transit service

Resale, which is the inclusion of another carrier's network components or products into a carrier's retail services, is currently not permitted in Bermuda. However, once the new legislation is in place, this restriction will be removed and carriers may therefore require additional network components or certain facilities to bundle with their own services in order to provide a full service portfolio to customers.

5 With some exceptions such as paging service providers.

In the sections below, access and interconnection services are considered under the following categories:

- Traffic based services, including indirect access services
- Connectivity based services
- Wholesale broadband services
- Co-location services
- Miscellaneous services

NOTE: Several of the services described in the following sections could be provided by both dominant and non-dominant carriers. However, as this document addresses potential obligations by dominant carriers, we refer to the services being provided by a dominant carrier.

5.1 Traffic Based Access and Interconnection Services

Traffic based services are concerned with the handling of call traffic between two or more carriers. Within a competitive domestic market, carriers are likely to require various interconnection services in order to deal with the following call handling situations concerning their customers:

a) The party being called by the customer is on another domestic carrier's network (i.e. a call termination service);
b) The party calling the customer is on another domestic carrier's network (i.e. a call origination service);
c) A domestic call between two parties, one or both of whom may be customers, can only be made via a third-party carrier's network (i.e. a call transit service);
d) An international call to or from a customer can only be made via a third-party domestic carrier's gateway network (i.e. an international call transit service);
e) A party, wishing to make a free-phone call to a customer, is on another domestic carrier's network (i.e. a call origination with free-phone number translation service);
f) A party, wishing to make a premium rate call to a customer, is on another domestic carrier's network I(i.e. a call origination with premium rate number translation service).

The exact nature of each of the above interconnection services is set out in sub-section [5.1.1] below through a series of short service descriptions. The subsequent sub-section considers the situation regarding indirect access services.

5.1.1 Interconnection Service Definitions

Set out below are definitions for various interconnection services that are likely to be required in Bermuda. Associated with the definitions are key terms on which each service would be provided, based on best international practice. It is expected that these definitions and associated terms would form the basis of the relevant remedies in Bermuda.

a) Call Termination

A CALL TERMINATION service is where a call is handed over from another licensed carrier's network, via a Point of Interconnection, to a dominant carrier's network, for termination on a valid Geographic Number on a dominant carrier's network within Bermuda.

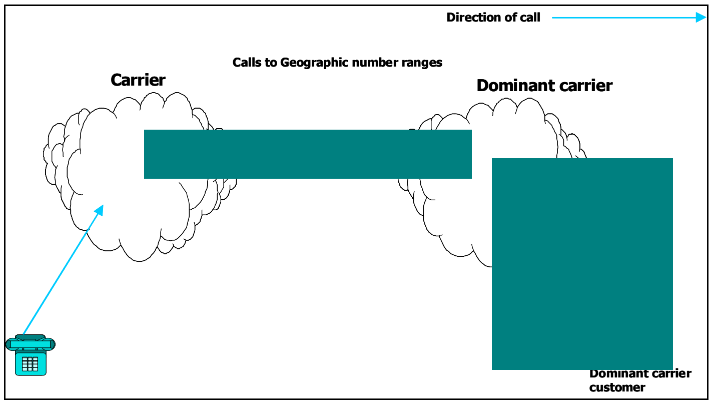


Figure 1 Call Termination

b) Call Origination

A CALL ORIGINATION service is the handover to the carrier of a call originated by a subscriber directly connected to a dominant carrier's system (utilising a Carrier Identification Code (CIC) or carrier selection routing prefix assigned to another licensed carrier), via a Point of Interconnection.

A dominant carrier shall convey and hand over to the other licensed carrier a call initiated on its system by a subscriber using a CIC, provided that:

- The other licensed carrier has been assigned that prefix
- The other licensed carrier has ordered and a dominant carrier has implemented the relevant data build in its network[6] to activate the CIC at the relevant exchanges

A dominant carrier shall convey Call Origination calls at the same standard and quality of services as it conveys calls made by its own subscribers.

6 See Data Management Amendment Service.

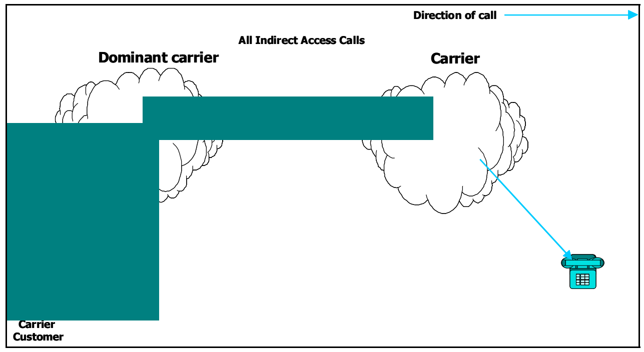


Figure 2 Call Origination

c) Call Transit

A CALL TRANSIT service is where a call is:

- handed over from another licensed carrier system via a Point of Interconnection to a dominant carrier system,
- switched by a dominant carrier's switch, and
- handed to another licensed carrier's system[7] within the country.

A dominant carrier shall convey Call Transit calls at the same standard and quality of services as it conveys calls made by its own subscribers.

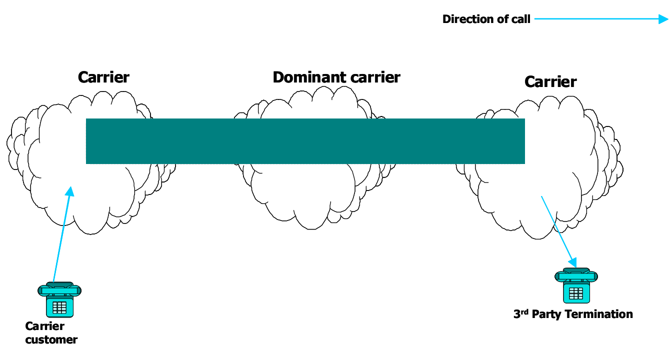


Figure 3 Call Transit

d) International Call Transit

An INTERNATIONAL CALL TRANSIT service is where a call is switched by a dominant carrier switch and handed to a third party carrier outside the country.

A dominant carrier shall convey International Call Transit calls at the same standard and quality of services as it conveys calls made by its own subscribers.

7 Or back to the originating carrier's system.

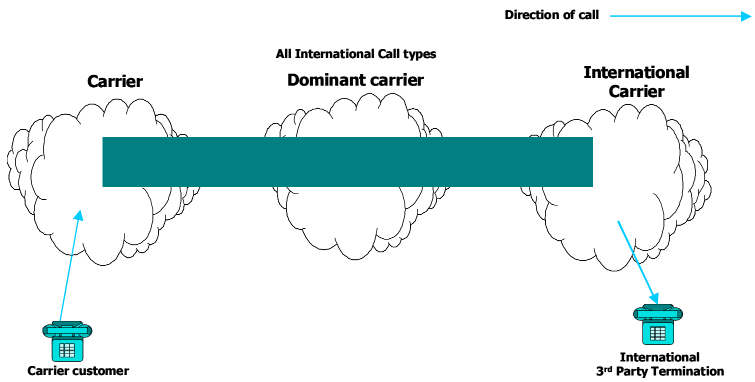


Figure 4 International Call Transit

e) Call Origination with Free-phone Number Translation

CALL ORIGINATION WITH NUMBER TRANSLATION - Free-phone Call Origination service is where a call, originated by a subscriber directly connected to a dominant carrier's system, is destined for a Free-Phone number (within a Free-Phone Number Range in the National Numbering Scheme) assigned to the interconnecting carrier.

A dominant carrier shall convey and hand over to the other licensed carrier a Free-Phone call initiated on a dominant carrier system by a subscriber dialling a Free-Phone Number provided that:

- The other licensed carrier has been assigned the Free-Phone Number Range (corresponding to the Free-Phone Number dialled)
- The other licensed carrier has ordered and a dominant carrier has implemented the relevant Data Management Amendment to activate the Free-Phone Number Range (corresponding to the Free-Phone Number Dialled) at the relevant dominant carrier exchange.

A dominant carrier shall convey Free-Phone Call Origination calls at the same standard and quality of services as it conveys calls made by its own subscribers.

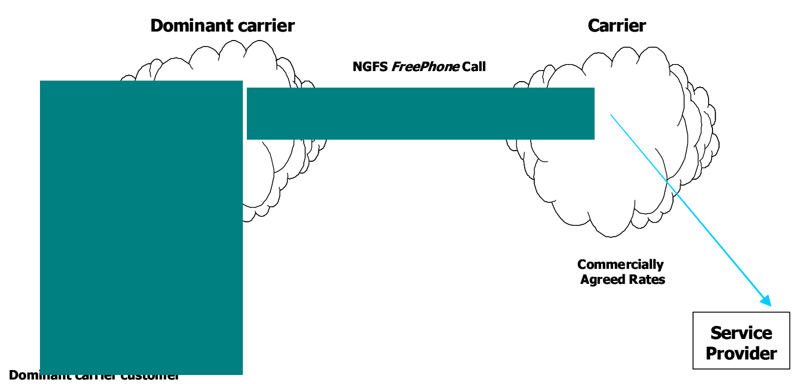


Figure 5 Free-Phone Call Origination

f) Call Origination with Premium Rate Number Translation

CALL ORIGINATION WITH NUMBER TRANSLATION – Premium Rate Number Call Origination service is where a call, originated by a subscriber directly connected to a dominant carrier system, is destined for a Premium Rate Services number (within a Premium Rate Services Number Range in the National Numbering Scheme) assigned to the interconnecting carrier.

A dominant carrier shall convey and hand over to the other licensed carrier a Premium Rate Services call initiated on a dominant carrier's system by a subscriber dialling a Premium Rate Services Number provided that:

- The other licensed carrier has been assigned the Premium Rate Services Number (corresponding to the Premium Rate Services Number dialled)
- The other licensed carrier has ordered and a dominant carrier has implemented the relevant Data Management Amendment to activate the Premium Rate Services Number (corresponding to the Premium Rate Services Number Dialled) at the relevant dominant carrier's exchange.

A dominant carrier shall convey number translation calls at the same standard and quality of services as it conveys calls made by its own subscribers

Question 1: Do you agree that the above definitions, a) to f), adequately represent the various traffic based interconnection services that are likely to be required in Bermuda? If not, please state what changes you believe are necessary and explain why.

5.2 Indirect Access

5.2.1 Introduction

Indirect Access means the ability for a customer to indicate that the call is to be conveyed for termination by a specific carrier.

Indirect access can take one of several forms:

1) Carrier Pre-Selection (CPS) is when subscribers pre-determine their carriers of certain types of call, e.g. international calls. Any calls of this type are automatically redirected to the designated carrier's exchange. This form of indirect access (IA) is currently mandated on all domestic carriers in Bermuda and is known as Pre-defined Inter-exchange Carrier (PIC).

2) Carrier Selection (CS) allows subscribers to choose their carrier on a call by call basis. A Carrier Identification Code (CIC) is dialled before the number. This code ensures the call is directed via the relevant carrier.

3) Carrier Pre-Selection with call-by-call override combines Carrier Pre-Selection and Carrier Selection. Subscribers can designate certain carriers for certain types of call, which are automatically redirected, but can also use

Carrier Identification Codes to override their pre-determined automatic selection.

Introduction of an indirect access remedy is intended to generate greater competition in the calls market by allowing users to select the carrier(s) for their calls. This means the user could be a subscriber of a dominant carrier but uses a different carrier for certain calls, most commonly international calls. By mandating a dominant carrier to offer indirect access to other carriers, the regulator can enable competition in certain calls markets, e.g. the international calls market.

Under Bermuda's current Pre-defined Inter-exchange Carrier (PIC) arrangement, the domestic fixed line and mobile carriers are obliged to offer customers access to the services of all licensed international carriers. Currently, as domestic fixed line and mobile carriers in Bermuda are not allowed to offer international call services as part of their portfolios, it is mandatory that customers select an international carrier to whom the domestic carrier must direct all international calls. The international carriers can bill customers directly, although it is possible too for wireline/wireless carriers to provide a billing service.

Once carriers receive unified licences, which will allow them to offer all communications services, there will be increased potential for competition in the provision of call services. For example, an existing Class B carrier will not only be able to provide domestic call services but also its own international call service. Likewise, the existing international carriers could offer domestic call services.

The risk of not retaining some form of indirect access regulation could be a real reduction in competition in, for example, the international call market. If only a dominant carrier in the domestic market can offer a full portfolio of calls services (e.g. domestic and international combined) the dominant domestic carrier could squeeze out competition in the international calls market.

By mandating some form of indirect access consumers retain the choice over who carries their international minutes and thus provides a degree of competition in this market.

The case for placing an indirect access obligation on non-dominant carriers is significantly weaker. Customers who choose the services of a non-dominant domestic carrier by definition have an alternative choice (i.e. a dominant carrier(s)).

