

## **Effective competition review of Internet connectivity**

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## Summary

S.1 Oftel's strategy is to match the level of regulation to the level of competition in the market, lightening formal regulation as competition develops, while continuing to protect and inform consumers where the market cannot do so. In this context, BT has made a request to Oftel to modify the regulatory obligations that apply to its generic wholesale dial-up Internet services, currently SurfPort, SurfPort24, WebPort and WebPort24. Specifically, BT has requested that the Director General exercise his discretion to remove its requirement to notify, publish and adhere to prices, terms and conditions for these services and that he confirm that any discrimination in the provision of the services encompassed by this review would be unlikely to be deemed 'undue'.

S.2 BT's services allow Internet Service Providers (ISPs) to connect their customers to the Internet and combine two or more of three wholesale products - call origination, Internet call termination and Internet connectivity. Oftel is currently reviewing the markets for call origination and Internet call termination in its *2000/01 effective competition review of dial-up Internet access* published in July 2001. However, to consider fully BT's request, specifically with respect to WebPort and WebPort24, Oftel is reviewing the UK market for Internet connectivity. Internet connectivity is a wholesale service that provides ISPs with access to one of the backbone networks that comprise the Internet. Protocol. The corresponding wholesale product is known as Internet Protocol (IP) transit.

S.3 Although only limited information is available, Oftel's initial view is that the market for Internet connectivity is effectively competitive. This preliminary conclusion is based on the following points:

- Wholesale prices are falling and seem to be competitive compared to Europe.
- Operators appear to be competing on quality and both ISPs and end users have access to network performance information.
- Bundling with other products may introduce some switching barriers, however switching between wholesale IP transit suppliers appears straightforward.
- Although incomplete, the data provided seem to suggest that no one operator enjoys a strong position in the market in terms of volumes.
- Although there are factors that limit entry, there has been recent entry and there are a considerable number of active suppliers.
- Price levels do not seem to indicate presence of excess profits.
- No operator appears to have market power.

S.4 The conclusions of this review will not be sufficient on their own to reach a decision regarding BT's request. Any regulatory changes will be dependent on the conclusions of this review and Oftel's effective competition review of dial-up Internet access. Depending on the conclusions of these reviews, Oftel may undertake a formal consultation on any changes that need to be made to BT's licence to relax these and other regulatory obligations with respect to wholesale dial-up Internet access services. Although Internet connectivity is an input to other Internet services, Oftel does not intend to consider levels of regulation with respect to Internet services other than dial-up Internet access.

S.5 Oftel has set a deadline for responses of 30 October 2001, coinciding with the deadline for its review of dial-up Internet access. These reviews are closely related and Oftel intends to publish its conclusions on both in a joint statement.

S.6 Oftel believes that this consultation is of most relevance to a relatively small well informed audience comprising operators providing Internet connectivity services and Internet Service Providers who buy these services. Consumer groups may not be so familiar with Internet connectivity as a wholesale service and consequently Oftel is not actively seeking views from consumers on this market, although we will of course consider any representations made. Oftel is separately seeking consumer views on retail Internet services in its effective competition review of dial-up Internet access.

## Chapter 1 - Introduction

### Background

1.1 Oftel's strategy is to match the level of regulation to the level of competition in the market, lightening formal regulation as competition develops, while continuing to protect and inform consumers where the market cannot do so. Oftel carries out market reviews to assess the level of competition in a particular sector and to ensure that regulation is appropriate.

#### *BT's request*

1.2 BT has made a request to Oftel to modify the regulatory obligations that apply to its generic wholesale dial-up Internet services to reflect the extent of competition in the markets for Internet call termination and Internet connectivity from the UK.

1.3 BT's current services within the scope of this request are SurfPort, SurfPort24, WebPort and WebPort24. These services are purchased by Internet Service Providers (ISPs) to enable them to supply retail dial-up ISP services.

1.4 Oftel's 2000/01 effective competition review of dial-up Internet access is currently consulting on the markets for retail dial-up Internet service provision, wholesale call origination and Internet call termination. The services within the scope of BT's request provide combinations of wholesale call origination, Internet call termination and Internet connectivity as shown in Table 1.1. Therefore, to consider fully BT's request, specifically with respect to WebPort and WebPort24, Oftel needs to review the market for Internet connectivity.

*Table 1.1: BT dial-up wholesale Internet access products*

Product	Wholesale services provided		
	Call origination	Internet Call termination	Internet connectivity
SurfPort	No	Yes	No
SurfPort24	Yes	Yes	No
WebPort	No	Yes	Yes
WebPort24	Yes	Yes	Yes

1.5 Oftel intends to use responses to this review, together with its review of dial-up Internet access, to inform its decision in respect of BT's request. Depending on the conclusions of these reviews Oftel may undertake a formal consultation on any changes that need to be made to BT's licence to relax these and other regulatory obligations.

### Internet connectivity

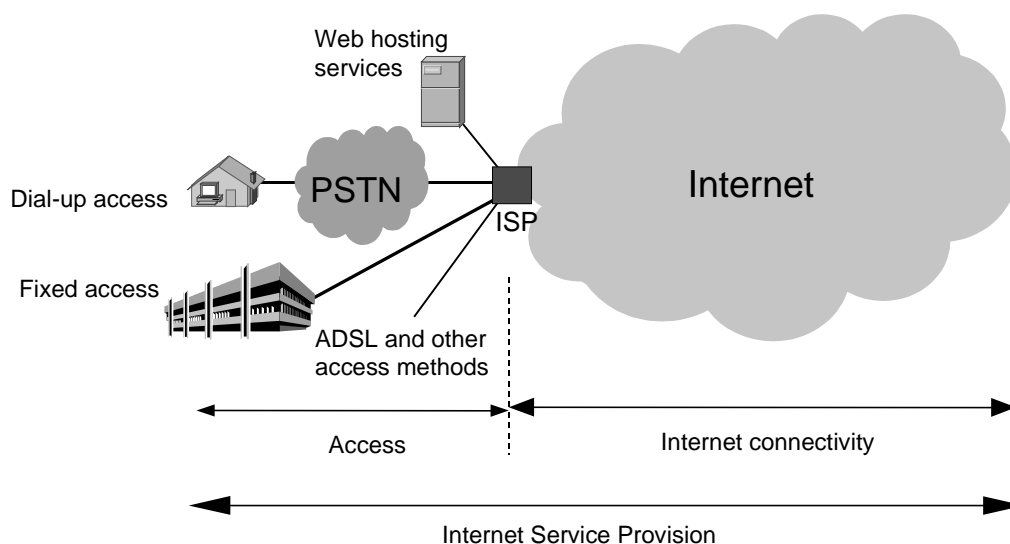
1.6 Internet connectivity is the ability to access the entire Internet from a point of interconnection with the Internet, ie a connection to one of the backbone networks that comprise the Internet. It is an essential input for all retail Internet service provision services. It provides the link from the ISP to the wider Internet, whereas call origination and Internet call

termination provide links from the end user to the ISP. A supplier of Internet connectivity, normally an Internet backbone operator, has an obligation to transport their customer's IP (Internet Protocol) traffic to and from any destination on the Internet. The corresponding wholesale product is IP Transit.

