

Local Loop Unbundling for Broadband competition

Response to the TRAI Consultation Paper on Accelerating Growth of Internet and Broadband Penetration

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The TRAI Consultation Paper on Accelerating Growth of Internet and Broadband Penetration, November 28, 2003 raises questions about the role of Local Loop Unbundling for broadband deployment using DSL (pages 40-41, questions 4-12). This paper surveys the international experience in the design and implementation of Local Loop Unbundling.

The major conclusions of this paper are:

Currently DSL and cable modem are the major broadband platforms. DSL accounts for almost 70% of broadband connections in Europe and Asia-Pacific and 40% in North America. DSL is expected to continue to be the dominant platform for broadband delivery across the world.

Access to the local loop is critical for DSL. Given the significant dominant position of the ex-monopoly incumbent operator, local loop unbundling is generally considered necessary for competition in broadband provision. While LLU is necessary for broadband competition it has the potential for discouraging new investment in broadband by allowing rivals to free ride on investments by incumbent. Appropriate LLU policy must balance the two interests of competition and incentive for investment.

Local Loop unbundling is unlikely to be easy to implement because of the need for competitors to co-operate. LLU requires operational co-ordination between the incumbent and new entrants regarding such processes as ordering, provisioning, billing, fault handling and service-level agreements. Agreement is also required in areas such as pricing, collocation and spectrum management on broadband local loops. Operational co-ordination and other agreements can be facilitated through self-regulatory frameworks or detailed intervention by regulators. The role of the regulator in arbitration remains essential. Given the pace of technological developments local loop unbundling rules and regulations may have to be frequently revised and updated. The regulator also has to continuously monitor the progress of LLU and prevent the incumbent from engaging in anti-competitive practices.

In the case of India, given the unorganized nature of the cable network in the country, DSL over copper has the greater potential for broadband provision in India, at least in the short term. The incumbent operators, who own most of the copper local loop, have not utilized this potential in any significant manner so far. While it is possible that this reflects their assessment of the viability of broadband provision, it is quite likely that this is the result of lack of competition. A large number of countries across the world have adopted local loop unbundling, mainly for competition in broadband. While the report of the task force on Internet growth² did not explicitly recommend local loop unbundling it did recommend that the basic services operators provide:

1. Co-location of ISP equipment in telephone exchange premises on commercial negotiation basis.
2. Innovative technical solutions like simultaneous voice and Internet services over wired as well as wireless local loop to enable cheaper and faster Internet access over PSTN lines.

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Views are personal.

² Report of the Task Force in Growth of the Internet in the country, TRAI, August 2002, page 11

The BSO response that "Co-location is not normally being provided by BSOs as it is difficult to extend the facilities to all ISPs non-discriminatively (sic). Also the agreements for hired buildings by BSOs, does not permit sub-lease."³ is as expected. Regulators in many countries have faced similar responses and have worked with the incumbent operator to resolve these problems.

The second key regulatory action is to allow domestic voice-over-IP or 'Internet telephony'. In any case this prohibition is inconsistent with a 'unified license' regime. More importantly, there is a mutually reinforcing relationship between IP telephony and broadband. IP telephony needs broadband for quality of service and broadband needs IP telephony as an application which has a ready demand and which does not require the provision of content.

This paper is organized as follows.

Section 1 documents the emergence of the two major broadband delivery platforms – DSL and cable - and the likely future evolution of these and other platforms.

Section 2 presents the rationale, design and issues in implementation of local loop unbundling for broadband competition via DSL.

Section 3 looks at the implementation of local loop unbundling in Europe, the US, Japan and recent decisions by New Zealand and Malaysia to introduce Local Loop unbundling.

Section 4 presents four case studies of actual and potential anti-competitive practices in broadband and Internet provision using local loop unbundling.