There are a number of reasons why a non-dominant carrier might attempt to block access to indirect access services from its network:

- The carrier might consider itself to be less competitive in certain segments of the market and could consider blocking indirect access to those market segments;
- The carrier might be cross subsidizing between different call markets, e.g. large margins on international calls could subsidies smaller margins on domestic calls; and

- The carrier might also consider that it is providing a better quality service than some indirect access providers and therefore could block indirect access to what it considers are lesser quality services.

A customer has the option to select service from either the dominant domestic carrier or the competing domestic carrier and if the dominant domestic carrier has an obligation to offer indirect access then it is not necessary for the competing provider to have this obligation. However, competing domestic carriers could offer indirect access if they consider it to be in their commercial interest (e.g. it could increase profits through increase in customer base). If customers value an indirect access product and the competing carrier does not offer this then customer may stay with the dominant carrier or change service to another competing carrier who offers indirect access. Therefore it can be concluded that the competing carrier does not have the market power to act independently of its customers and competitors. In that case there is no requirement to mandate indirect access for non-dominant carriers.

For a non-dominant carrier that does not offer indirect access to retain its customers, when faced with competition from other carrier(s) which offer indirect access services, the carrier needs to offer a service that is still preferable to its customers overall. If it were able to retain its customers despite not offering indirect access and not having an overall more attractive service, then it is likely that the carrier holds a position of significant market power in one or more relevant markets.

Not all jurisdictions[8] have opted for mandating indirect access. In the Cayman Islands, for example, it was decided that indirect access would be counter-productive. It was considered that it could discourage new entrants from investing in infrastructure and require perpetual regulatory oversight. One option, therefore, could be to abandon the current PIC arrangements and allow the market to develop without regulatory intervention through regulated indirect access. However, in contrast to the Cayman Islands there would be little or no implementation costs for IA in Bermuda and therefore the experience of the Cayman Islands is not directly applicable.

The Fair Trading Commission in Barbados has similarly opted for a light-handed approach but the Minister retains the right to impose indirect access if it is felt necessary.

Question 2: Should the RA continue to impose some sort of indirect access obligation following the reform of the telecommunications industry in Bermuda?

Question 3: If the answer to question 1 is yes then should this obligation be imposed on all carriers or only those that are found to be dominant in the relevant market(s)?

5.2.2 Introduction of Indirect Access

The current PIC arrangements fall into the carrier pre-selection (CPS) category as described earlier in this section. Customers must elect which carrier conveys their international calls. The process of selecting an international carrier is mandatory and

8 See Annex 1 for further details on the regulatory decisions taken in other jurisdictions.

is not an option for the domestic carrier not to offer this service. Although it is currently mandatory for customers in Bermuda to select an international carrier, it is also possible to introduce CPS on a non- mandatory basis. That is customers can choose whether to use a CPS provider for international calls or to buy the bundled domestic and international calls from the domestic carrier.

The second category, CS, provides the consumer with the flexibility to select a carrier on a call by call basis, although the need to dial a CIC every time before the main number is often regarded as an inconvenience. This problem is addressed by the third category, CPS with call override, since the CIC need only be dialled in exceptional cases[9].

There are costs associated with the implementation of indirect access and various additional technical requirements that must be fulfilled if a particular service category other than the existing PIC service is to be realized. The costs include one-time set up costs, such as ensuring the dominant carrier(s)' exchanges are able to facilitate indirect access, and the ongoing costs of regulation.

In the Cayman Islands, for example, the costs of ongoing regulation spread over a relatively small population were regarded as a significant reason against introducing a legal requirement for fixed line carriers to facilitate indirect access. Depending on the hardware currently in place, the cost of upgrading technical capabilities may also present a more restrictive cost than in other jurisdictions.

In some circumstances the mandating of an indirect access obligation could be seen as an un-warranted burden. However, as A-carriers use the current PIC service to provide their services to customers and B-carriers are currently providing the PIC access service in Bermuda, it is suggested that the incremental cost of PIC for a dominant carrier is low and the cost benefit balance is more likely to be positive.

In light of the current situation in Bermuda it is suggested that the RA could mandate that:

- A dominant carrier in the A&I market is obliged to offer a PIC service. Non-dominant carriers would be allowed to offer a bundle of services including an optional PIC service;
- the dominant carrier should provide a call-by-call override service;
- the PIC service will be limited to international calls only as it is considered that the magnitude of savings for a national PIC service are so small that it would not be viable;
- No carrier should be able to block calls to a retail service (i.e. a 2020 service).

Question 4: Do you agree with the above suggestions for PIC services? If not, please state your reasons.

9 It is only likely that call-by-call override would be beneficial if carriers had relatively different tariffs so calls within the market section, e.g. one carrier was cheaper for calling the UK but another was cheaper for US. Whilst it is possible this may represent cross subsidisation which customers may prefer, and the differences in relative charges are likely to be small.

5.2.3 Summary of Traffic Based Access and Interconnection Services

The following table summarises the access and interconnection traffic based services considered in this section.

Table 1 A&I Traffic Based Services that could be mandated by the RA

Traffic Conveyance (Dominant carrier may be fixed or mobile network operator)

Service Type	Definition	Service Categories
Traffic termination	Dominant carrier receives traffic from another licensed carrier and terminates it within its own network	**Local switch termination**: where PoI is in the local switch to which destination end-user is connected
Traffic transit	Dominant carrier receives traffic from another licensed carrier and routes it to the network of the same or a third carrier. The dominant carrier would be compensated for carrying this traffic.	(1) **National**: Traffic originates and terminates in Bermuda (2) **International**: Traffic originates and/or terminates overseas
Traffic origination	Dominant carrier provides traffic originating on its network to another licensed carrier for onward transit and/or termination.	(1) **Carrier Pre-selection**: Traffic is passed to another licensed carrier who has been pre-determined by the calling end-user (2) **Carrier Selection**: Traffic is passed to another licensed carrier selected by the end-user on a call-by-call basis
Traffic origination with number translation	As above but the calling end-user dials a non-geographic number and is charged nothing for the call in the case of Free-phone or a fixed fee, regardless of the distance of the call in the case of local call and premium rate calls	(1) Free-phone (2) Local call rate (3) Premium rate

It is suggested that access and interconnection remedies available for mandating by the RA could include the traffic based services listed in Table 1.

Question 5: Do you agree that the suggested service categories for traffic based access and interconnection should be mandated, if necessary, by the RA? If you believe any services are not necessary then please explain your reasoning.

Question 6: Does Table 1 contain a comprehensive list of traffic based access and interconnection services likely to be required in Bermuda? If not, what other services could be included and why?

5.3 Connectivity Based Access and Interconnection Services

In addition to traffic based services, licensed carriers also require connectivity based services. The following are short descriptions of connectivity services that are commonly mandated by regulators on dominant carriers.

INTER-CARRIER LEASED LINES can be defined as:

- a means of connecting two physical points by using a dedicated telecommunications circuit. Each end of the circuit being permanently connected to the other.

The provision of an inter-carrier leased lines service by a dominant carrier would allow another licensed carrier to lease capacity from the dominant carrier to form part of its network. The leased line capacity is provided between two carrier locations and does not involve the provision of leased line capacity to an end-user as this would be a wholesale service, not and access and interconnection services.

BACKHAUL can be defined as:

- the part of the network that comprises the links between the core, or backbone, of a network and the network elements at the edge of a network (e.g. a mobile network base station to the point of presence on a core network)

Another licensed carrier deploying network equipment at its point of presence could require network transmission capacity back to the dominant carrier's network. The provision of a backhaul service by a dominant carrier would enable the other licensed carrier to lease backhaul capacity from the dominant carrier to enable it to provide capacity between its network point of presence and the dominant carrier's network.

IN-SPAN INTERCONNECT (ISI) can be defined as:

- a service that enables the interconnection of two carrier's networks through the splicing of two cables between the premises of the carriers, i.e. not at the premises of either carrier.

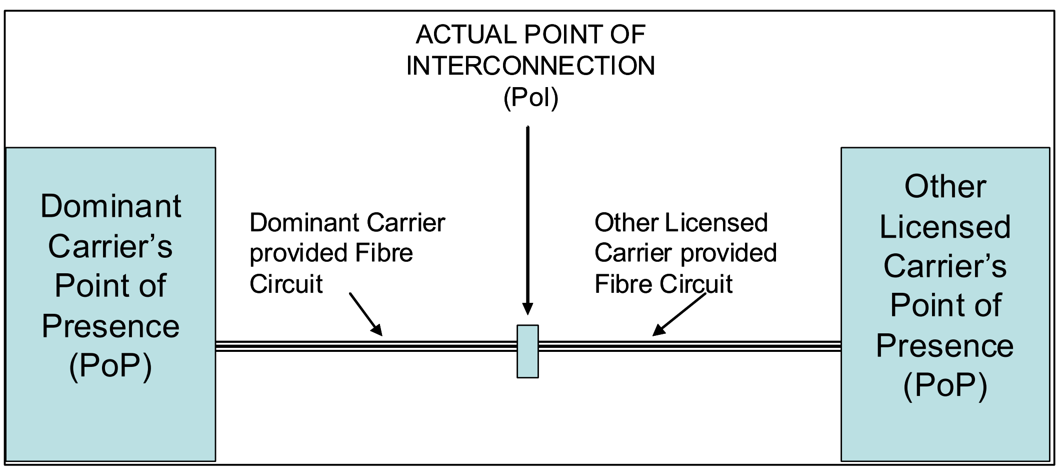


Figure 6 In-Span Interconnect (ISI)

Another licensed carrier requiring interconnection could interconnect with a dominant carrier at an agreed location between both carriers' equipment. ISI is of particular advantage where the other licensed carrier has some network deployed close to the network of a dominant carrier and therefore interconnection could be provided at a convenient location in both parties network.

CUSTOMER-SITED INTERCONNECT (CSI) can be defined as:

- a service that enables the interconnection of two carriers' networks by the dominant carrier supplying a circuit from its own premises to the interconnecting carrier's premises, where the two networks are interconnected.

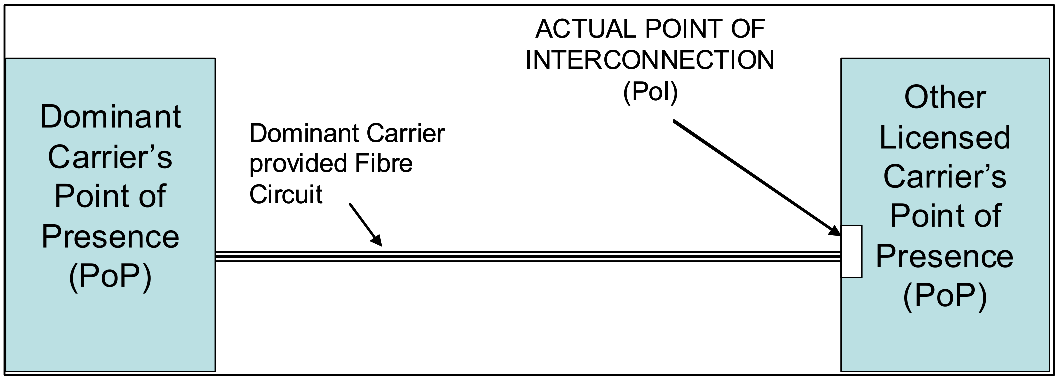


Figure 7 Customer Sited Interconnect (CSI)

Another licensed carrier requiring interconnection may wish to interconnect with the dominant carrier at its own point of presence. CSI is of particular advantage where the other licensed carrier (who is the customer of the dominant carrier, hence the name CSI) has limited or no network deployed close to the network of a dominant carrier and therefore interconnection could be provided by the dominant carrier connecting its network to the interconnecting carrier's point of presence without the interconnecting carrier needing to build network to meet the dominant carrier for interconnection.

The following table summarises the access and interconnection connectivity based services discussed above.

Table 2 Access and interconnection connectivity based services that could be mandated by the RA

Connectivity	
Service Type	**Definition**
Leased lines	Dominant carrier provides another carrier with capacity either between two points on the same or different networks (but not between a carrier's network and its end-users[10]).
Backhaul	Dominant carrier provides another carrier with leased line capacity between its own network and the other carrier's network.
In Span Interconnect (ISI)	This service comprises of one or more interconnect links and signalling links, between the dominant carrier's network and the other carrier's network. The interconnection is provided at a location between the two carriers' interconnecting switches.
Customer Sited Interconnect (CSI)	This service comprises of one or more interconnect links and signalling links, between the dominant carrier's network and the other carrier's network. The interconnection is provided at the location of the other carrier's switch.

10 The provision of capacity between a carrier's network and an end user is a wholesale service and not an access and interconnection service.

It is therefore suggested that access and interconnection remedies that can be mandated by the RA should include the connectivity based services listed in Table 2.

Question 7: Do you agree that the suggested service categories for connectivity based access and interconnection are relevant and could be mandated, if necessary, by the RA? If you believe that any services are not necessary then please explain your reasoning.

Question 8: Does Table 2 contain a comprehensive list of connectivity based access and interconnection services likely to be required in Bermuda? If not, what other services could be included and why?