1.7 Internet connectivity is also required for web hosting services in order to provide connectivity between the customer's web site and the rest of the Internet. The scope of Internet connectivity is illustrated in Figure 1.1 below.

1.8 Although Internet connectivity is an input to many types of Internet services, for example Internet service provision using ADSL and leased line access, Oftel only intends to consider levels of regulation with respect to wholesale dial-up Internet access services. As noted in Oftel's "*Effective competition review of dial-up Internet access*", dial-up Internet access makes up a substantial share of the Internet service provision market. The relative immaturity of other access mechanisms such as xDSL and cable modems, and the need for ensuring consistency and depth of analysis mean that it is appropriate for this review to focus on dial-up access only.

Figure 1.1: Scope of Internet connectivity



1.9 The analysis in Chapter 2 sets out Oftel's initial view that a product market for Internet connectivity can be identified and that this market is national in scope.

## Chapter 2 – Market Definition

### The Internet

2.1 The public Internet consists of many interconnected IP networks. These are known as Internet backbone networks and are interconnected in such a way that any computer on the Internet is reachable by any other computer on the Internet.

2.2 There are two main types of interconnection agreement that are used between Internet backbone networks:

- *Peering*. Traffic is exchanged directly between two Internet backbones, usually based on shared costs with no settlement for the volume of traffic exchanged. The agreement allows traffic to be exchanged between computers connected to either network, but does not allow traffic to transit one of the networks to reach computers on a third network.
- *Transit* (or IP Transit). An operator pays to interconnect to another, normally larger, Internet backbone network that provides access to the whole of the Internet.

2.3 Originally the Internet consisted of a few major networks in the US that all peered with each other. The topology of the Internet is now such that the only operators able to provide access to the whole Internet without buying transit from elsewhere are a small number of large US operators, sometimes known as tier-1 or top-level Internet backbone operators.

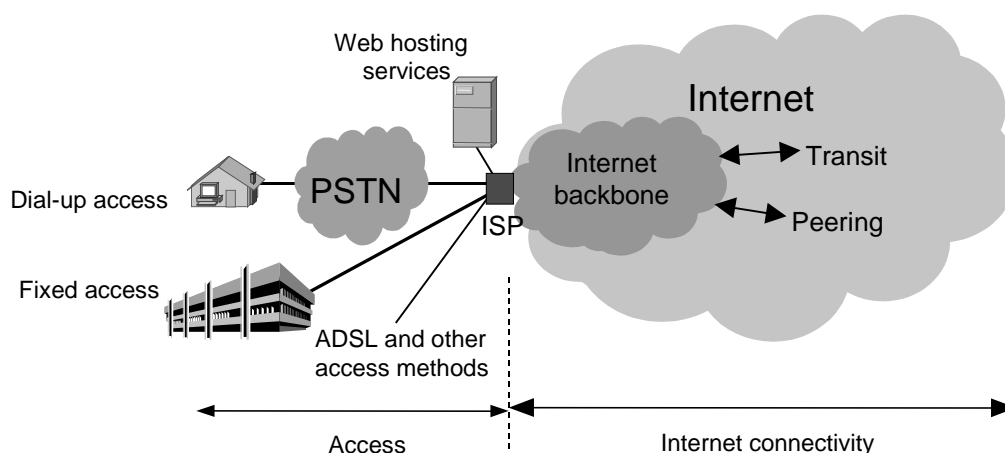
### Internet connectivity

2.4 Internet connectivity may be defined as the ability to access the entire Internet from a point of interconnection with the Internet, ie a connection to one of the backbone networks that comprise the Internet. From a contractual point of view, Internet connectivity places an obligation on a supplier to transport their customer's IP traffic to and from any destination on the Internet.

2.5 Internet connectivity is an essential component of all retail Internet service provision services, regardless of the access method (for example, dial-up, leased line or ADSL). Together with other wholesale inputs, such as call origination and Internet call termination for dial-up access, it allows ISPs to provide Internet services at the retail level. The relevant wholesale product may be defined as IP transit.

2.6 Internet backbone operators provide connectivity by using their own IP backbone networks, exchanging traffic (peering) with other operators and by purchasing transit from a top-level backbone operator. The role of the Internet backbone operator is illustrated in Figure 2.1.

Figure 2.1: Backbone operators and Internet connectivity



2.7 There are two dimensions to the definition of a relevant market: the relevant products to be included in the same market and the geographic extent of the market(s). Oftel's approach to market definition follows that used by UK competition authorities and is in line with those used by European and US competition authorities. Market boundaries are determined by identifying constraints on the price-setting behaviour of firms. There are two main competitive constraints to consider: how far it is possible for customers to substitute other services for those in question (demand-side substitution); and how far suppliers could switch, or increase, production to supply the relevant products or services (supply-side substitution) following a price increase.

2.8 The concept of the 'hypothetical monopolist test' is a useful tool to identify close demand-side and supply-side substitutes. A product is considered to constitute a separate market if a hypothetical monopoly supplier could impose a small but significant, non-transitory price increase without losing sales to such a degree as to make this unprofitable. If such a price rise would be unprofitable, because consumers would switch to other products, or because suppliers of other products would begin to compete with the monopolist, then the market definition should be expanded to include the substitute products. However, the relevant market is not necessarily the smallest which it is possible to define using the hypothetical monopolist test. It may be appropriate to include in the relevant market, a number of products (or areas), in the supply of which competitive conditions are homogeneous.

2.9 The demand for Internet connectivity is derived from the corresponding retail market. End users determine the demand for retail Internet access, which in turn determines the ISPs' demand for Internet connectivity (together with the demand for the other wholesale inputs, such as, from a dial-up perspective, call origination and Internet call termination).

2.10 Consider a hypothetical sole provider of Internet connectivity, and consider the possibility that it raised the price of Internet connectivity by, say, 10%. From the perspective of ISPs wishing to serve customers who want to access the Internet, there is no substitute for Internet connectivity in order to provide the customer with Internet services. This implies that no demand-side substitution would occur if a hypothetical monopolist raised the price of Internet connectivity significantly and non-transitorily.