³ Appendix 1 Table 1.1, Consultation Paper on Accelerating Growth of Internet and Broadband Penetration,

1. Broadband delivery platforms

DSL and cable are the two major broadband delivery platforms. Overall share of DSL is about 60% with 40% share in the Americas and 70%-75% share in Europe and Asia-Pacific

Thousands of lines at 30 June 2003

Country	DSL	Cable modems etc	Total	% DSL
World total	46,683	30,358	77,041	61%
Americas	10,606	16,084	26,691	40%
USA	7,576	13,367	20,943	36%
Canada	1,868	2,259	4,127	45%
EMEA	13,441	4,432	17,874	75%
Germany	3,865	65	3,929	98%
France	2,039	341	2,380	86%
UK	1,072	1,094	2,165	49%
Spain	1,302	305	1,607	81%
Italy	1,435	0	1,435	100%
Netherlands	543	695	1,238	44%
Asia-Pacific	22,635	9,841	32,476	70%
South Korea	6,811	4,108	10,919	62%
Japan	8,257	2,224	10,481	79%
China	4,100	2,214	6,314	65%
Taiwan	2,142	287	2,429	88%
Hong Kong	629	478	1,107	57%
Australia	259	211	470	55%
Singapore	192	92	284	68%
India	30	127	157	19%

Source: Point Topic Ltd 2003

Of all the Top Ten broadband countries only the USA and Canada have clearly more cable modems than DSL lines. (The numbers are about equal in the UK.) Cable has wider coverage in the USA and Canada than in most other countries, and cable operators compete more aggressively with the telcos, often offering low-speed, low -cost entry-level services to attract residential customers.

Only in North America is cable broadband growing faster than DSL. DSL is growing faster than cable almost everywhere else. Exceptions include Germany where cable broadband is still relatively small, and South Korea and Taiwan where DSL may be approaching saturation.

1.1 Broadband in OECD⁴

Cable companies, rather than incumbent telecommunications carriers, have been the leaders in introducing broadband access services to OECD countries. "DSL providers, particularly incumbents, are not innovators but have the ability to compete vigorously and gain significant market share once they decide to enter a market." Once broadband access service has been

⁴ Staff Report of the Office of Strategic Planning and Policy Analysis and International Bureau, FCC, October 2003, "Broadband Internet Access in OECD Countries: A Comparative Analysis"

introduced and proven to be a viable business, incumbent telecommunications carriers have responded by introducing DSL services that provided strong competition to the cable modem services. In many countries, the resulting “duopoly competition” has been effective in generating rapid take-up of broadband.

Sweden is the only country where the main competitors were not cable modem services and DSL. Instead, operators of fiber networks within apartment building using a third platform, Ethernet LANS⁵, are the prime challengers to the telco and cable operators in the provision of broadband service.

In what appears to be an exceptional case, Korea had rules, which required structural separation of cable infrastructure owners and cable service providers. These rules have now been eliminated. When they were in effect, however, they enabled new firms to use cable infrastructure capacity to provide quickly cable modem service and challenge the incumbent telecommunications operator. Another factor in Korea was competition among building owners who used broadband availability to attract residents. While cable broadband service began in 1995, Korea Telecom, the telecom incumbent, entered the broadband market only in 2000. However, in spite of the late start DSL accounted for almost two-third of subscribers in 2002.

1.2 Alternative Broadband Platforms

Broadband deployment using alternative platforms is small. The following table provides data on deployment of alternative broadband platforms in Western Europe (end-2002)

Country	Type of platform	Number of subscribers
Denmark	FWA	1,211
Ireland	FWA	5,600
Ireland	Wide-area WLAN	N/A
Italy	Fiber to the home	110,000
Italy	Satellite	65,000‡
Norway	WiFi & FWA	1,020
Spain	Powerline	3,000
Sweden	Fiber LAN	190,000
United Kingdom	Satellite	4,000
United Kingdom	FWA	2,500
†May include more than one provider; ‡May 2002, one-way satellite only		

FWA: Fixed wireless access

Sources: DotEcon, Informa (2003); ETNO (2003); Netsystem website. As reported in "Competition in broadband provision and its implications for regulatory policy: A report for the Brussels Round Table", by DotEcon and Criterion Economics, October 2003

1.3 Future evolution

A survey⁶ of the broadband market projections of five major forecasters: Datamonitor, Forrester, Idate, IDC and Strategy Analytics revealed certain broad trends. Although there is significant variation in their numbers, some key themes can be identified across the forecasts.