5.4 Miscellaneous Access and Interconnection Services

In order to provide a full portfolio of services to its customers a carrier, in addition to traffic and connectivity based services, could require certain miscellaneous access and interconnection services commonly provided by the dominant carrier to its direct connected customers. The following are short descriptions of miscellaneous services that are commonly mandated by sector regulators on dominant carriers.

OPERATOR SERVICES CALLS can be defined as:

- those calls to services that are provided by a carrier dominant in the relevant market (i.e. Reverse Charge Calls, Alarm Calls, Calls via the Operator);
- the dominant carrier shall answer calls handed over from the carrier and deal with them in the same way as a call made by a subscriber of the dominant carrier.

In order for a carrier, offering a call based service to its customers, to provide a service equivalent to a dominant carrier's calls based service it would need to offer an operator service. It could be difficult for a new entrant to provide an operator service equivalent to that offered by a dominant carrier and therefore the competing carrier may wish to have access to the service provided by a dominant carrier instead of providing its own service.

DATA MANAGEMENT AMENDMENTS are defined as:

- Data reconfiguration of either or both carriers' systems as is necessary for the access, routing and charging of calls on and between the carriers' systems.

Data Management Amendments (DMAs) are an important aspect of ensuring that two interconnected networks can function correctly. DMAs ensure the accurate and timely exchange and implementation of technical information to support the routing of calls and other services between the two carriers.

The following table summarises the access and interconnection miscellaneous services discussed above.

Table 3 Access and interconnection miscellaneous services that could be mandated by the RA

Operator services (Dominant carrier may be fixed or mobile network operator)

Service Type	Definition	Service Categories
Operator Services	Dominant carrier provides one or more operator services to another carrier's customers	(1) Operator assistance (2) Directory enquiries (3) Directory number inclusion

Data Management Amendments	
Service Type	**Definition**
Data Management Amendments (DMA)	Data reconfiguration of either or both carriers' system as is necessary for the access, routing and charging of calls on and between the carriers' systems (e.g. for setting up new number groups etc.).

It is therefore suggested that access and interconnection remedies available for mandating by the RA should include the miscellaneous services listed in Table 3.

Although there are no emergency services call centres operated by telecommunication carriers in Bermuda today, access to customer information would be available from BTC for the emergency services to assist with the handling of silent calls, interrupted calls, etc.

Question 9: Do you agree that the suggested service categories for miscellaneous access and interconnection are relevant and should be mandated, if necessary, by the RA? If you believe that any services are not necessary then please explain your reasoning.

Question 10: Does the list above contain a comprehensive list of miscellaneous access and interconnection services likely to be relevant to Bermuda? If not, what other services could be included and why?

In many countries all licensed carriers provide data of their customers to a database which is used by the emergency services to ensure that all customers have the same level of service when making calls to the emergency services.

Question 11: Do you consider that customer information should be provided by all licensed carriers to a database that is communicated to the emergency services to assist in the handling of emergency service calls? If not, please explain your reason.

5.5 Enabling Competition in Broadband Service Provisioning in the Fixed Network

Local Access networks are difficult for a new entrant to replicate and therefore may act as a 'bottleneck' for any new entrant who wishes to compete in the broadband services market.

In recognition of the significant barrier the local loop may represents to entry into the fixed telecommunications market and the difficulties associated with infrastructure investment, regulators have pursued various ways of facilitating service-based competition in the provision of voice and data services whilst still providing some incentives to invest in alternative local loop infrastructure where considered viable by the competing carriers. Regulators have focused on enabling competitive access to the local loop as a means of generating more competition in the provision of broadband services.

5.6 Wholesale Broadband Services

The regulatory remedies available for introducing competition in broadband services from carriers who do not have an access network fall into two main categories, these being:

- resale of a wireline carrier's services;
- wholesale access (sometimes referred to as network unbundling or bitstream access), whereby a wireline carrier's high-speed access links to customers' premises are made available to a third party, possibly at an aggregated level and combined with associated transmission services[11];

With resale, the carrier reselling the product cannot influence the technical provision of the service provided by the wireline carrier and hence no way of differentiating itself in terms of service quality. Neither, however, does the new entrant have to invest in any infrastructure and so the risk is relatively low.

Bitstream access[12] provides some opportunity for the operator to differentiate its service in quality terms and, to some extent, the range of services offered; whilst the dominant carrier still controls the types of service available (maximum downstream and upstream speeds, standards used etc), the entrant may choose to have a different service configuration from the dominant carrier. Also, the entrant may choose to build its own transmission (backhaul) network, in full or in part.

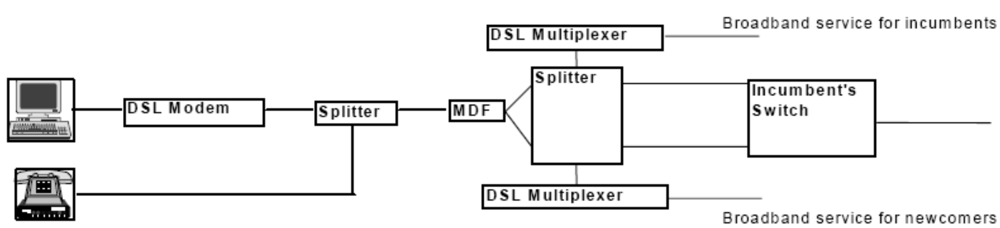


Fig 8: Example of Bitstream Access using DSL technology (source: OECD)

11 In some jurisdictions this is regarded as another form of local loop unbundling, although it may be more accurately described as network unbundling.

12 In the IRG document ONPCOM01-18Rev1 bitstream access is defined as: "High speed bit stream access (provision of DSL services by the incumbent operator) refers to the situation where the incumbent installs a high speed access link to the customer premises (e.g. by installing its preferred ADSL equipment and configuration in its local access network) and then makes this access link available to third parties, to enable them to provide high speed services to customers. The incumbent may also provide transmission services to its competitors, to carry traffic to a 'higher' level in the network hierarchy where new entrants may already have a point of presence (e.g., transit switch location). The bit-stream service may be defined as the provision of transmission capacity (upward/downward channels may be asymmetric) between an end-user connected to a telephone connection and the point of interconnection available to the new entrant."

Question 12: Do you have a preference to which form of wholesale broadband access you would wish to see mandated on a dominant carrier? Please explain your reasons.

5.7 Defining Access to the Traditional Telecoms Network Local Loop

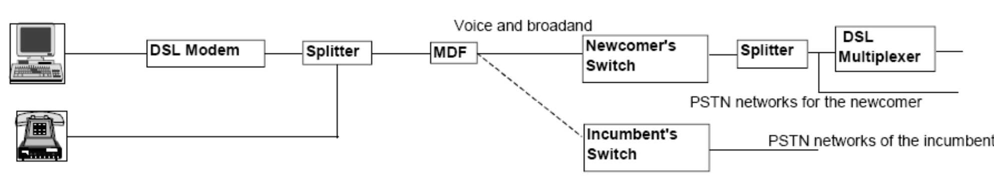
Local loop unbundling (LLU) is a regulatory remedy available for introducing competition in the broadband market. LLU is where part or all of the physical local loop is made accessible to another carrier, who would then install its own complementary network infrastructure. Options for introducing local loop unbundling include:

- full loop unbundling;
- sub loop unbundling;
- line sharing.

The attraction of unbundling, from an entrant's perspective, is that it enables the carrier to control the data transmission over the local loop, and thus determine the types of service it offers. Providing broadband services over a fully unbundled local loop usually involves a carrier installing its own equipment, usually at the dominant wireline carrier's local exchange, and requires close collaboration with the dominant carrier to ensure adequate support in terms of space, power, air-conditioning, security, maintenance etc (known collectively as co-location services and discussed in a subsequent section) are in place.

Sub-loop unbundling usually involves a carrier in installing its own equipment, usually at a network node[13] part way in the network between the carrier's exchange and the customer.

LLU, therefore, involves significantly greater investment from the new entrant than using broadband wholesale services, as well as technical and administrative resources from the dominant carrier and considerable involvement from the regulator.



13 Commonly known as a cabinet or primary cross connection point

Fig 9: Full Loop Unbundling (source: OECD)

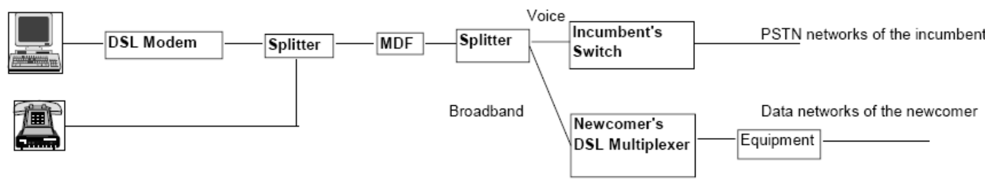


Fig10: Line Sharing (source: OECD)

Full and sub-loop unbundling are the only unbundling solutions that allow carriers the opportunity to provide traditional voice services alongside data services. Simple resale and wholesale (bitstream) can only offer broadband services.

The extent of any unbundling has significant effects on the development and nature of telecommunications competition. If there is not enough unbundling, entry by efficient competitors may be inhibited. If there is too much unbundling then dominant carriers may have reduced incentives to invest in unbundled parts of the network. This can lead to inadequate capacity, lower quality, and slower development of new technology (such as high capacity broadband). Meanwhile, entrants may:

- focus on arbitrage opportunities, by obtaining services at attractive wholesale prices and reselling them to customers, instead of designing innovative product mixes that give customers greater choice; and
- delay investing in infrastructure and focus instead on expanding re-bundled services as quickly as possible.

Early attempts at introducing LLU had mixed results, with the initial take-up being very slow in, for example, the UK and France; although it proved more successful in Hong Kong. Some jurisdictions chose only to implement simple resale or bitstream access.

More recently, regulatory initiatives to encourage broadband competition have been influenced by the lessons learnt elsewhere and the increase in competitive pressure exerted by cable TV networks and wireless access networks. Consequently, some regulators believe it is no longer appropriate to mandate resource-intensive LLU because of increased competition from alternative infrastructure investment. On the other hand other regulators (e.g. Jordan and Malaysia) are concluding that early problems with LLU have now been overcome and a full suite of LLU products should be introduced (in Jordan's case, whilst there has been investment in alternative infrastructure, it was felt that this alone would never provide universal coverage). In Trinidad and Tobago, the regulator has proposed a phased introduction approach: full and line-sharing LLU would be introduced first and the possibility of sub-loop LLU and bitstream would be reviewed at a later date. (Further details on the situation in other jurisdictions may be found in Annex A.)

It is suggested that a local loop unbundling remedy should be included within the scope of services that can be mandated by the RA.

Question 13: Do you agree that local loop unbundling remedies may be appropriate for Bermuda? If not, please provide your reasoning.

5.8 Defining Access to the Networks of Cable TV Service Providers

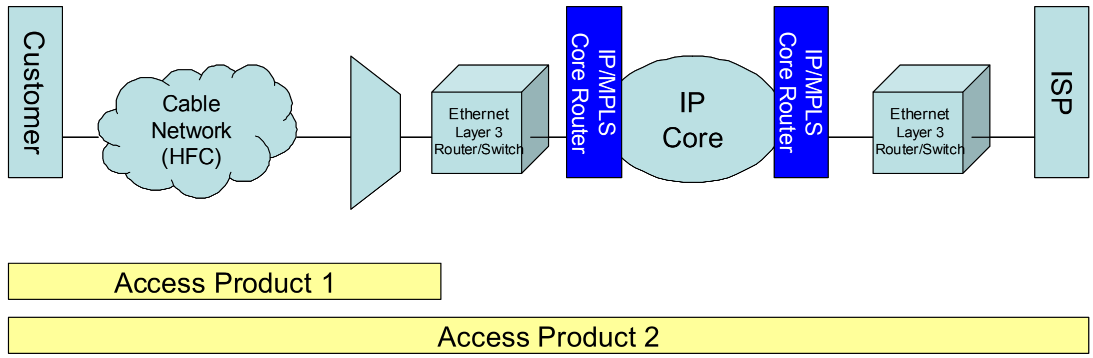
The cable networks deployed for the distribution of cable TV (CATV) services are fundamentally different from traditional fixed telecoms networks. Commonly, these cable networks use frequency division multiplexing technology to carry a variety of services usually over a Hybrid Fibre Coax (HFC) network. Services on these systems are carried on Radio Frequency (RF) signals in the 5MHz to 1 GHz frequency band.

For the avoidance of doubt, references in this document to cable networks refer to the multi-service networks deployed by cable TV service providers. Cable networks means the network elements and infrastructure utilised by the cable TV service providers to deliver their services to customers.

Owing to the topology of the cable networks and the network and service management applied to the network it may not be feasible to physically unbundle the network on a cable by cable basis (i.e. at the customer connection level) in the same manner as with a traditional wireline network.