2.11 The market may have to be broadened were producers of other products able to switch to the production of Internet connectivity in the short term (supply-side substitution), following the hypothetical monopolist price increase. However, in order for a firm to supply Internet connectivity, and without purchasing it from elsewhere, it needs to provide its own IP backbone network and have sufficient interconnection arrangements so that any Internet destination can be reached. The conclusion seems to be that no supplier of other goods would be able to switch to the production of Internet connectivity in the short term profitably if a hypothetical monopolist raised the price of Internet connectivity significantly and non-transitorily.

2.12 In summary, a hypothetical monopolist supplier of Internet connectivity would find it profitable to raise the price significantly and non-transitorily because no demand or supply-side substitution would occur. Therefore, it is our initial view that a separate product market for Internet connectivity can be identified.

### **Geographic scope of the market**

2.13 The geographic market is the area where substitution is assessed to take place, and is defined through a process which is the equivalent of the one that can be used for the definition of product markets. In particular, the objective is identifying substitutes which would prevent a hypothetical sole supplier of the service being considered to raise its price substantially above the competitive level.

2.14 For the definition of the geographic scope of the market, the starting point is normally the narrowest market definition which is conceivable. From this starting point, the area where substitution may take place is gradually broadened and it is assessed whether demand-side (from the user's perspective) and/or supply-side substitution (from the producer's perspective) would take place, so as to make the hypothetical sole supplier's price rise ineffective. If substitution is so significant that it would make the price rise unprofitable for the hypothetical monopolist, the geographic scope of the market for the product or service under consideration can be broadened accordingly.

2.15 Most Internet backbone operators roll out their networks at least at the national level, and often at the international level. It is, therefore, sensible to consider a national market for Internet connectivity as a starting point.

2.16 For small and medium sized ISPs having end-users physically located in the UK, there are potentially three geographic options for purchasing Internet connectivity. They can buy connectivity within the UK, elsewhere in Europe or in the US. Note that when buying Internet connectivity outside the UK, international capacity will be required to link the ISP to the point of interconnection.

2.17 Prices for Internet connectivity in the UK appear to be comparable or cheaper than other major European cities offering access to Internet backbones (see Figure 3.3). However, the price of international capacity from London to other major European cities is significant. Typically, the price of international capacity accounts for at least 25% of the price of Internet

connectivity (based on 45Mbit/s)<sup>1</sup>. Consequently, UK ISPs wishing to purchase connectivity outside the UK would face a substantial additional cost for international capacity on top of the cost for Internet connectivity. Were a hypothetical sole provider of Internet connectivity in the UK to raise the price by, say, 10%, ISPs located in the UK would still find it more convenient to buy Internet connectivity from the hypothetical monopolist, as they would face a 25% increase in price were they to switch to a provider located in another European country. Therefore, purchasing Internet connectivity elsewhere in Europe does not seem to represent a substitute for connectivity within the UK.

2.18 For similar reasons, buying Internet connectivity in the US does not provide a reasonable alternative to buying it within the UK for small and medium-sized ISPs. The price of transatlantic capacity is approximately twice as much as the price for Internet connectivity in the UK faced by ISPs (based on 45Mbit/s). Although high capacity connectivity may be purchased at lower cost in the US than the UK, this option is only feasible for users with high demand, typically other backbone operators. For low users, ie small and medium-sized ISPs in the UK, the joint cost of connectivity and transatlantic capacity to the US is not likely to represent a viable substitute for connectivity in the UK.

2.19 In addition to price-related considerations, there are also quality-related considerations that suggest that the scope of the market may be national. UK ISPs without their own infrastructure and UK peering arrangements, would face lower quality buy buying connectivity in the US. This is because in the absence of suitable peering arrangements, all UK Internet traffic would need to travel via the US, meaning that its UK customers would experience additional delays in accessing UK based content.

2.20 By taking into account these price- and quality-related issues, it is therefore Oftel's initial view that it seems possible to identify a separate UK geographic market for Internet connectivity, defined as Internet connectivity provided via interconnection with an Internet backbone within the UK.

2.21 Note that other institutions<sup>2</sup> have suggested that the market for Internet connectivity is global in geographic scope. However, it is Oftel's understanding that the market thus identified is not the one for Internet connectivity as defined here, but a vertically related upstream international market, which can be defined as the global wholesale market for top-level / Tier-1 Internet connectivity. All lower tier Internet backbone operators, regardless of their location, need to purchase Internet transit from these top level providers to ensure universal Internet connectivity. In particular, operators providing Internet connectivity in the UK will need to purchase Internet connectivity in the upstream international market . However, this vertically related global market is not within the scope of this review.

## **Related services**

2.22 When sold on its own, Internet connectivity is usually referred to as wholesale IP transit or Internet Transit. However, it can also be packaged with other products to provide bundles of intermediate wholesale products. Such products include bundles of call

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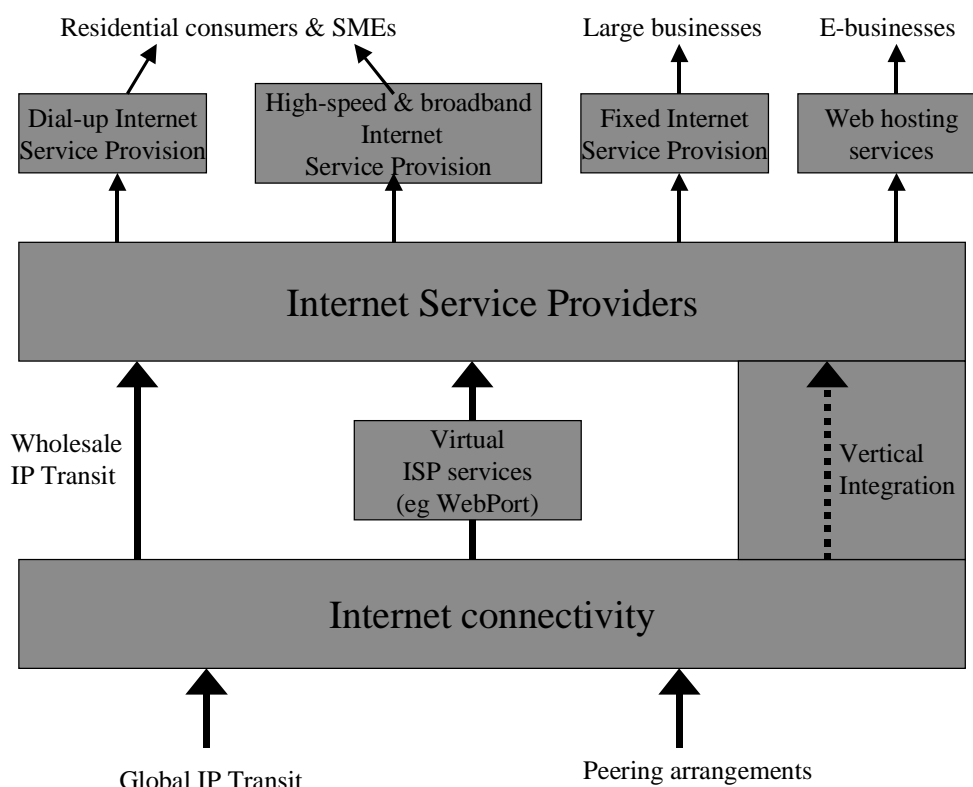
<sup>1</sup> In August 2001, the average price of 45 Mbit/s of IP transit (ie wholesale Internet connectivity) from Band-X London was £8,532 / month. The cheapest advertised 45Mbit/s circuit to Paris was the equivalent of £2,490 / month (source: Band-X).