⁵ “Ethernet LANS,” refers to a common arrangement in Sweden where a local area network (LAN) on a residential property is linked to the Internet infrastructure through a city or regional fiber network. The residential LAN, which is not normally a fiber network, is based on Ethernet technology, and connects to individual homes on the property.

⁶ "Competition in broadband provision and its implications for regulatory policy: A report for the Brussels Round Table", by DotEcon and Criterion Economics, October 2003

These can loosely be termed the ‘central scenario’ for platform competition in the European broadband market.

- *DSL* will remain the leading delivery platform across Europe. It will also gain ground in countries where it has lagged cable, especially the United Kingdom, where limited rollout (51% of homes passed) will constrain the relative growth prospects of cable.
- *Cable* will experience strong subscriber growth across Europe (with the exception of Italy). Although it will lose market share generally to DSL, its is expected to expand its share in a number of countries where DSL has hitherto been overwhelmingly dominant. For example, Strategy Analytics projects cable market share to increase from 2% to 35% in Germany and 16% to 37% in France, from 2002-08.
- *Fiber* will be the leading alternative delivery platform, with significant rollout in urban areas in a number of EU states. For example, Idate projects that the market share of metro ethernet (fiber) across Western Europe will triple to 6% in the five years to 2007. Although pure fiber platforms are not expected to break the hold of cable and DSL over the medium term, the picture is somewhat blurred as many new cable and DSL upgrades will involve installing fiber closer to the home.
- *Other* fixed access delivery platforms are not expected to have a mass-market role. Satellite and FWA are expected to consolidate their positions as niche technologies, serving rural and business markets respectively. The forecasters do not expect powerline to take off.

2. Issues in Local Loop Unbundling

Local Loop unbundling requires extensive co-ordination and negotiations between the incumbent and potential users of the local loop. Some form of price regulation will also be required given the monopoly position of the incumbent.

2.1 Types of Local Loop Unbundling⁷

The local loop refers to the telecommunication circuit, usually pairs of copper wire, between the user’s premises and the telecommunications operator’s main distribution frame (MDF). Local loop unbundling (LLU) refers to the process, in which incumbent carriers lease, wholly or in part, the local segment of their telecommunications network to competitors.

Unbundling, as a policy, is built on the recognition that incumbent carriers have a dominant position in the provision of local communication access by virtue of their control over the local loop. The local loop is often considered as an essential facility that cannot be economically replicated by alternative operators. This position of dominance has resulted from the many years during which incumbents had a monopoly in the provision of telecommunication infrastructure and voice telephony services. Despite liberalization of telecommunication markets, it has proven extremely difficult in most countries to reduce the bottleneck control of incumbents over the local loop and access to this loop. The market power of incumbents can vary in different geographic and service markets. Details of unbundling policies may therefore vary according to market conditions.

Although LLU began as a policy to promote competition in local telephony, recently it has received attention because of its role in stimulating broadband development in a number of countries. The emergence of Internet services highlighted the importance of access to the local loop since Internet service providers (ISPs) have to depend on local network providers to access customers. With the emergence of high-speed Internet access (broadband) based on

⁷ Developments in Local Loop Unbundling, Working Party on Telecommunication and Information Services Policies, OECD, DSTI/ICCP/TISP(2002)5/FINAL, 10-Sep-2003

the public switched telecommunication network – mainly asymmetric digital subscriber line technology (ADSL) – the question of access to local network infrastructures has moved to the forefront of policy agendas. ADSL technology converts pairs of copper wire telephone lines into high-speed digital lines.

Local loop unbundling can be classified into three main types:

1. Full unbundling (or access to “raw copper”).
2. Line sharing or shared access.
3. Bitstream access.

The application of LLU varies across countries. For example, in the US network unbundling includes sub-loops, switching, and operations support systems (OSS), whereas European countries basically focus on loops.

Full unbundling (sometimes referred to as access to raw copper) occurs when a new entrant leases the copper pairs, connecting a subscriber to the MDF, by the incumbent. The new entrant takes total control of the copper pairs and can provide subscribers with all services including voice. The incumbent still maintains ownership of the unbundled loop and is responsible for maintaining it.