Unbundled access to a cable network to allow another carrier to provide broadband services over the same network could be provided by a resale remedy or by using a method very similar to bitstream unbundling in the traditional telecoms network. In Denmark the regulator decided that it needed to regulate the access to the cable network as it found that a cable network operator was dominant in the market for broadband connectivity. In its recent draft decision on providing access the Danish regulatory authority described the potential bitstream type options as:

- At the nearest Ethernet layer 3 router/switch (Access Product 1); and
- At an Ethernet layer 3 router/switch higher in the network hierarchy or at a corresponding point in the network (Access Product 2).



Question 14: Do you consider that access to cable networks, as defined by the Danish regulator, for the provision of broadband services may be appropriate for Bermuda? Please explain your reasoning.

It is further suggested that access to a cable network is achieved through mandating that the dominant carrier provide a bitstream access service, as opposed to a resale-only remedy. How the bitstream access service is deployed would depend on the type of access that is mandated.

It is suggested that a future RAIO could contain an access to a cable network remedy. The proposed service descriptions are:

Cable network access at a local Ethernet layer 3 router/switch	Local Ethernet layer 3 router/switch access to the cable network of the network operator deemed to have SMP in the relevant market.

Cable network access at an Ethernet layer 3 router/switch higher in the network hierarchy	Ethernet layer 3 router/switch access to the cable network of the network operator deemed to have SMP in the relevant market.

Question 15: Do you agree that the specified 'cable network access' remedies could be included in any future reference offer of a carrier found to be dominant in the relevant market? If you disagree then please explain your reasons.

5.9 Co-location Access and Interconnection Services

5.9.1 Introduction

Co-location is the practice of facility sharing where a carrier, often the dominant carrier, provides space at key locations[14] for communications equipment used by competitive carriers. This facilitates the provision of services to end-users. Arrangements of this sort can be for environmental reasons, due to technical constraints, or for commercial convenience.

Local loop unbundling (LLU) has brought about an increase in the practice of co-location since LLU requires the new entrant to install and manage equipment that must be located close to the local loop termination point at the dominant carrier's premises[15]. The greater the distance between the termination point and the competing carrier's equipment, the more likely there will be degradation in quality of service. Failure to provide co-location can represent discrimination against the competing carrier but, at the same time, there are a range of practical considerations to take into account when trying to implement a solution.

In some countries, such as the UK, regulators make it mandatory for dominant carriers to provide co-location services. However in others, co-location occurs even without regulatory intervention. In these cases, carriers will have negotiated and made agreements amongst themselves

Currently, carriers in Bermuda provide co-location on a commercial basis in order to provide equipment space to support existing interconnection agreements. A lack of co-location services could be a barrier to the development of an effective access and interconnection framework for new carriers entering the market and also for existing carriers entering new communications market in Bermuda. It is therefore suggested that co-location to support interconnection should continue to be available and mandated if necessary by inclusion in any future RAIO (see Chapter 8 of this consultation document for more information on a RAIO). In addition, co-location facilities should be provided to support local loop unbundling remedies if mandated by the RA.

Question 16: Do you agree that co-location remedies may be appropriate for Bermuda? If you disagree then please explain your reasons.

5.9.2 Types of Co-location

There are a number of common methods of co-location:

14 such as transmitter sites, switching exchanges or other premises

15 The length of the wireline circuit between the customer's premise equipment and the DSLAM is a constraining factor that limits the maximum speed of service that could potentially be provided over the circuit. By placing the DSLAM at a distance from the point at which the wireline circuit terminates in the dominant carrier's premises increases the total length of the wireline circuit and therefore could limit the services that could be provided over that circuit.

- by building a dedicated room, known as physical co-location;
    - carriers regard this solution as providing a greater degree of security for equipment as separate access is provided to the dedicated equipment room.
- in the same space where the dominant carrier's equipment functions, this is also physical co-location and often referred to as co-mingling
    - this solution is often the easiest to be implemented as it uses any available space at the dominant carriers exchange location and equipment can be provided at various locations in the exchange location as space availability allows.
- distant co-location, where the beneficiary's equipment will be located outside the carrier's premises;
    - allows the other licensed carrier to utilise any space it may have located close to the dominant carrier's location. In the case where the other licensed carrier does not have space and where the dominant carrier is unable to offer co-location facilities this option allows for space to be found in an alternative location near to the dominant carrier's exchange.
- virtual co-location, where the entrant either leases equipment from the dominant carrier for a fee or the entrant purchases its own equipment and then hands over its equipment to the dominant carrier;
    - the dominant carrier operates and maintains the equipment. The entrant uses this equipment to gain access to the dominant carrier's switching and transmission facilities without physically having to enter the dominant carrier's premises.
- at a third party data centre.
    - this is becoming popular option for the co-location of servers.

It is expected that the RA will publish guidelines or regulations on issues such as co-location agreements, so as to avoid disputes over issues.

Question 17: What advantages and disadvantages do you anticipate with each of the above co-location methods if it were to be adopted as a remedy in Bermuda?

6 Extent of Access and Interconnection Obligations on Non-dominant Carriers

A non-dominant carrier is only likely to refuse access and interconnection if there were a net cost in doing so. In general it will be in the interest of the non-dominant carrier to provide access and interconnection with other carriers, although it may choose to do so indirectly through third party carriers as this reduces costs and is technically easier.

The majority of regulatory authorities reviewed were found to impose access and interconnection obligations on the dominant carrier only, having found this to be the most effective and efficient means of utilising limited regulatory resources. Our research has found that only two jurisdictions (Anguilla and Singapore) imposed access and interconnection obligations on both dominant and non-dominant carriers. Further details may be found in Annex A.

The consensus view is that imposition of access and interconnection obligations on all carriers, large and small, generally amounts to over-regulation. In principle, only firms with a dominant market position have the ability to establish access and interconnection terms independently of competition. Non-dominant competitors would find it difficult to independently maintain excessive access and interconnection rates, or discriminatory conditions.

It is suggested that there should be no formal access and interconnection obligations on a non-dominant carrier but there should be general interoperability obligations on all networks. This means that physical interconnection would not be mandated; although carriers would have to ensure that a mechanism was in place to enable traffic flows between networks, where appropriate.

However, there may be circumstances when it is appropriate to impose access and interconnection obligations on one or more non-dominant carriers. An example of a reciprocal[16] obligation is the Data Management Amendment which is defined in section 5.4 of this consultation. This condition is imposed in order to support the principles of inter-operability and any-to-any services. It is suggested, therefore, that the RA will have the discretion to impose specific obligations where there is a clear and justifiable case for doing so.

Question 18: Do you agree with the principle that non-dominant carriers should not have a formal access and interconnection obligation but that there should be a general interoperability obligation on all carriers?

16 Reciprocal obligation refers to an obligation applied to all parties that interconnect with the dominant carrier. That is all carriers must implement data management amendment changes within specified timescales regardless whether found to be dominant or not.

7 Access and Interconnection Charging

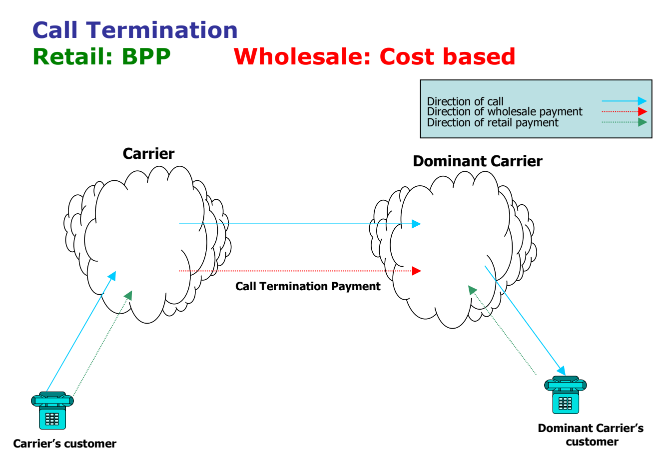
The existing charging principle for access and interconnection services in Bermuda is that charges should be cost-based[17]. Where cost-based charges are not applied, a Bill & Keep (B&K) arrangement is used whereby there is no inter-carrier settlement. The cost-based charging principle is widely used across the world where the retail charging method of calling party pays (CPP) is used, but not where the receiving party pays (RPP) or both parties pay (BPP). Where RPP or BPP is used, B&K is the prevalent inter-carrier settlement method. However, setting a zero call termination charge for carriers using the RPP or BPP retail charging method could lead to arbitrage opportunities.

It is suggested that in Bermuda however cost-based charging for interconnection should in principle be applied to all interconnection and access settlements, regardless of the up-stream retail charging method used. The benefits of adopting cost-based charging include the following:

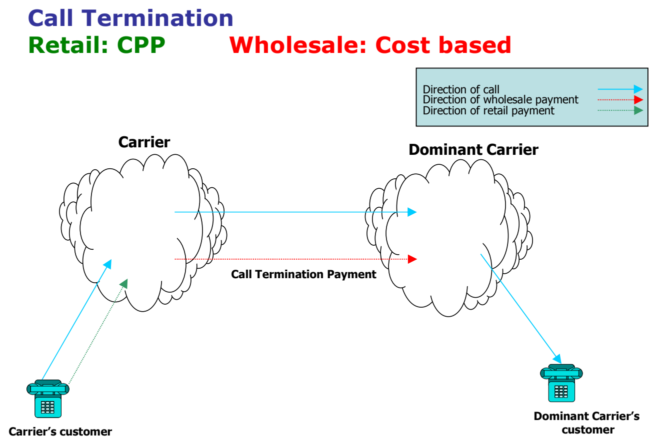
- It ensures that the access and interconnection service provider is able to recover its efficiently incurred costs of providing the service;
- The interconnecting carrier who purchases the service has a clear incentive to invest in its own infrastructure if it can do so more economically; and
- It can limit the potential for arbitrage.

The specific implementation of the cost-based charging principle suggested for termination of calls on all fixed and mobile networks in Bermuda is that all carriers can charge other carriers a standard fee set by the RA. The RA would calculate the standard fee to reflect the efficiently incurred costs for the largest fixed network provider for terminating of calls on its network.

The retail and inter-carrier money flows for BPP (also covering RPP) and CPP are set out below:



17 This currently only applies to the LAC charges in Bermuda.

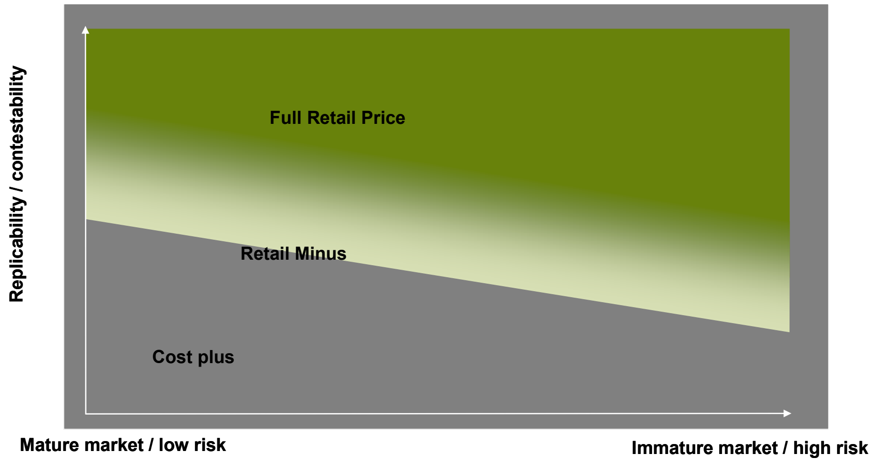


Question 19: Do you agree that the suggested cost-based charging framework is suitable and practicable for Bermuda? If not then please substantiate your answer.

Question 20: Do you believe that arbitrage opportunities might arise if a cost-based charging framework was not in place? If so, please substantiate your answer.

Further, it is suggested that although the principle of cost-based charging for access and interconnection services should be applied consistently for calls where the CPP principle is used, the RA should have the flexibility to apply set cost-oriented charges to reflect the detailed market conditions relevant to the individual access and interconnection service. This would include an assessment of the level of risk the dominant carrier faces in providing the corresponding retail services as well as the extent the market for the retail and wholesale services could be contestable – that is whether the access and interconnection services could be replicated by competing providers.

The diagram below illustrates a suggested application of cost-orientation for access and interconnection charges in Bermuda. If the risk is low because the market is mature or there is a low likelihood of competition, the suggested wholesale price would be cost plus. On the other hand, where the risk associated with a product is high or the threat of entry is great, the suggested wholesale price would increase towards the retail price.



As explained above, the choice of the appropriate charging method could depend on a number of aspects, including whether the service is replicable (e.g. whether other licensees would be technically and financially able to replicate the service) and also how mature the relevant market is and thus the level of risk that the licensee has incurred in investing in the service. To illustrate this, we offer two examples:

In the UK, several years ago, BT launched broadband services using DSL in its local copper network. This was at the very early stages of broadband deployment and it was uncertain whether there was a real market for residential broadband services - thus BT took a considerable risk in developing DSL services for the retail market. Competitors to BT requested that the regulator, Oftel, mandate that BT make the local loop available on an unbundled cost plus basis in order that they would be able to compete with BT in the broadband provision market. Their rationale for this was that the service was based on BT's local loop, which is considered an enduring bottleneck (thus unlikely to be replicated). Oftel considered the situation carefully and eventually mandated that BT make its service available on a wholesale basis - that is, it was not mandated to unbundle the local loop, but to resell its broadband service. Also Oftel determined that BT did not have to offer this wholesale service on a cost plus basis but on a retail minus basis. Oftel's decision was based on the following: the service was not replicable (i.e. an enduring bottleneck) but the development was high risk and thus Oftel did not want to discourage such investment by mandating cost plus unbundled service. Thus the service was at the bottom right hand corner of the above diagram.