<sup>2</sup> See, for example, European Commission, merger case M.1069 –Worldcom/MCI.

termination and/or Internet connectivity and/or other related services. These bundled services are generically referred to as virtual ISP services as they allow ISPs to provide services without running their own infrastructure. BT's WebPort and WebPort24, and similar offering by other operators represent examples of such bundles.

2.23 The relationships between Internet connectivity and the services based on it are summarised in Figure 2.2.

Figure 2.2: Services related to Internet connectivity



### Summary

2.24 In summary, Oftel's initial view is that a product market for Internet connectivity can be identified. This market is national in scope, and will be the subject of this Review.

**Question 1** Do you agree with Oftel's definition of the Internet connectivity market?

## Chapter 3 - Market Analysis

### Introduction

3.1 This chapter considers the market for Internet connectivity, as defined in Chapter 2, and assesses it using the effective competition indicators set out in Annex A.

### Market structure

3.2 There are over 20 suppliers of Internet connectivity active in the UK (see Annex B). Services supplied include wholesale IP Transit, virtual ISP services, web hosting and retail Internet access via dial-up, leased lines and ADSL. BT offers products in all these categories through its BT Ignite division.

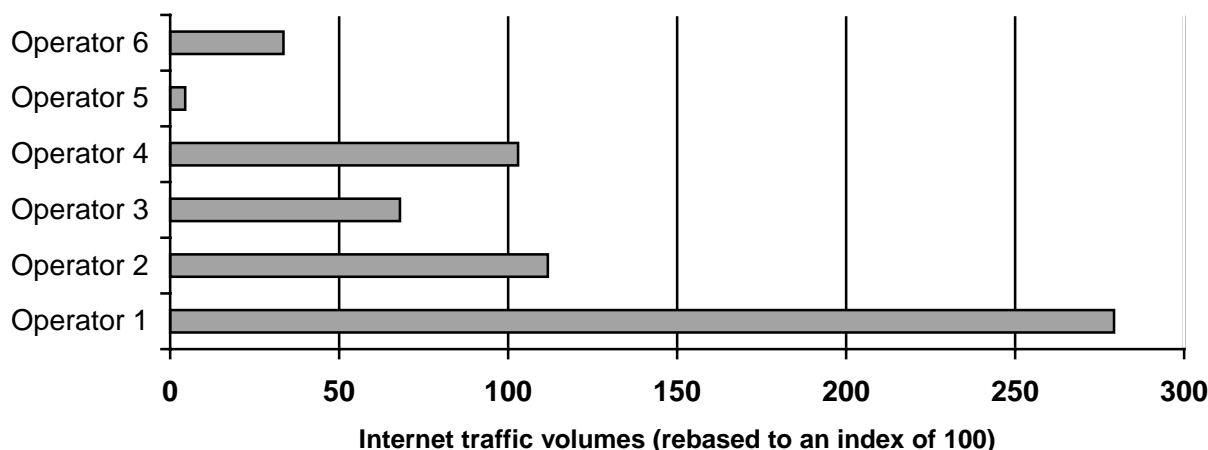
3.3 Oftel has attempted to obtain revenue data in order to assess market shares. However, it has not been possible to obtain suitable data from industry participants. Nevertheless, estimates of Internet connectivity traffic volumes have been obtained from a limited number of operators and are presented below.

### Volumes

3.4 Figure 3.1 shows estimates, rebased to an index of 100, of the average volume of Internet traffic carried to/from UK customers by a limited number of major operators. Where operators have supplied both inbound and outbound figures and average has been presented. Oftel notes that there are methodological difficulties in obtaining accurate measurements of Internet traffic. However, it believes the data provided is sufficient to aid its analysis of market structure.

3.5 The figure shows operator 1 to have larger volumes relative to the others presented. It is important to note that there are at least 15 other operators for which data was unavailable. Even when making very modest assumptions about the traffic volumes carried by these other operators, it seems unlikely that operator 1, or any other operator, could have a strong position in the market in terms of volumes.

Figure 3.1: Internet traffic for major players in UK Internet connectivity market



**Question 2** *Do you agree that despite limited information, this analysis provides a fair assessment of the relative position of operators in this market?*

### ***Barriers to entry***

3.6 Market entry is theoretically possible by reselling existing capacity. However a new entrant may not be able to compete strongly on this basis. To enter the market with a competitive service suppliers need their own IP network, global transit from a top-level backbone operator and peering arrangements with regional backbone operators.

3.7 Building a backbone IP network requires a large sunk cost (ie, a fixed non-recoverable cost) in network infrastructure. Once fibre is in the ground, there are extensive economies of scale, as the marginal cost of IP traffic is very small. Furthermore, as transmission technology continues to improve, the capacity of a fibre network can continue to be expanded for incremental costs. Internet backbone operators also need to have a substantial customer base to make their network more attractive as a peering partner.

3.8 Despite the factors above that would appear to limit entry, there has been a considerable amount of entry over the last 2-3 years. Several new entrants have built out large pan-European fibre networks. These include Level3, Carrier1, 360Networks, GlobalCrossing, Interoute and KPNQwest (see Annex B). This has been in response to very rapid growth in Internet traffic and enabled by the ready availability of finance to construct new networks. Although Internet backbone operators now face greater financial constraints future new entrants may well be able to obtain access to the spare fibre networks that have already been laid.

**Question 3** *Do you agree that there appear to be no insuperable barriers to entry and new entrants may be able to enter the market by using spare capacity on existing networks?*

### **Supplier behaviour**

#### ***Active competition in price, quality and innovation***

3.9 In reaction to falling prices, suppliers appear to be competing on quality of connectivity in order to maximise revenues. They emphasise the size and capacity of their network, round-trip times, the number of hops required to reach Internet destinations and the reliability of their service. In response to large customers who have a choice of suppliers, suppliers are offering service level agreements, and adopting tools to manage network congestion.