Line sharing allows the incumbent to continue to provide telephone service while the competitor provides broadband (xDSL) services on the same copper pair. With line sharing, the competing supplier uses the non-voice frequency of the loop. Consumers can obtain broadband service from the most competitive provider without installing a second line. A primary difficulty of line sharing has to do with technical interface problems such as interference.

Bitstream access provides ISPs with a wholesale xDSL product from the incumbent. With bitstream access, the incumbent maintains control over the subscriber’s line but allocates spectrum to an access seeker. Unlike full unbundling and line sharing, the access seekers can only supply the services that the incumbent designates.

Bitstream access implies less competition than full unbundling and line sharing as there is no competition at the physical layer and there is no incentive for the incumbent to deploy new technology. With bitstream access, spectrum management between operators is unnecessary because it is handled completely by the incumbent. While bitstream access has been considered as a form of unbundling, there are some countries that do not view bitstream access as coming within the scope of unbundling policy. It is treated merely as interconnection arrangement. There are also a number of countries that have not introduced this form of access at all.

According to one set of views unbundling reduces the incentives for network owners to make risky investments in new facilities or platforms because they allow entrant-arbitrageurs to drive prices quickly to costs if the platform investment is successful. If the platform is unsuccessful then the network owners suffer the losses in sunk facilities. The adverse investment incentives are considered worse in the case of mandated bitstream access because the entrant can offer advanced, broadband services with little or no investment, while line unbundling requires some investment in equipment and network facilities. Bitstream access provides the entrant with immediate and virtually unlimited ability to engage in arbitrage, bidding away high-valued customers without having to underwrite the risks of investing in network facilities.

2.2 Steps for implementing LLU

LLU requires close co-operation between access seekers and incumbents. Because such co-operation is difficult to impose through regulation, self-regulatory frameworks, which encourage all market players to reach agreement on the different technical and commercial aspects of LLU, are important. In some cases, the extent of conflicting interests in LLU is too

great to be able to rely on a voluntary regulatory mechanism in the market. Therefore, adequate arbitration mechanisms are also critical for implementation of LLU.

For example, in the UK OFTEL identified the following issues that needed to be resolved before LLU could be successfully introduced:⁸

Quality of the circuit

Loops sold need to meet a given quality standard to enable them to be successfully upgraded and used to deliver higher bandwidth services. This quality level is measured in terms of a number of characteristics, which may include the length of the loop, its tendency to radiate unwanted emissions and the material from which it is composed (e.g. copper). The NICC group, an advisory body to OfTel on technical matters, developed the appropriate quality standard.

Spectral management

Because operators can place different types of equipment on the loop to provide higher bandwidth, there is a risk that crosstalk between the equipment could cause mutual interference. This risk can be minimized by specifying a spectral management plan and deployment process for the attachment of equipment onto the loop. The NICC DSL task group developed a precise plan and deployment processes, and guidelines for operators to follow when upgrading.

Provisioning of the circuit

It was expected that to provide the loop, BT would in most circumstances be able to make use of 'spare pairs' in its access network, just as it did when customers requested a second telephone line in their homes. In some cases, where no spare pair was available and the customer did not wish to transfer all service from the current line, line sharing would be necessary.⁹

Provision of data

In order to enable operators to plan their rollout, BT would need to provide to other operators information on the location of their local telephone exchange buildings and the precise areas they serve. BT will also need to provide, on request, feasibility data for each proposed circuit so that operators can assess whether they are likely to be able to provide a given customer with DSL.

License condition

A new condition needed to be inserted in BT's license that sets out the services that BT will need to provide and any relevant conditions. The insertion of a new condition in BT's license would also enable OfTel to set out a clear pricing regime for the service.