The provision of call termination services[18] (where calling party pays is used in retail charging) is a market that is recognised by regulators across the world as one where the network carrier by definition has dominance in the provision of that service due to there being no possibility for the calling party to choose another network to send the call to (one has to terminate the call on the network to which the called party is connected - whether fixed or mobile). The facility used for this market is not replicable and the service market is not contestable as explained above; and, in addition, it is a well-established mature market with low risk being associated with the provision of basic call services. Therefore the charging method applied to this service

18 In Bermuda charges for call termination are known as Local Access Charges (LAC)

would typically be cost plus and the service market is located at the bottom left corner of the diagram above.

The above examples are intended as illustrations only. It is not possible to predetermine which of the A&I services contained in this document would fall into the different cost-orientation categories as this depends on the market analysis. It is however the intention of these illustrations to indicate that the RA would not always automatically apply the cost plus charging method to access and interconnection remedies. In fact, it may be that the RA finds that some access and interconnection markets are so contestable that the only obligation on the dominant carrier would be to offer the service on a non-discrimination basis, at the standard retail price.

Question 21: Do you agree with the suggested approach to the application of cost-orientation? If not then please substantiate your answer.

8 Reference Access and Interconnection Offer (RAIO)

8.1 Introduction

One of the access and interconnection remedies a regulator could impose on a dominant carrier is the development and publication of a RAIO. Reasons for mandating a RAIO include:

- Providing a standardized contractual framework for interconnection and access;
- Setting regulated terms and conditions for access and interconnection – including prices, forecasting, ordering, provisioning timescales, maintenance and fault handling;
- Setting out standard access and interconnection products available under regulated terms and conditions;
- Providing recourse to regulator for dispute resolution;
- Reducing the time and cost of negotiating access and interconnection between carriers; and
- Securing non-discrimination between different carriers seeking access and interconnection from a dominant carrier.

A RAIO should:

- Provide contractual conditions and products that reflect access and interconnection legislation and regulation;
- Create predictability, transparency and certainty in the market;
- Enable new entrants and dominant carriers to plan their businesses and networks based on transparent principles;
- Encourage investment in sustainable competition to the dominant carrier.

It is usual in other jurisdictions for the RAIO to be drafted by the dominant carrier and for it to set out all the relevant terms and conditions applicable to the access and interconnection services provided by that carrier. The RAIO should require approval by the regulator and the scope of the RAIO (e.g. the services and interfaces included and the principles underlying the provision of the RAIO services and interfaces) should be mandated by the regulator. The dominant carrier should be required to negotiate terms with interested parties. METEC proposes that a dominant carrier should produce a RAIO and the scope of this would be based on transparent analysis and consultation.

Question 22: Do you agree with the suggestion that the carrier(s) found dominant in the provision of access and interconnection services in specific markets make available a RAIO? If yes, how long should each dominant carrier be given to file a comprehensive RAIO once instructed to do so?

8.2 Structure of RAIO Document

The RAIO should provide entrants with sufficient information about the dominant carrier's network to allow for informed decision-making, and to provide a baseline for negotiating an access and interconnection agreement. It also helps to get the dominant carrier to start thinking about interconnection well ahead of when it receives access and interconnection requests. The work done in advance will expedite the process; it should also ensure that the dominant carrier has internal mechanisms in place to effectively manage access and interconnection arrangements with other carriers.

To begin this process, METEC wishes to launch a discussion now among interested parties on what the RAIO might look like, both in terms of typical structure and underpinning principles of interconnection.

The basic principles may be summarized as follows:

- Access and/or interconnection must be provided on request by dominant carriers to all other licensed carriers at Points of Interconnection (which are in addition to the network termination points offered to end-users);
- The terms and conditions of providing access and interconnection shall be reasonable, transparent and non-discriminatory;
- Charges and quality of service shall be no less favourable that those provided by a dominant carrier to its own retail operation and shall contain no cross-subsidy of any part of the dominant carrier's business operation;
- Access and interconnection fees shall be cost-oriented;
- Access deficit costs shall be identified separately and not part of the access and interconnection charge;
- Each access and interconnection service must be sufficiently unbundled that other carriers need only order and pay for the network components they require; and
- End-users of public communications services shall be able to communicate with other users of like services regardless of which carrier they have elected to use and without any loss in functionality of the service.

Question 23: Do you agree that the above list represents a comprehensive set of principles that should guide the formulation of all RAIOs? Please elaborate if not.

A framework for a typical RAIO is given in Annex B. METEC considers that the key issues that need to be addressed are as follows:

Service Definition and duration of service agreement.

Points of Interconnection. The physical locations where interconnection will take place and the technical standards to be employed in the interconnection are defined. A process for requesting and obtaining additional points of interconnection should be established. This is closely related to the issue of transport charges and traffic routing.

Quality of service standards, testing and establishing access and/or interconnection. Quality standards are defined, particularly for time to provision circuits and for call blocking levels, and remedies are defined for when those standards are not met. Often, dominant carriers are required to provide at least as high a level of quality to interconnecting carriers as he provides to his own retail customers. Testing opportunities should be provided to each party.

This should also include the procedure for establishing supporting services such as power, air-conditioning etc.

Network and facility changes. Part of providing interconnection is having the available capacity to deliver and receive the traffic that flows between the interconnecting networks. To do so, a planning process must be followed between the interconnecting carriers so that investment for additional capacity can be agreed, budgeted, and installed in time to meet the forecasted demand. Procedures to resolve differences over forecasts also must be defined as well as what constitutes a bona fide request for additional interconnection capacity. At a minimum, a mutual obligation to notify the other party of network changes and upgrades well in advance is needed to avoid disadvantaging one competitor over another.

Traffic measurement and settlement. Sometimes specific trunk groups are identified to carry different types of traffic so that each type of traffic can be billed for separately. However, these arrangements can be defeated and traffic will thus end up disguised as the cheapest type of traffic. The responsibilities of each interconnecting carrier to measure traffic are defined, as are settlement procedures for when there are discrepancies over the amount of traffic measured. Obligations to cooperate in fraud detection and enforcement activities should be specified.

Transport (conveyance) charges and traffic routing. Some definition must be made for how calls will be routed. In other words, if there are multiple interconnection points defined, what is the proper routing and hand-off point for each type of call? Otherwise, higher charges may apply to misrouted calls. The applicability of transport charges in the receiving network for calls that must be carried beyond the local area to the point of interconnection must be defined. If one carrier has requested interconnection in a particular area so as to avoid paying the receiving network for transport charges, and the interconnection point is not made available, sometimes a virtual point of interconnection is defined for that location whereby transport charges are not collected to bring calls to that area.

Frequently, dominant carriers desire to offer as few as possible points of interconnection so as to maximize transport revenues. However, over time, entrants usually wish to build out their own networks and interconnect in more places so as to avoid paying the incumbent's transport charges.

Infrastructure sharing and co-location. There needs to be a clear understanding on the provisions that will be made available by the dominant carrier to accommodate equipment belonging to another carrier, the arrangements for accessing the equipment and the associated charges that will be paid.

Prices. This includes the level of interconnection charges.

Billing and collection. When and how to collect traffic data, when and how to exchange bills, and when and how to make payment should be specified. A process for reconciling traffic data and for making inquiries to the other party and for handling claims also should be incorporated. A procedure for resolving discrepancies is useful, which often involves seeking recourse to arbitration, the regulator, or to the courts.

Access to customer information. By necessity, when completing calls and billing for them, interconnecting carriers pass back and forth considerable information about each other's clients. Limits on the permitted uses of this information should be defined, particularly regarding the temptation to engage in marketing activities in approaching another carrier's clients based on information obtained through interconnection activities. Safeguards are also necessary to protect customers' privacy.

Question 24: Do you agree that the above represents a reasonable set of issues to be addressed by the RAIO? If not, what changes should be made and why?

9 Conclusion

In the preceding sections a number of very important and wide-ranging issues were introduced regarding the future shape of access and interconnection in Bermuda. Because of the complexity of the various subjects, it is expected that further detailed consultations will be undertaken.

Nevertheless, respondents are encouraged to engage positively in this initial discussion on the introduction of competition measures so as to ensure that the outcome is viable and suitable for Bermuda and that any implementation programme can be realistic, achievable and ultimately of benefit to consumers and Bermuda as a whole.

Question 25: In your opinion are there any other issues that you believe ought to be included in this consultation that have not been raised in this current document? Please provide a detailed response along with support for your position.

10 Summary of Consultation Question

Question 1: Do you agree that the above definitions, a) to f), adequately represent the various traffic based interconnection services that are likely to be required in Bermuda? If not, please state what changes you believe are necessary and explain why.

Question 2: Should the RA continue to impose some sort of indirect access obligation following the reform of the telecommunications industry in Bermuda?

Question 3: If the answer to question 1 is yes then should this obligation be imposed on all carriers or only those that are found to be dominant in the relevant market(s)?

Question 4: Do you agree with the above suggestions for PIC services? If not, please state your reasons.

Question 5: Do you agree that the suggested service categories for traffic based access and interconnection should be mandated, if necessary, by the RA? If you believe any services are not necessary then please explain your reasoning.

Question 6: Does Table 1 contain a comprehensive list of traffic based access and interconnection services likely to be required in Bermuda? If not, what other services could be included and why?

Question 7: Do you agree that the suggested service categories for connectivity based access and interconnection are relevant and could be mandated, if necessary, by the RA? If you believe that any services are not necessary then please explain your reasoning.

Question 8: Does Table 2 contain a comprehensive list of connectivity based access and interconnection services likely to be required in Bermuda? If not, what other services could be included and why?

Question 9: Do you agree that the suggested service categories for miscellaneous access and interconnection are relevant and should be mandated, if necessary, by the RA? If you believe that any services are not necessary then please explain your reasoning.

Question 10: Does the list above contain a comprehensive list of miscellaneous access and interconnection services likely to be relevant to Bermuda? If not, what other services could be included and why?

Question 11: Do you consider that customer information should be provided by all licensed carriers to a database that is communicated to the emergency services to assist in the handling of emergency service calls? If not, please explain your reason.

Question 12: Do you have a preference to which form of wholesale broadband access you would wish to see mandated on a dominant carrier? Please explain your reasons.

Question 13: Do you agree that local loop unbundling remedies may be appropriate for Bermuda? If not, please provide your reasoning.

Question 14: Do you consider that access to cable networks, as defined by the Danish regulator, for the provision of broadband services may be appropriate for Bermuda? Please explain your reasoning.

Question 15: Do you agree that the specified 'cable network access' remedies could be included in any future reference offer of a carrier found to be dominant in the relevant market? If you disagree then please explain your reasons.

Question 16: Do you agree that co-location remedies may be appropriate for Bermuda? If you disagree then please explain your reasons.

Question 17: What advantages and disadvantages do you anticipate with each of the above co-location methods if it were to be adopted as a remedy in Bermuda?

Question 18: Do you agree with the principle that non-dominant carriers should not have a formal access and interconnection obligation but that there should be a general interoperability obligation on all carriers?

Question 19: Do you agree that the suggested cost-based charging framework is suitable and practicable for Bermuda? If not then please substantiate your answer.

Question 20: Do you believe that arbitrage opportunities might arise if a cost-based charging framework was not in place? If so, please substantiate your answer.

Question 21: Do you agree with the suggested approach to the application of cost-orientation? If not then please substantiate your answer.

Question 22: Do you agree with the suggestion that the carrier(s) found dominant in the provision of access and interconnection services in specific markets make available a RAIO? If yes, how long should each dominant carrier be given to file a comprehensive RAIO once instructed to do so?

Question 23: Do you agree that the above list represents a comprehensive set of principles that should guide the formulation of all RAIOs? Please elaborate if not.

Question 24: Do you agree that the above represents a reasonable set of issues to be addressed by the RAIO? If not, what changes should be made and why?

Question 25: In your opinion are there any other issues that you believe ought to be included in this consultation that have not been raised in this current document? Please provide a detailed response along with support for your position.

11 Glossary

The following is a glossary of terms that used within this document.

"**Access Charge**" means a payment, usually based on an amount per minute, charged by a network carrier for the use of their network by other network carriers

"**Bill and Keep**" means interconnection arrangement where no charges are payable between interconnecting carriers for termination of each other's traffic.