#### ***Efficient provision of services***

3.10 Many suppliers have recently built out new fibre networks and are able to utilise technologies, such as Dense Wavelength Division Multiplexing (DWDM) and high speed IP routers, that enable efficient provision of IP services. Suppliers are also becoming active in minimising costs through peering as a substitute for paid transit where possible and through least cost routing.

**Question 4** Do you agree that there appears to be active competition in terms of quality, innovation and efficiency?

### **Consumer outcomes**

3.11 The customers of wholesale Internet connectivity services are ISPs who wish to provide Internet services to end users. As illustrated in Figure 2.2, the end-users of Internet services are residential and business consumers, who are supplied with Internet connectivity as part of Internet access or hosting services.

3.12 The analysis below concentrates on the ISP as a customer of wholesale IP transit services. In some cases it is possible to consider the outcome for the consumer, but Oftel's effective competition review of dial-up Internet access more fully considers outcomes for consumers of dial-up retail Internet access services.

### **Price**

3.13 Price comparisons can only easily be made when Internet connectivity is not bundled with other services, ie when it is sold as wholesale IP transit. Internet connectivity only forms part of the cost for virtual ISP or end-user services, so that any price changes or differentials might be attributed to other cost components, for example, the call termination component of dial-up Internet access services.

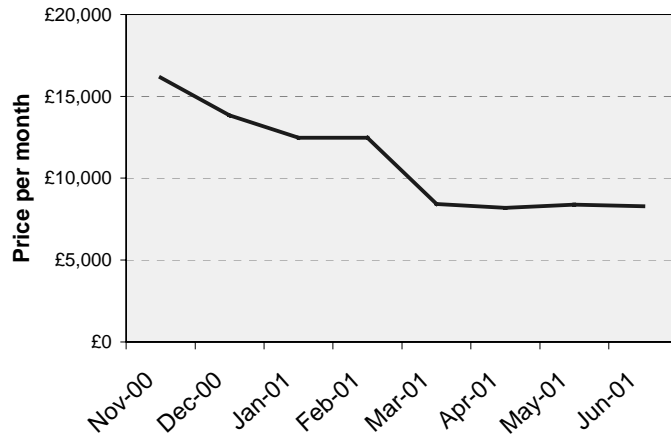
3.14 The information presented on network coverage in Annex B suggests that a great deal of new IP capacity has been installed across Europe in the last 2-3 years. This has been perceived as causing a "glut of bandwidth"<sup>3</sup>, possibly contributing to downward pressure on prices for many carrier services, including IP transit. Figure 3.2 shows that 45Mbit/s transit prices at the Band-X<sup>4</sup> London exchange have more than halved between November 2000 and June 2001, although prices have begun to level off in the last few months. While these prices are not necessarily representative of the whole market, it seems reasonable to expect that they reflect the overall market trend.

*Figure 3.2: Average prices for 45Mbit/s IP transit at Band-X London*

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<sup>3</sup> For example, see Financial Times "Too much fibre to digest" June 28 2001

<sup>4</sup> Band-X is an online trading exchange for telecommunications capacity, with marketplaces trading IP transit capacity in London, Paris, Amsterdam, New York and Hong Kong.



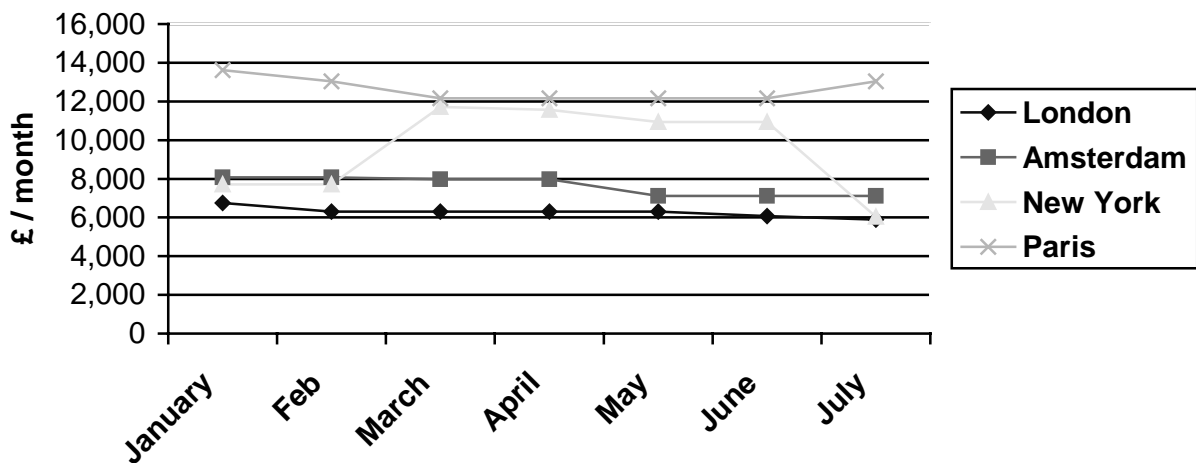
source: Band-X

*International comparisons*

3.15 Figure 3.3 shows the lowest prices for 45Mbit/s IP transit at London, Paris, New York and Amsterdam Band-X exchanges. Again, whilst not necessarily providing an accurate picture of the whole market, they appear to provide a reasonable guide to relative prices. They seem to show that the UK compares favourably with other European countries and the US.

3.16 In summary, prices seem to have gone down substantially in recent times, which may be part of a downward trend that has continued for some time. At the same time, costs for connectivity are likely to be falling as new technologies and economies of scale are exploited. However the active competition in price which seems to be taking place, supported by the low cost of acquiring information on prices in trading exchanges such as Band-X, suggests that excess profits can be competed away rapidly and that prices are around the competitive level.

Figure 3.3: Lowest prices (£/month) for 45 Mbit/s IP transit at Band-X exchanges (January-July 01)



source: Band-X

### ***Range of services / choice***

3.17 There is no opportunity for differentiation of Internet connectivity services in terms of scope, as connectivity has to be provided to the whole Internet to be of any value. However, there is significant choice in network performance and reliability and, to a lesser extent, in interconnect locations.

3.18 Network performance, ie latency and throughput, and reliability are key criteria when choosing a supplier of Internet connectivity. They are dependent on the extent, capacity, utilisation and design of the backbone operator's network, and upon the peering arrangements in place with other operators. Customers may also exercise choice depending on the geographic area being accessed. For example, a backbone operator with very good European connectivity rather than high US capacity, may be preferred if the majority of the customer's traffic is for European destinations. In general there will be a quality / price trade off.

3.19 Internet backbone operators normally offer interconnection points at major Internet exchange points. Most commonly these are located in the Docklands area of London, however interconnection is increasingly being offered at Manchester, Glasgow and other regional centres. For an ISP with a strong regional bias, interconnection at other locations may be attractive.

**Question 5** *Do you agree that customers (ISPs) have a good choice of competitively priced products?*

### **Consumer behaviour**

#### ***Access to information***

3.20 Most firms supplying Internet connectivity publish the extent and capacity of their IP networks therefore facilitating an ISP's choice of suppliers. Some also publish information on their network performance, for example as round-trip times to US or European sites.

3.21 The performance of Internet backbone networks can also be directly tested using standard Internet tools to measure the number of hops and delay in reaching Internet destinations. Band-X maintains a quality index based on the actual tested performance of all the suppliers connected to its trading exchange.

3.22 End users can obtain information about the network performance of ISPs from magazines such as Internet magazine. These typically test the time taken to access a number of popular web sites using different ISPs.

**Question 6** *Do you agree that customers (ISPs) have access to sufficient information about suppliers and that they are able to take advantage of this information?*

### ***Switching***

3.23 Suppliers of IP transit often offer their services at neutral locations where there are a number of other suppliers present, sometimes known as Internet Exchange Points (IXP). If a customer is purchasing transit at one of these locations, it should be relatively straightforward to switch to another co-located supplier. For example, customers of the Band-X IP transit

trading exchange can switch suppliers on a monthly basis without re-negotiating contracts or re-configuring their equipment.

3.24 However, Internet connectivity is often sold as part of a package of services, such as Virtual ISP or fixed Internet access. In this case, the customer could switch supplier of the whole package, but there may be barriers to switching of the other components. For example, there may be an installation cost associated with a leased line between the customer's premises and the supplier's Internet backbone. Alternatively, switching only the Internet connectivity component may be inconvenient or difficult as the customer then has two suppliers and has to rely on them interconnecting successfully.

3.25 In summary, although there may be some switching barriers when the Internet connectivity is bundled, switching suppliers of wholesale IP transit, ie Internet connectivity on its own, should be straightforward.

**Question 7** *Do you agree that switching suppliers of Internet connectivity is straightforward?*

**Question 8** *To what extent does the bundling of Internet connectivity introduce switching barriers and are these barriers a threat to the effectiveness of competition in Internet connectivity?*

## **Conclusions**

3.26 In summary, although only limited information is available, the indicators examined above suggest that:

- Wholesale prices are falling and seem to be competitive compared to Europe.
- Operators appear to be competing on quality and both ISPs and end users have access to network performance information.
- Bundling with other products may introduce some switching barriers, however switching between wholesale IP transit suppliers appears straightforward.
- Although incomplete, the data provided seem to suggest that no one operator enjoys a strong position in the market in terms of volumes.
- Although there are factors that limit entry, there has been recent entry and there are a considerable number of active suppliers.
- Price levels do not seem to indicate presence of excess profits.
- No operator appears to have market power.

3.27 Therefore, based on the indicators examined, Oftel's initial view is that the UK market for Internet connectivity is effectively competitive. Where the ability to switch suppliers for bundled services could be restricted, Oftel will pay particular attention to ensure that operators are not able to lever market power from other markets into Internet connectivity.

**Question 8** *Do you agree that even though the evidence is incomplete, it is sufficient to conclude that competition in the market for Internet connectivity is effective and that no operator has market power?*

## **Chapter 4 - Conclusion and levels of regulation**

### **Conclusions**

4.1 Oftel's initial view is that the market for Internet connectivity, as defined in Chapter 2, and based on the analysis in Chapter 3, is effectively competitive. It will however continue to monitor for significant increases in concentration or leverage from related markets.

### **Levels of regulation**

4.2 Oftel's strategy provides a framework to ensure appropriate regulation is achieved, adjusted to the level of competition in the market and focused on the area of concern. Although Oftel's initial view is that Internet connectivity is effectively competitive, the conclusions of this review will not be sufficient on their own to reach a decision regarding BT's request for de-regulation of wholesale dial-up Internet access services.

4.3 Therefore, Oftel intends to use responses to this review together with its review of dial-up Internet access, to inform its decision in respect of BT's request. Depending on the conclusions of both reviews, Oftel may undertake a formal consultation on any changes that need to be made to BT's licence to relax these and other regulatory obligations with respect to wholesale dial-up Internet access services.

4.4 Although Internet connectivity is an input to other forms of Internet access services, for example those using ADSL and leased line access, and web hosting (as discussed in Chapter 2), Oftel does not intend to consider levels of regulation with respect to Internet services other than dial-up Internet access. The relative immaturity of other access mechanisms such as xDSL and cable modems, and the need for ensuring consistency and depth of analysis mean that it is appropriate for this review to focus on dial-up access only.

## Chapter 5 - Next steps and the consultation

### Details of consultation

5.1 Please supply your comments on this consultation document. The deadline for responses is the 30 October 2001. This date coincides with the deadline for responses to Oftel's related effective competition review of dial-up Internet access. There are strong advantages in finishing both consultation periods at the same time because any decision regarding regulatory changes will be dependent on the conclusions of both reviews.

5.2 Oftel believes that this consultation is of most relevance to a relatively small well informed audience comprising operators providing Internet connectivity services and Internet Service Providers who buy these services. As a consequence, Oftel believes that those with most interest in the review will be in a position to respond to the consultation within a time period which is shorter than our normal 12 weeks. Consumer groups may not be so familiar with Internet connectivity as it is a wholesale service underpinning the wider retail Internet market. Oftel is not actively seeking views from consumers on this market, although we will of course consider any representations made. Oftel is however actively seeking consumer views on retail services in its effective competition review of dial-up Internet access.

4.7. On this occasion, Oftel is not inviting stakeholders to make detailed comments on the responses of others. However, in the interests of transparency, all non-confidential responses will be published.

4.8. Comments should be made in writing and where possible sent by e-mail to [justin.moore@oftel.gov.uk](mailto:justin.moore@oftel.gov.uk). However, copies may also be posted or faxed to the address below. If any stakeholders are unable to supply their comments in one of these ways, please use the contact details below to discuss alternatives.

Justin Moore  
Regulatory Policy  
Oftel  
50 Ludgate Hill  
London, EC4M 7JJ

Fax: 020 7634 8975  
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5.3 Responses will be published on Oftel's website in the *Publications* section under '*Responses to Oftel consultations*' except where respondents indicate that the response, or part of it, is confidential. Respondents are therefore asked to separate out any confidential material into a clearly marked annex. In the interests of transparency, respondents are requested to avoid confidential markings wherever possible. Appointments to view written comments in Oftel's Research and Information Unit must be made in advance (see contact details below).

## **Internet**

5.4 This document is available on Of tel's website at [www.of tel.gov.uk](http://www.of tel.gov.uk). (Hard copies are also available from Of tel's Research and Information Unit).