"**Carrier Pre-Selection**" means a form of equal access in which the customer selects a preferred service provider

"**Co-location**" means facility sharing in which a carrier, often an incumbent carrier, provides space in its switching exchanges or other premises for communications equipment, such as transmission cables, of competitive carriers to facilitate interconnectivity to end-users

"**Concessionaire**" means a person or entity authorized to operate a public telecommunications network or provide a telecommunications service.

"**Equal Access**" means the ability of telecommunications users to access the services offered by new entrants as easily as to those of incumbent carriers.

"**Exchange**" means switches that are connected to the PSTN. Local exchanges connect local loops from end users to trunks which are connected to other exchanges including tandem exchanges and international gateway exchanges, all of which are different types of switches.

"**Full unbundling**" of the local loop involves control of the local loop being transferred from the incumbent to the new entrant, allowing the new entrant to access the full spectrum of the local loop connection and thus provide data and voice services. Interconnection is effected at the local exchange.

"**Interconnect Agreement**" means a document detailing arrangements as negotiated and agreed between parties to interconnect their networks in order to provide telecommunication services and which is binding on the signatory parties over the period of the agreement.

"**Interconnection service**" means a service provided by an interconnection provider to an interconnection concessionaire.

"**Local Loop**" means the transmission path linking end users to the nearest exchange.

"**Point of Interconnection**" means a point on the interconnection provider's network where physical connection is allowed to any interconnecting concessionaire to act as a gateway between networks and enable the exchange of telecommunications services between or among networks so interconnected.

"**Reference Access & Interconnect Offer (RAIO)**" means a document setting out the terms on which an incumbent carrier proposes to offer access and interconnect services to concessionaires.

"**Shared unbundling**" refers to an arrangement whereby the incumbent network carrier maintains control of the local loop including that part of its capacity that supports voice services whilst the data-carrying part of the local loop is leased to a new entrant for the provision of data services. Interconnection is effected at the local exchange.

"**Sub-loop unbundling**" involves the new entrant interconnecting to the local loop at some intermediate point, rather than at the local exchange. This is most appropriate where the new entrant wishes to offer very high bandwidth services, which are only capable of being transmitted short distances over copper-based local loops.

"**Transit Services**" means an interconnection service providing connectivity from a point of interconnection to a network termination point on a customer's premises.

"**Unbundled Local Loop**" means access to the full and exclusive use of the copper pair connected to the customer and/or some form of shared access to the local loop. See also Full unbundling, Shared unbundling and Sub-loop unbundling.

12 Annex A

The Annex provides some background information. The chapter numbers that appear at the heading of each section correspondence to the section numbers that appear in the main body of this consultation document.

Ref: Chapter 5.2 - Indirect Access

Jamaica

In 2006, the Jamaican Office of Utility Regulation (OUR) explored the option of implementing indirect access. The dominant fixed line carrier is Cable & Wireless Jamaica. The primary limitation was that 25-30% of subscribers were served by NEAX switches which could not handle numbers over 15 digits, which would be exceeded by the combination of the 7-digit Carrier Identification Code and e.g. an international number. This prevents any form of call by call carrier selection (CS and CPS with override), and also certain forms of Carrier Pre-Selection (e.g. local calls), but some forms of CPS could still be implemented where the call went via a trunk exchange. OUR mandated C&WJ to implement CPS to the extent that it was feasible (i.e. on international, fixed line to mobile and fixed line to non-geographic numbers). The NEAX switches are expected to be phased out by 2009-10.

In July 2007, the OUR further mandated C&WJ to allow 2-Stage Dialling carriers on direct exchange lines (i.e. local numbers). There were no incremental costs expected for calls already routed via a toll-free numbers. However recipients of toll-free calls were previously charged J$2.50 per minute, whereas local calls only cost J$0.6-0.9 per minute. The difference between these rates can be passed on to the customer. The OUR will ensure that C&WJ is not given an unfair burden by ensuring they have the opportunity to recover costs.

Barbados

The Fair Trading Commission (FTC) in Barbados has opted for a light-handed approach. Carriers are encouraged to find solutions between themselves, subject to the Barbados Equal Access and Indirect Access Policy set out by the FTC. The Minister retains the right to oblige any carrier to facilitate both Carrier Selection and Carrier Pre-Selection. Appeals may be made to extend the timetable for implementation provided that the Carrier “has not shown a profit in any of its last three annual financial reports”.

In short, the FTC provides a framework for negotiations between Carriers to be based around, but has not required all carriers to facilitate indirect access by law.

Cayman Islands

The Information and Communications Technology Authority (ICTA) believes that there are certain factors that ensure a degree of competition within the international calls market. The incumbent fixed line carrier, C&W, argued that the relevant market definition should include alternative methods of international communication other than fixed line, i.e. mobile telephones and VoIP. Once these are included, C&W would not have significant market power and that as such there is no justification for regulatory intervention. ICTA believed that increased substitutability and increased competition in the fixed lines market would act to discipline international call rates.

There were additional cost concerns. Firstly, Digicel argued that mandating indirect access to any fixed line carrier would reduce the incentives to compete in the fixed line market. Secondly, it would reduce the incentives to invest in alternative forms of communication. Finally it would ensure the need for continued regulation in the medium to longer term. ICTA identified the ongoing costs of regulating and mandate as a significant reason against mandating indirect access.

The benefits were expected to be limited because of already existing price discipline. Coupled with the set up costs that would be necessary to facilitate indirect access, which would ultimately be passed on to consumers, the ICTA concluded:

"The Authority finds that mandated Indirect Access… is not warranted at this time"

Ref: Chapter 5.5 – Enabling Competition in Broadband Service Provisioning

Jamaica

In 2006, the OUR in Jamaica proposed to mandate full and shared LLU. Accounting separation of its local access business would be imposed on the incumbent to support transparent pricing of the wholesale products.

Trinidad and Tobago

In 2008, the Telecommunications Authority of Trinidad and Tobago launched a public consultation on proposals to mandate full and line-sharing LLU for the incumbent fixed telephone provider. This proposal was based on an analysis of LLU in other jurisdictions, the expressed demand for the various services and an assessment of the incumbent's infrastructure and readiness to implement the different services. The regulator felt that a managed approach to introducing unbundling was necessary and so sub-loop LLU and bitstream access would not be mandated in the first phase but would be kept under review.

The TATT proposed that fully unbundled and shared line rental charges should be determined using a top-down long-run average incremental cost (LRAIC) approach (with assets valued using current cost principles). The line charges would be geographically averaged, i.e. a uniform charge would apply regardless of where the end-customer was located and how this affected the underlying cost of providing the access line. It also proposed that the other main cost items – line connection and co-location charges – should be arrived at through commercial negotiation between incumbent and new entrant; although the regulator has the power to intervene and determine prices.

Separation of the incumbent's access network operation to deter any favourable behaviour towards its own retail activities was not considered necessary by the regulator. TATT did, however, state that this was to be kept under review.

Jordan

In 2005, the Telecommunications Regulatory Commission (TRC) chose to mandate only bitstream access for the incumbent fixed line carrier, having noted the difficulties that had been experienced elsewhere with LLU. In light of subsequent developments – namely the licensing of several broadband Fixed Wireless Access (FWA) frequencies – the Jordanian government felt that, given the risks associated with new infrastructure investment, broadband FWA carriers were unlikely to be able to offer the same geographic coverage as the incumbent. The TRC was therefore asked by the Government to consider, amongst other things, doing more to facilitate a mix of service- and facilities-based competition. So, in 2008, it put forward proposals to mandate LLU and infrastructure sharing by designated carriers of fixed telecommunication services, stating that it believed that many of the earlier problems with LLU in other jurisdictions had since been resolved.

The TRC did not express any preference for the way in which wholesale charges should be determined, choosing instead to simply set out the full range of possible approaches.

A final decision on LLU had not been made by the time this report was prepared.

Malaysia

The communications regulator in Malaysia (MCMC) first launched a consultation into the alternative ways in which access to the local loop could be achieved in 2003. It came to the view, two years' later, that where network duplication was likely to be uneconomic, access to all elements of the local loop would promote efficient investment and economically efficient use of infrastructure. It concluded that all forms of LLU, as well as bitstream and simple DSL resale, should be introduced.

Incumbents were given 120 days to prepare the appropriate Reference Offer documentation.

Ref: Chapter 5.8 – Defining Access to the Networks of Cable Tv Service Providers

Cable TV - Danish Case Study

In Denmark, as in the rest of the EU, access regulation only applies to wholesale access to broadband over the telecoms network.

Following a market analysis, NITA, the Danish regulator, found that TDC has Significant Market Power (SMP) in the wholesale broadband market including DSL and cable networks. In order to address this competition problem and to increase competition, NITA wants to extend this regulation to cover cable networks and for TDC to open its cable network to other operators.

NITA plans to impose the regulation on TDC, its cable network YouSee[19], and wholesale broadband access. NITA proposed to enforce the following obligations on TDC on the wholesale broadband access market:

- Access
- Price control
- Cost accounting
- Non-discrimination
- Publication of a Reference Offer, including a Service Level Agreement and Key Performance Indicators
- Transparency, including information on TDC's passive and active infrastructure and their further development
- Accounting separation

The proposed access obligation covers all bitstream connections. The access obligation also includes migration between different wholesale access products. It also includes the provision of co-location services and associated facilities, both for the alternative operators own purposes and in order to host third parties. NITA has also proposed that TDC provides access to all functionalities that support a supply of broadband products through copper and cable TV network which are sold to end-users and which TDC also uses.

Cable TV Access - Netherlands Case Study

In 2008, following an analysis of the Dutch broadcasting market, OPTA, the Dutch regulator, announced that the four main cable operators (Ziggo, UPC, Delta and CAIW) have dominant positions in the market and that it planned to impose regulatory remedies. In particular, OPTA planned to open the television cables belonging to UPC and Ziggo as the two operators were deemed as having SMP with a market share of 81% despite the emergence of Digital Terrestrial TV (DTT), IPTV and satellite in the Dutch market. OPTA believes that the situation calls for intervention as it is unlikely to improve, especially with the popularity of triple play bundles offered by individual operators[20]. Delta and CAIW would also be subject to light-touch regulatory intervention. OPTA notified the European Commission of its plans in January 2009, in accordance with Article 7 of the EU Framework Directive.

19 TDC provides cable services via its subsidiary YouSee.

20OPTA confirms plans to open Dutch Cablenets, August 2008
http://www.broadbandtvnews.com/?p=6444

OPTA states, in the publication 'Focus on 2009'[21], that UPC and Ziggo are obliged to sell their current analogue connections to other providers in administrative terms. The aim is for consumers to have a greater choice of cable packages and a larger range of triple play options in the future.[22]

Ref: Chapter 5.9 - Co-location Access and Interconnection Services

Jamaica

In Jamaica the Ministry of Mining and Telecommunications has issued a draft telecommunications policy[23] in order to update Jamaica's existing Telecommunications Act of 2000. In the draft policy the Ministry has stated that the co-location of telecommunication equipment is an important policy ingredient due to the introduction of competition in the Jamaican telecoms market. Jamaica is also planning the roll out of Local Loop Unbundling (LLU) and co-location is also an important factor in the success of LLU. Currently the telecoms carriers are not sharing their premises and facilities which is leading to carriers engaging in disruptive excavations of public roadways in order to lay their equipment. The Ministry hopes that a new policy of co-location will remove such problems. Their main objective is to have cell towers located across the island and that co-location will occur in relation to these towers, cable-landing stations, central offices and carrier premises.

The Ministry recommendations are:

- *Provisions will be made in the new Telecommunications Act for co-location as it relates to cellular towers, cable landing stations, right-of way to lay cables and attachment of cables to poles.*
- *Equipment sited prior to this policy will be co-located with the consent of the carriers or in accordance with all applicable laws*
- *Incentives will be given to companies with equipment at sub-optimal locations to relocate such equipment to optimal locations or co-locate at such sites*
- *The regulator in collaboration with other government agencies will identify prime cell tower locations, cable landing sites, pole locations and right of way for laying cables. This information will be used as a criterion for certifying cell towers.*
- *The regulator will certify these optimal locations and ensure that the electronic equipment and cables be implemented in accordance with technical standards*
- *Telecommunication companies that are authorised to erect new towers based on the optimal location criterion will be required to facilitate the co-location of equipment of other providers. The regulator will prescribe the co-location rates to be charged by owners of cell towers*[24].

21 Focus on 2009, OPTA, 2008

http://www2.opta.nl/download/DEFINITIEF%5FOPTA%5Ffocus%5Finteractief%5FEN+%28050109%29%2Epdf

22 OPTA, 2009

http://www2.opta.nl/asp/en/publications/document.asp?id=2843

23 The Jamaica Telecommunications Policy 2007, METEC, Jamaica., 2007. http://www.mct.gov.jm/Draft%20Telecom%20Policy.pdf

24 The Jamaica Telecommunications Policy 2007, METEC, Jamaica., 2007. http://www.mct.gov.jm/Draft%20Telecom%20Policy.pdf

Malaysia

In March 2003, the Malaysian Communications and Multimedia Commission (MCMC) formally announced the Malaysian Access Forum Berhad (MAFB) as the 'Access Forum' under the CMA 1998. MAFB is thus recognised as the industry forum dealing with access and interconnection issues in Malaysia under the Communications and Multimedia Act (CMA). In September 2008, MAFB prepared a public consultation on the Voluntary Industry Access Code[25]. Until the publication of the code, access was regulated by the Mandatory Standard on Access which was published by the Malaysian Communications and Multimedia Commission.

The code states that the access provider must provide both physical and virtual co-location to the access seeker if requested. The access seeker may also locate equipment alongside the provider's network facilities so they can use the access services. The access provider must adopt a queuing policy when dealing with co-location requests. The access seeker must give the provider a range of information such as details of the equipment that will be co-located, power requirements, heat output and installation period. Nominated employees of the access seeker are allowed access to their equipment at any time but if an inspection is carried out the access provider needs 5 days notice and must be provided with details of the employees entering the facilities. The access provider is permitted to use an escort for the access seeker and also the use of a site register is allowed.

The access provider may agree to carry out preparatory work for the co-location. Before the work begins, the access provider must give the seeker an estimate and the provider must not exceed this charge or the agreed time-frame unless warning has been given. The access provider must also ensure that all utilities and ancillary services are provided to the access seeker. These services include access to roads and land, power, heat, light, air-conditioning, security and site maintenance.

In relation to security, the access provider shall not require the use of cages or similar structures to physically segregate co-located equipment and both parties must mark their equipment so that they are easily identifiable.

Trinidad and Tobago

In the 2005 Recommendation for Access to Facilities Regulations it states that a holder of a *concession* for the provision of a public telecommunications network shall provide access to its facilities (including co-location) and that it must not unreasonably withhold access. Negotiations regarding access must be in good faith and access must not be impaired once granted, unless it is authorized by the Authority or a court of law. If co-location is requested by an access seeker the access provider must provide:

a. *Information on the relevant sites along with security arrangements and conditions*
b. *Co-location options at the relevant sites*

25 Voluntary Industry Access Code (Version 1.0) prepared by MAFB and issued for public consultation, Malaysian Access Forum Berhad, 25 September 2008. http://www.mafb.com.my/pcpaper/Access%20Code%20Draft%20Ver%201.0%20for%20Public%20Consultation%20dd250908.pdf

c. *Restriction on equipment which can be co-located*
d. *Security standards and measures to be put in place by access seekers to guarantee security*
e. *Principals governing allocation of co-location space to access seekers*
f. *Principals governing the rights to entry of co-location space by access seekers' employees* [26]

The Recommendation also states that all access charges must be just and reasonable. An access provider must set charges using costing methodologies or models. The Authority may suggest formulae to be used from time to time.

Gibraltar

The Gibraltar Communications Act 2006[27] includes a section on co-location and facility sharing. Under the Act the Gibraltar Regulatory Authority (GRA) shall encourage communications network owners to share their facilities or properties with others seeking to provide communications networks. The Act makes reference to those carriers deprived of access to "*viable, alternative facilities or property as a result of the need to protect the environment, public health, public security or to meet town planning objectives"*. The Act also states that negotiations on co-location are to be conducted between the two parties. However the GRA will intervene if there is a dispute relating to the co-location facilities

Jordan

In 2005, the Telecommunications Regulatory Commission of Jordan (TRC) published Interconnection Instructions[28]. The Instructions were issued by the TRC in order to replace the previous Interconnection Guidelines that were published in 2002. Co-location and infrastructure sharing services are highlighted in the document. The TRC state that "*all licensees shall cooperate in all aspects of providing collocation and infrastructure sharing services"*[29]. The aim for the TRC is to aid environmental, economic and social benefits by ensuring that carriers adopt co-location within the market.

In order to inform other carriers of the space available, an access provider must publish space allocation in their Reference Interconnection Offer (RIO). Access providers must also keep a record of how much space they are willing to provide and the prices that they will charge. The TRC states that "*leases for co-location space should reflect the local market values"*[30]. Those carriers that provide co-location must ensure that the adequate site access in provided. The RIO should set out how site access will be implemented. This includes details on when access to the site can occur and if staff members need to be escorted while on the site.

26 Recommendations for Access to Facilities Regulations, Telecommunications Authority of Trinidad and Tobago, 23 September 2005.
http://www.tatt.org.tt/ddocs/Access%20to%20Facilities%20Regulations%20V3%20(2005%2009%2023)%20-%20FINAL.pdf

27 Communications Act 2006, Government of Gibraltar http://www.gra.gi/sites/communications/downloads/46/communications%20ordinance.pdf

28 Interconnection Instructions, TRC Board Decision No. (2-1/2005) Date (5/1/2005)
http://www.trc.gov.jo/images/stories/pdf/INTERCONNECTION_INSTRUCTIONS.pdf

29 See Footnote 19

30 See Footnote 19

Access providers are obliged to provide an alternative solution if they are unable to provide co-location space. The TRC will get involved if there is a dispute relating to co-location.

Ref: Chapter 6 - Extent of A&I Obligations on Non-dominant Carriers

Anguilla

In the Telecommunications Act 2003, specifically the Interconnection and Access to Facilities Regulation 2004[31], the Regulatory Authority of Anguilla states:

(1) These Regulations apply to the interconnection of public telecommunications networks and public telecommunications services and to access to facilities and utility installations.
(2) These Regulations apply to all operators of public telecommunications networks and to all providers of public telecommunications services with respect to the operation of such networks and the provision of such services and to all operators and public utilities with respect to access to facilities and utility installations, respectively.

Every carrier or service provider has a duty to provide interconnection, direct or indirect, to every other carrier or service provider to encourage a fully integrated telecommunications service. There are a few variations noted between the treatment of a dominant and non-dominant provider:

- The non-dominant carrier will not be subject to price regulation, whereas the dominant provider will be, to the extent that price must not exceed stand-alone costs (i.e. the cost of providing a service independently of providing any other service).
- If the interconnection agreements involve one dominant party then the Commission will publish this publically for inspection.
- Both dominant and non-dominant carriers are required to provide a Reference Interconnection Offer to the Commission within 30 days (this is a request for the non-dominant provider and obligated for the dominant provider).
- Dominant providers must offer alternative solution where access is not possible.
- Dominant providers are also subject to specific network unbundling obligations, network element obligations and rate offering obligations.

Singapore

In Singapore access and interconnection provisions apply to both dominant and non dominant facilities based licensees. The Telecommunications Act (Chapter 323) Code

31 Telecommunications Act 2003, Interconnection and Access to Facilities Regulation 2004.
http://www.gov.ai/telecommunications/images/Anguilla%20Interconnection%20Regulation%20042004.pdf

of Practice for Competition in the Provision of Telecommunication Services 2005 says that licensees have a duty and are required to co-operate with each other in the manner specified by the Act. A Licensee refers to "*facilities-based licenses and service based licensees that use switching or routing to provide telecommunication services to the public"*. This includes non-dominant carriers.

The Info-communication Development Authority (IDA) states that they will not reject a non-dominant licensee. Specifically where neither party is a Dominant Licensee, IDA will not reject any Interconnection Agreement that fulfils the Minimum Interconnection Duties listed in the Act. Some of the Minimum Interconnection Duties include:

- *Duty to Establish Compensation Agreements for the Origination, Transit and Termination of Telecommunications Traffic*
- *Duty to provide non-discriminatory interconnection quality*
- *Duty to prevent technical harm to the network*
- *Duty to provide billing information*
- *Duty to preserve confidential information provided by other licensees.*
- *Duty to obtain IDA approval for suspension or termination*
- *Duty to amend*[32]

Non-dominant licensees do not have a duty to develop a Reference Interconnection Offer but a dominant licensee does. In relation to infrastructure sharing, licensees are not required to share the use of any infrastructure it controls with its competitors. However, the Government may mandate licensees to share infrastructure with other licenses if it deems specific infrastructure to be Critical Support Infrastructure (CSF) or if it believes it is in the public interest. This practice can apply to both dominant and non-dominant licensees.

Ref: Chapter 7 - Access and Interconnection Charges

Jamaica

The Office of Utilities Regulation (OUR) presented a consultation in 1999[33] which considered whether to use retail-minus or cost-based charges. Previously, Cable & Wireless Jamaica (CWJ) differentiated pricing depending on whether access was for own use or resale. However, the OUR considered that whilst it may be reasonable to have different prices for different grades of service, it was not reasonable to charge different rates to different users for the same service when this does not reflect a cost difference.

When considering the choice between pricing methods, the OUR points out that the size of discount applied in retail-minus could be a source of contention. Looking to

32 Telecommunications Act (Chapter 323) Code of Practice for Competition in the Provision of Telecommunication Services 2005. http://www.ida.gov.sg/doc/Policies%20and%20Regulation/Policies_and_Regulation_Level2/TCC_2005.pdf

33 Interconnection in Telecommunications, A Consultative Document, March 1999 http://www.our.org.jm/PDF-FILES/Interconnection%20in%20Telecommunications-%20March%201999.pdf

other countries, discount rates tend to vary significantly with retail pricing strategies used by carriers, reducing comparability to the Jamaican case. Another problem faced was that CWJ's retail prices were sometimes above cost (such as with international calls) but at other times below cost (on line rental and inter-Parish calls) which meant that carriers that competed in the local market would benefit from retail-minus pricing whereas international carriers would be at a disadvantage. Although CWJ's prices overtime may be more balanced, the fundamental problem of lack of transparency behind the pricing decision will remain where retail-minus prices are used.

Given the above drawbacks of retail-minus pricing, the OUR favoured cost-based pricing and released a consultation document in July 2008 regarding using a long-run incremental cost model[34] as it established that "the application of this standard gives the regulatory authority assurance that prices are set in conformity with competitive market conditions".

Trinidad & Tobago

Similar to the situation in Jamaica, Trinidad and Tobago used to allow mobile carriers to charge higher fees for terminating traffic on their network than the price they pay to send traffic on fixed networks. However, the regulator now considers the Caribbean market to be mature enough to avoid revenue based pricing and to withstand a cost based approach. Policy 13 of the Trinidad and Tobago consultation document[35] states that "*asymmetries between fixed and mobile interconnection charges should reflect differences in the efficient costs (as defined in the Interconnect Regulations) of supply. Where measures are not in place for determination of efficient costs on mobile and fixed networks, the Authority shall carefully benchmark similar charges in other similar markets*".

More recently, a further document has been produced on the methodologies[36] that assume a cost-based approach. It is recommended that costs should be set on a current cost basis as this will provide "economically efficient pricing signals for investment decisions" (pp.10) whereas historic costs are inefficient as "they have no relevance to investment decisions today" (pp. 10).

Barbados

Barbados goes further than Jamaica and Trinidad and Tobago in support of using a cost-based approach by providing a timeline in which these changes are to be implemented. In 2003, the government issued new guidelines[37] with the objective of promoting competition in the quickest possible timeframe after issuing licenses to three new mobile carriers. Further to the theoretical considerations on which regime would best suit Barbados, practical considerations such as timing and ease of transition also became key considerations.

34 Principles of Long-run Incremental Cost Model for the Jamaican Telecommunications Market, Consultation, OUR, July 30 2008

35 Recommendation for Access and Interconnection Policy, TATT, September 23 2005.

http://www.tatt.org.tt/ddocs/DraftInterconnectionPolicy_26Sept05%20(2).pdf

36 Proposed Costing Methodology for Interconnection and Access Services in the Telecommunications Sector, Consultation, TATT, December 6 2006

37 Interconnection Guidelines – Accounting, Costing and Pricing Principals, FTC 03/02, Fair Trading Commissions, Barbados.

http://www.ftc.gov.bb/library/2003-07-01_interconnection_guidelines.pdf

It was recommended that Barbados move to a historic cost approach, where the data required is already available from the accounting and engineering records of dominant carriers, for a maximum of three months. Main reasons for the short time frame once again referred to the potential dampening effect this may have on the implementation of new technology etc.

It is then proposed that Barbados will move onto a current cost approach for a maximum of 6 months which will have higher data requirements but be more representative than a historical approach. After this period, Barbados will move onto a Total Service Long Run Incremental Cost system as it is suggested that a simple LRIC basis will set prices too low and will not suitably compensate the incumbent. Whilst TSLRIC will still face problems, such as when total revenues fall short of total costs and the data requirements, it is believed that this is the most efficient and transparent method of pricing. No further data is available on the progress of this plan.

Cayman Islands

Grand Cayman issued a decision on the usage of Forward Looking Long Run Incremental Costing (FLLRIC) in 2005[38] after a consultation that started in 2004. Cable and Wireless were to develop a FLLRIC model and this was believed to set efficient entry and investment signals to all new carriers whilst providing Cable and Wireless compensation for the future costs of providing interconnection and access to infrastructure sharing services.

Once again, this is a long process an Grand Cayman lists out three phases; firstly the model foundations will be established, secondly Cable and Wireless will file a draft costing manual with proposed key assumptions and preliminary cost study results, and finally parameters and assumptions will be finalized and the model will be implemented in phase three.