5.5 Of tel has a free e-mail based mailing list to help people stay informed about the work that Of tel is doing. Each time an Of tel document is published and placed on Of tel's website at [www.of tel.gov.uk](http://www.of tel.gov.uk), subscribers to the list receive an e-mail informing them about the document. To register, please go to the *What's New* section of the website and link to the electronic form.

## **Alternative formats**

5.6 Copies of this consultation document are available on disk. Accessible formats such as large print, Braille and audio cassette can be made available on request. Please contact the Of tel Research and Information Unit on 020 7634 8761 or by e-mail at [info cent@of tel.gov.uk](mailto:info cent@of tel.gov.uk) for more information.

## **Summary of questions**

### ***Chapter 2***

Q1 Do you agree with Of tel's definition of the Internet connectivity market?

### ***Chapter 3***

Q2 Do you agree that despite limited information, this analysis provides a fair assessment of the relative position of operators in this market?

Q3 Do you agree that there appear to be no insuperable barriers to entry and new entrants may be able to enter the market by using spare capacity on existing networks?

Q4 Do you agree that there appears to be active competition in terms of quality, innovation and efficiency?

Q5 Do you agree that customers (ISPs) have a good choice of competitively priced products?

Q6 Do you agree that customers (ISPs) have access to sufficient information about suppliers and that they are able to take advantage of this information?

Q7 Do you agree that switching suppliers of Internet connectivity is straight forward?

Q8 To what extent does the bundling of Internet connectivity introduce switching barriers and are these a threat to the effectiveness of competition in Internet connectivity?

Q9 Do you agree that even though the evidence is incomplete, it is sufficient to conclude that competition in the market for Internet connectivity is effective and that no operator has market power?

## **The consultation criteria**

5.7 Oftel considers that this document meets the Cabinet Office code of practice on written consultation documents. The code is reproduced below for convenience. If you have any comments or complaints about this consultation process please contact:

Oftel Co-ordinator for the code of practice:

Rob Jex

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50 Ludgate Hill

London

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tel: 020 7634 5340

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- 1) Timing of consultation should be built into the planning process for a policy (including legislation) or service from the start, so that it has the best prospect of improving the proposals concerned, and so that sufficient time is left for it at each stage.
- 2) It should be clear who is being consulted, about what questions, in what timescale and for what purpose.
- 3) A consultation document should be as simple and concise as possible. It should include a summary, in two main pages at most, of the main questions it seeks views on. It should make it as easy as possible for readers to respond, make contact or complain.
- 4) Documents should be made widely available, with the fullest use of electronic means (though not to the exclusion of others), and effectively drawn to the attention of all interested groups and individuals.
- 5) Sufficient time should be allowed for considered responses from all groups with an interest. Twelve weeks should be the standard minimum period for consultation.
- 6) Responses should be carefully and open-mindedly analysed, and the results made widely available, with an account of the views expressed, and reasons for decisions finally taken.
- 7) Departments should monitor and evaluate consultations, designating a consultation co-ordinator who will ensure that all the lessons are disseminated.

## **Annex A**

### **Effective competition indicators**

<b>Indicator</b>	<b>Criteria</b>
<b>Consumer outcome</b>	<p>UK consumers shown to enjoy 'best or near best deal' in comparison with consumers in similar economies</p> <p>A wide range of services available to UK consumers Consumers satisfied with the quality of service they receive</p> <p>Sets of prices which broadly reflect underlying costs (ie absence of persistent excessive profits)</p>
<b>Consumer behaviour</b>	<p>Consumers able to access information to help make effective choices</p> <p>Consumers confident/ knowledgeable in using information and in taking advantage of market opportunities</p> <p>Absence of barriers to consumers switching suppliers</p>
<b>Supplier behaviour</b>	<p>Active competition in price and quality and innovation</p> <p>Absence of anti-competitive behaviour</p> <p>Absence of collusion</p> <p>Meeting consumer needs</p> <p>Efficient provision of services</p> <p>Recent entry</p>
<b>Structural</b>	<p>Limited entry barriers which would make the threat of entry a competitive discipline</p> <p>Absence of inefficient suppliers</p> <p>Limited ability of operators with market power in related markets (through vertical or horizontal integration) to lever this market power into the market segment being reviewed</p> <p>Changes in market structure over time, especially a tendency to reduce concentration.</p>

## Annex B

### UK suppliers of Internet connectivity

This annex provides a non-exhaustive list of firms supplying services that include Internet connectivity within the UK. It excludes firms that only resell capacity.

Provider	Network coverage
360networks	360networks is constructing a network to link 11 European countries, to provide long-haul connectivity among 35 European cities and to extend 18 000km by mid-2001. The company is buying 330km of dark fibre strands on rings in six cities: Geneva, Lyon, Marseilles, Milan, Paris and Strasbourg.
AboveNet	
BT Ignite	A GBP4 billion investment is due in 2000–2003 to extend the existing 50 000km pan-European IP backbone by 20 000km, using Cisco 12000 series routers to provide multiple 10Gbit/s trunks. The network covered Denmark, Ireland, Norway, Spain and Sweden by January 2001.
Cable & Wireless	CWG is currently investing around USD1.5 billion in its network. The backbone is being connected with 11 000 miles of dark fibre, integrating national IP networks. The company aims to have a total of 200 European POPs in operation by 2002, on a network reaching more than 40 cities in 13 countries. In the first half of 2000, the company acquired 22 ISPs, so providing itself with local presence and customer bases in 12 European countries. Collectively, eight of the ISPs had 123 POPs.
Carrier1	Carrier1 operates a pan-European fibre network connecting 12 countries, extending over 10 000km and connecting POPs in 20 European cities. It is in the process of constructing six city ring fibre networks and plans to build at least another 14 in 2000–2001.
COLT Telecom	
Concert	The existing 2.4Gbit/s backbone network covers 21 cities in 17 countries. AT&T and BT have said they will invest USD3 billion in the Concert joint venture to 2005, in order to build an IP backbone linking about 60 cities by the end of 2000, and about 100 cities outside the USA and the UK by the end of 2001.
Deutsche Telekom	Deutsche Telekom currently operates a nationwide IP backbone in Germany with 74 nodes. Following the end of its partnership with Global One, the company announced plans to invest DEM4 billion over five years on its own pan-European fibre networks, aiming to install 90 POPs in 40 countries and 150 000km of fibre.
EasyNet	
Energis	Energis operates 6500km of fibre-optic network in the UK and a continental European backbone network of 12 000km, linking 18 POPs.
France Telecom	France Telecom is in the process of constructing a new European backbone network, which is due to stretch 20 000km and connect

	40 POPs in 16 European countries by the end of 2001. It will interconnect with other national and regional networks, giving total coverage of 250 European cities and access to the networks of France Telecom's Equant and Global One subsidiaries.
Global Crossing	Global Crossing operates a backbone network serving cities in Belgium, France, Germany, Italy, the Netherlands, Switzerland and the UK. Gateways in Whitesands, UK, and Beverwyjk in the Netherlands connect the network with GTS's Atlantic Crossing 1 (AC-1). The company intended to expand its VoIP backbone to 15 additional US cities as well as to Amsterdam, Brussels, Copenhagen, Frankfurt, London and Paris by the end of 2000.
GTS	GTS operates a network consisting of three major components: a pan-European IP-optimised backbone (incorporating the former Hermes Europe Railtel network); a number of fibre-optic MANs in Western and Eastern Europe; and Gemini AC-1, a transatlantic backbone cable. The backbone network extended 17 500km at May 2000.
Interoute	Interoute is constructing a 20 900km pan-European IP network that will link 70 European cities in 17 countries and will have 200 POPs. The first phase of the network, due for completion in mid-2001, will consist of eight rings connecting 46 cities in nine European countries with 18 000km of cable. There are plans to migrate all circuit-switched voice traffic onto the new network by the end of 2001.
KPNQwest	KPNQwest is in the process of constructing a pan-European fibre-optic backbone, based on seven EuroRings and connected via a transatlantic link to Qwest's network in North America and Asia. The EuroRing network, when complete, will reach approximately 20 000km and will link 59 business centres in Western, Central and Eastern Europe. It will have around 450 POPs throughout the region.
Level 3	Level 3 is constructing a three-ring European inter-city IP network using SONET-ring architecture and DWDM running at STM-1 and above. Ring 1 covers 1800 miles and links gateways in Amsterdam, Brussels, Frankfurt, London and Paris; Ring 2 is the inter-city loop through Germany; Ring 3 will add an additional 1300 miles. On completion, the total network will link 13 local city networks and extend 5300km.
NETs (Tiscali Group)	
NTL	
PSINet	A long-term network upgrade is currently underway in Europe, replacing PSINet's E3 infrastructure with STM-1 and above. The final IP backbone network will reach over 21 000km and link at least 30 major European cities.
Tele globe	The company's pan-European network reached around 7700km by the end of 2000. Its network construction programme involves building a number of DWDM, fibre-optic rings. By the end of 2000

	Teleglobe was aiming to connect 30 European metropolitan areas with 26 000km of fibre.
Telenor	A pan-European IP network (Nextbone) directly connects Oslo via STM-1s to Frankfurt, New York and Stockholm. Connections at Frankfurt and Stockholm link the STM-1 network to three European rings with 45Mbit/s capacity. The largest connects Amsterdam, Frankfurt, London and Stockholm. The two smaller rings connect Copenhagen, Helsinki and Stockholm, and Frankfurt, Milan and Zurich. A further 45Mbit/s extension to Paris is planned.
Telia	Telia operates a 30 000km IP network covering 15 European countries. Its core 'Viking Ring' backbone network came into operation in early 1999, and links Frankfurt, Hamburg, London, Paris and Stockholm. In June 2000, Telia announced that it will construct a new 1400km OC-192 element to the 'Viking Ring' in western France.
Thus/Demon	
WorldCom/UUnet	WorldCom operates a wholly owned pan-European network spanning over 12 800km. WorldCom's subsidiary UUNET operates an IP network within Belgium, France, Germany and the Netherlands. The network reaches over 200 POPs.

Source: Analysys/Oftel

## Annex C

### Glossary

**ADSL (Asymmetric Digital Subscriber Line)** - a technology that allows the use of a copper line to send a large quantity of data in one direction and a small quantity in the other.

**Bandwidth** – the physical characteristic of a telecommunications system that indicates the speed at which information can be transferred. In analogue systems, it is measured in cycles per second (Hertz) and in digital systems in binary bits per second. (Bit/s).

**Barriers to entry** – an additional cost which must be borne by entrants but not by firms already in the industry; or other factors, which enable an incumbent to maintain prices above the competitive level without inducing entry.

**BT** - British Telecommunications plc.

**Call origination** - provided by the network operator with access to the customer. Originating operators provide customers with access to the network for fixed telephony and Internet access.

**Dense Wavelength Division Multiplexing (DWDM)** A technology that uses multiple lasers and transmits several wavelengths of light simultaneously over a single optical fibre. Such systems can provide more than a terabit per second of data transmission on one optical fibre.

**Internet Call termination** - the link between the originating network and an Internet Service Provider

**Consumer** - residential and business customers

**Dominant** – a dominant firm is one that is able to act largely independently of its competitors and customers in terms of pricing or output decisions. Dominance has to be assessed within the context of an analysis of the degree of competition within a relevant market.

**Ecommerce** - The action of buying online or establishing an online store-front. Also, using technology to speed up and make more efficient the transaction of commerce at all stages of the process from production to delivery.

**End-user / user** - A person using or requesting publicly available telecommunications services.

**Interconnection** – the physical and logical linking of telecommunications networks used by the same or a different organisation in order to allow the users of one organisation to communicate with users of the same or another organisation, or to access services provided by another organisation. Services may be provided by the parties involved or other parties who have access to the network.

**Internet** - a global network of networks that use Internet Protocol

**Internet connectivity** - the ability to access any destination on the Internet from a point of interconnection with an Internet backbone

**Internet service provider** – a company that provides individuals and other companies access to the Internet and other related services.

**IP (Internet Protocol)** - packet data protocol used for routing and carriage of messages across the internet.

**IXP (Internet Exchange Point)** – Also known as NAP (**N**etwork **A**ccess **P**oint). A junction point where major Internet service providers and backbone operators interconnect with each other.

**Kbit/s** - Kilo (thousand) bits per second. A measure of the speed of transfer of digital information.

**Market power** – the ability to raise prices above the competitive level for a non-transitory period. See also dominant.

**Mbit/s** - Mega (million) bits per second. A measure of the speed of transfer of digital information.

**Network operator** - the operator of a telecommunication network with a *Public Telecommunication Operator (PTO)* licence, which provides, amongst other things, network services.

**PSTN** – Public Switched Telephony Network.

**Service provider** – provider of telecommunication services, or services with a telecommunication service component, to third parties whether over its own network or otherwise.

**SME** - Small and Medium Enterprise.

**Substitutability** – whether an increase in the price of one product would lead consumers to switch to other competing products or services (demand-side substitutability) or lead producers to switch rapidly into the supply of the good in question (supply-side substitutability).

**Telecommunications** – conveyance of speech, music and other sounds, visual images or signals by electric, magnetic, electro-magnetic, electro-chemical or electro-mechanical means.