It is interesting to note that whilst most carriers on the islands supported the concept of FLLRIC, many raised concerns regarding "*the value of costing relative to the actual costs of developing a cost-based methodology*" (pp. 5). TeleCayman suggests that greater net benefits may be accrued by focusing on other pro-competitive regulatory actions, such as settling regulatory disputes. Digicel is also concerned about the costs of implementing the system and suggests that this may be in the order of US$550,000, some of which, it worries, it may have to meet.

38 Decision for the Forward-Looking Long-Run Incremental Costing Consultation (CD (2004 I), ICT Decision, Grand Cayman, July 22 2005

13 Annex B

Example of a Typical Structure of Reference Access & Interconnect Offer[39]

Table 3-1: Contents of a Typical Interconnection Agreement

Contents	Detail and Comments
Interpretation	
Recitals	➢ "Whereas" clauses add historical and legal context to assist understanding by future readers of agreements
Definition of Key Terms	➢ Terminology varies significantly among different countries and operators ➢ It is important to ensure compatibility of terminology to the local environment when adapting interconnection agreements from other countries ➢ Definitions in other documents may be referenced, e.g. definitions in laws or regulations, regulatory guidelines, ITU definitions
Scope of Interconnection	
Description of Scope and Purpose of Interconnection	➢ Different types of interconnection agreements have different purposes (e.g. two local networks, local to long distance/international, fixed-to-mobile, mobile-to-mobile, local ISP to ISP backbone) ➢ The purpose of some interconnection agreements is to provide termination *services* or transit services; others involve provision of unbundled *facilities*, etc. ➢ Interconnection architecture (annotated diagrams)
Points of Interconnection and Interconnection Facilities	
Points of Interconnection (POI) and Related Facility Specifications	➢ POI locations (e.g. exchanges, meet points) usually listed in an appendix; may be modified from time to time. Typically includes exchange types and street addresses ➢ Specific POI facility locations (e.g. digital distribution frame; manhole splice box)

[39] Telecommunications Regulation Handbook, Infodev, 2000

Table 3-1: Contents of a Typical Interconnection Agreement (cont'd)

	➢ Description of network facilities to be interconnected (e.g. OC-3 fibre optic terminals with interconnecting single-mode optical fibres)
	➢ Specify capacity and/or traffic volume requirements
	➢ Indicate which party is to provide which facilities (include diagram of POIs and interconnected facilities)
	➢ Technical specifications, for example:
	  ➢ Calling Line Identification (CLI) specs
	  ➢ Other advanced digital feature specs, e.g. call forwarding, caller name ID, etc.
	  ➢ Basic and ISDN call control interface specs
	➢ Local Number Portability (LNP) query-response network specs

Signaling Interconnection	➢ Specify type of signaling networks/standards (e.g. CCS7) ➢ Signaling POIs locations to be specified (i.e. Signal Transfer Points or STPs) ➢ Point Codes to be specified ➢ Technical interface specifications (e.g. signaling links to be dedicated E-1 or DS-1 transmission facilities; operating at 56 kbps) ➢ Diagram of signaling interconnection architecture
Network and Facility Changes	

Planning and Forecasts	➢ Requirement for mutual notification of network changes and capacity forecasts, for example:
	  ➢ traffic forecasts for each POI
	  ➢ local number and portability requirements
	  ➢ area code saturation and changes to increased digit phone numbers
	  ➢ default and redundant routing arrangements
	➢ Periodic network planning reports may be specified

Facility Ordering Procedures	➢ Specify rights and obligations of each party with respect to ordering and provisioning of interconnection facilities (including unbundled network elements – see below). ➢ Confidentiality requirements and procedures to ensure same ➢ Ensure no anti-competitive use of order information (e.g. no contacts with end users; competitive service divisions of operator receiving orders) ➢ Specify points of contact (e.g. Interconnection Service Groups; E-mail addresses, etc.) ➢ Specify order format and procedures (e.g. standard order forms may be utilized in paper or electronic (EDI) format)

Table 3-1: Contents of a Typical Interconnection Agreement (cont'd)

	➢ Procedures to expedite specific orders ➢ Co-ordination process for migration of customers between operators (e.g. coordination of cut-overs to prevent or minimize service interruptions to end users) ➢ Procedures for ordering operator to arrange for all equipment installations and changes at end-user premises ➢ Order confirmation and order rejection procedures, timely notification, notification of additional charges, etc. ➢ Order completion notification and reporting requirements
Traffic Measurement and Routing	
Traffic Measurement Responsibilities and Procedures	➢ Describe party responsible; measurement and reporting procedures (see billing procedures below): ➢ Rules for routing of different types of traffic, if any (e.g. Bill and Keep local traffic that is to be terminated reciprocally without charge may be carried on "Bill and Keep" trunks; traffic to which termination charges apply may be carried on other trunks, e.g. transit trunks, national traffic trunks, etc.)
Infrastructure Sharing and Collocation	
Sharing of Infrastructure, Procedures and Costs	➢ Availability of poles, conduits, towers, rights of way, etc. ➢ Procedures, if any, for determining available capacity; procedures for allocating capacity among requesting operators (e.g. first come/first served) ➢ Prices and/or costing method ➢ Provision and pricing of supplementary services (electrical power, security systems, maintenance and repairs, etc.) ➢ Sub-licences on property of third parties (e.g. right of way owners, municipal and other public and private property owners, where infrastructure is located), insurance and indemnification for damages
Collocation	➢ Availability of actual or virtual collocation (e.g. for transmission facilities on exchange premises); list of addresses where collocation is available; procedures for determining available space; reservation of expansion space ➢ Prices and/or costing method for collocated space ➢ Provision and pricing of supplementary services (e.g. electrical power and emergency backup power, lighting, heating and air conditioning, security and alarm systems, maintenance and janitorial services, etc.) ➢ Procedures for ensuring access to and security of collocated facilities (notification; supervised repair and provisioning work and/or separated premises, etc.)

Table 3-1: Contents of a Typical Interconnection Agreement (cont'd)

	➢ Negotiation of other lease and/or licence arrangements, including issues of sub-licences on property of third parties (e.g. building owners, right of way owners, municipal and other public property owners), insurance and indemnification for damages
Billing	
Scope of Billing Arrangements and Responsibilities	➢ May include different arrangements, for example: ➢ Operators billing each other for interconnection services (e.g. termination) and facilities (e.g. unbundled loops and other network elements) ➢ Performance of billing functions by some operators for others (e.g. local operators billing end-users for long distance or international operators, ISPs, etc.)
Billing Procedures	➢ Interconnection billing media – discs, tapes, paper and/or electronic (EDI) transfers; format and software specifications ➢ Guidelines for production of interconnection billing outputs, including: ➢ Applicable industry standards (e.g. CABS, BOS, SECABS, used with or without modifications) ➢ Billing data format and data elements ➢ Standardized codes and phrases ➢ Billing schedule ➢ Customer Service Record (CSR) provision, including: ➢ details to be supplied by provisioning local operator (e.g. record of interconnection elements used, including circuit and other (e.g. DSLAM) equipment identification numbers) ➢ media (e.g. tape, paper, etc.) and schedule for delivery ➢ other requirements to facilitate efficient verification and billing of end-user by non-provisioning operator ➢ Retention periods for billing data
Payment Terms and Conditions	➢ Billing fees and related charges. ➢ Payment terms and conditions, including late payment penalties; service disruption credits, etc.
Billing Disputes and Reconciliation Procedures	➢ Contact details for reconciliation and billing queries ➢ Responsibilities to provide back-up records ➢ Notification of billing disputes ➢ Initial resolution procedures (e.g. escalation to more senior management) ➢ Final resolution (referral to arbitration, regulator or courts)

Table 3-1: Contents of a Typical Interconnection Agreement (cont'd)

Quality of Service/Performance and Trouble Reports	
Quality of Service	➢ Service performance standards may be specified in appendix, for example: ➢ Average time for provisioning interconnection circuits ➢ Percentage of interconnection cut-overs made on scheduled dates ➢ Comparative provisioning performance for competitors and self (or affiliates) ➢ Switching and transmission quality measures on interconnected circuits (e.g. probability of blockage at peak hours, transmission delay and loss – consider referencing ITU-T recommendations
Testing and Maintenance	➢ Right to make reasonable tests, and to schedule service interruptions; procedures to minimize disruption
Trouble Reports	➢ Procedure for trouble reports; notice periods; response time standards ➢ Duty to investigate own network before reporting faults to interconnecting operator ➢ Responsibility for costs incurred to second operator in investigating faults subsequently found to exist in first operator's network. Calculation of charges (labour, etc.) for investigating trouble reports
System Protection and Safety Measures	➢ Responsibilities of parties to take necessary precautions to prevent interference with, or interruptions of, other parties' networks or customers
Interchange and Treatment Information	
Data Interchange Format	➢ Method and format of data interchange between carriers, including data interfaces, software, forms, etc.
Data to be Exchanged	➢ Specify all data types and systems for which data is to be interchanged, for example: ➢ New facilities and service orders, network changes and forecasts, billing, etc. (see above) ➢ Number allocations and other data required for call routing and local number portability (where applicable, e.g. where LNP system is operated by incumbent operator rather than an independent party) ➢ Customer listings in directories and databases ➢ Access to network databases, for provision of advanced services

Table 3-1: Contents of a Typical Interconnection Agreement (cont'd)

Access to and use of Customer Information	➢ Confidentiality procedures for customer information, including: ➢ Establishment of separate interconnection services group with secure data (password protection for electronic files; locks for data rooms and filing cabinets, etc.) ➢ Confidentiality forms to be completed by all relevant employees (penalties and bonding optional) ➢ Procedures to ensure protection of customer privacy
Access to and use of Operator Information	➢ Confidentiality procedures (see customer information procedures – above) ➢ Intellectual property rights
Equal Access and Customer Transfer	
Equal Access Procedures	➢ Procedures depend on equal access approach, e.g. carrier pre-selection; casual selection. Detailed procedures normally incumbent for carrier pre-selection, including: ➢ Customer authorization requirements (signature on prescribed form, clear choice requirements) ➢ Authentication and measures to prevent unauthorized customer transfers (slamming) ➢ Penalties for unauthorized customer transfers ➢ Methods of reporting customer transfers (contact points and data to be provided) ➢ Order confirmation procedure (format, medium, etc.) ➢ Schedule to implement transfers ➢ Procedures to implement transfers ➢ Dispute resolution process (e.g. escalation through senior management, arbitrator and regulator); information to be provided in dispute resolution process ➢ Procedures for dealing with disputed customers (which operator may contact customer, information to be provided to and/or obtained from disputed customers)
Ancillary Services	
Operator Assistance	➢ Types of operator assistance services to be provided, including directory assistance, translation services, fault report routing, etc. ➢ Call handling and operations procedures ➢ Fees and billing procedures

Table 3-1: Contents of a Typical Interconnection Agreement (cont'd)

Other Ancillary Services	➢ Subscriber listings in telephone directories ➢ Information and billing inserts ➢ Repair and maintenance services ➢ Other services provided by one or other operators to increase mutual operating efficiencies
Termination	

Grounds for Termination and Restrictions	➢ Termination may only be permitted subject to certain restrictions (e.g. regulatory approval for termination of interconnection by incumbent operator)
	➢ Grounds for termination by incumbent may include:
	    ➢ Regulatory or court orders
	    ➢ Bankruptcy, insolvency, receivership, etc.
	    ➢ Cessation of business
	➢ Fewer, if any, termination restrictions in competitive markets, and by non-dominant operators

Termination Procedures	➢ Advanced notice requirements ➢ Payment of non-recoverable interconnection costs incurred by disconnected operator ➢ Computation and payment schedule for disconnection costs ➢ Dealings with end-users, communications restrictions, etc. ➢ Disconnection cutover procedures.
Other Provisions	
Force Majeure	➢ List of conditions for which non-performance of interconnection agreement obligations will be excused
Assignment	➢ Rights of assignment and restrictions on same (e.g. consent or regulatory approval requirements)
Applicable Laws	➢ Agreement to be governed by, and interpreted in accordance with, the laws of relevant jurisdiction
Regulatory Approvals	➢ Specify regulatory approvals required for effectiveness and/or renewal, amendment, termination, etc. of agreement
Breach of Agreement	➢ Remedies and penalties ➢ Liabilities, indemnification and limitation of liabilities
Legal Interpretation	➢ Standard provisions for legal interpretation and enforcement of agreement (e.g. entire agreement clause, effect of unenforceable terms, cumulative rights and remedies, etc.)

Table 3-1: Contents of a Typical Interconnection Agreement (cont'd)

Dispute Resolution	➢ Procedures for resolution of disputes under agreement that are not specifically dealt with elsewhere. For example: ➢ Good faith negotiations, time schedule for same, escalation through management levels ➢ Referral to regulator, arbitrator or court (e.g. of different types of issues) ➢ Selection of, and procedures for, arbitration
Term	➢ Duration of term ➢ Renewal rights and procedures
Amendment	➢ Review and re-negotiation procedures ➢ Impact of regulatory changes