Contractual arrangements

As with other leased circuits, the unbundled loop would remain part of BT's network, and be managed and maintained by BT. Therefore, the contract between BT and operators taking the service would cover in detail BT's obligations to test the line, correct line faults and maintain the quality of the line at a given level. Equally there would be contractual obligations on the operator using the service to adhere to the spectral management plan and deployment processes to prevent cross-talk between lines. BT would be entitled to disconnect any operator infringing these requirements. Details of the contractual arrangements were worked out by the Operator Policy Forum (OPF) focus group

Collocation

Collocation is one of the more important steps in implementing LLU. Incumbents are required to provide technical resources and the connection of technical equipment to access seekers. Incumbents may claim, rightly or wrongly, that their exchange space is limited or

⁸ Access to Bandwidth: Delivering Competition for the Information Age, A statement issued by the Director General of Telecommunications, OFTEL, November 1999

⁹ Initially, OFTEL provided for only full unbundling but later on also introduced 'line sharing'.

unsuitable for collocation, especially in the case of core business areas. Thus, new entrants often complain about the time taken to deal with their requests. While collocation space is normally allocated on a “first come, first served” basis in most countries, some countries have made some effort to improve the system. For example, OFTEL introduced a voting system called the “bow wave process”.

2.3 Pricing issues

The pricing issues in LLU are similar to those in interconnection or access pricing. Opinions on contentious issues such as forward looking versus historical costs, rates of depreciation, cost of capital and allocation of costs tend to be polarized between incumbents and rivals - with the former favouring alternatives which result in higher prices and the latter alternatives which result in lower prices. The regulator charts a middle path with several specific compromises and an eye on the final number. One outcome of this process is large differences in rates that cannot be justified on the basis of objective differences in conditions.

For example, in the case of EU countries¹⁰ "the variations in the level of unbundling charges also seems to suggest inappropriate pricing methodologies, and cannot be explained merely in relation to differences in population distribution or the actual cost of network elements. This seems to be particularly true with regard to shared access. It appears that the allocation of the costs of shared access is done in a number of different ways in the EU, and it has been difficult to establish whether the tariffs are truly cost-oriented or whether the costs have been correctly attributed."

In addition, "There are a large number of different retail, wholesale bitstream and resale offers for xDSL services in the Member States, with varying combinations of data rates and other technical conditions, with the result that it is very difficult to compare price levels in the EU. In fact the variation and complexity of these offers are in themselves a factor in inhibiting the development of competition, and in some cases it is hard for operators and NRAs to determine if there is a price squeeze between wholesale and retail products."

3. Local Loop Unbundling Implementation

While local loop unbundling has been introduced in most of the major telecom markets across the world, progress has varied across markets.

3.1 Take-up of LLU in Europe

Of the total country DSL lines the incumbents provide about 94% and the balance 6% is accounted for by unbundling and line sharing. 80% of the DSL connections provisioned by incumbents are also retailed by incumbents or an affiliated subsidiary. A further 18% are provided as bitstream connections to other ISPs. According to ECTA¹¹, only a minority of these are provided in such a way (e.g. ATM interconnect) that new entrants can control the technical characteristics of the bitstream access. This is impeding more substantial product differentiation by entrants.

However, a contrary view is presented in a recent report¹² according to which, in many EU states availability of bitstream and wholesale access at relatively low regulated prices may be

¹⁰ Commission of the European Communities, Eighth Report from the Commission on the Implementation of the Telecommunications Regulatory Package, European telecoms regulation and markets 2002, Brussels, 3.12.2002 COM(2002) 695 final

¹¹ European Competitive Telecommunications Association

¹² "Competition in broadband provision and its implications for regulatory policy: A report for the Brussels Round Table", by DotEcon and Criterion Economics, October 2003,

crowding out LLU. In France and the United Kingdom, which have the highest take-up levels of bitstream access and very little LLU take-up, the price increment in the monthly charge for the main wholesale products over full LLU appears very small. On the other hand in some other countries, LLU take up is significant, as access-based entry strategies are limited. For example, no resale or bitstream access is available (Germany); or else it is difficult to obtain (Finland) or has only recently become available (Netherlands, since September 2002). The relatively significant LLU take-up in Denmark and Italy appear to be the result of particularly low LLU access prices compared with the EU average.

ECTA DSL Scorecard, end of June 2003

	'Total country DSL lines	No. of incumbent DSL lines				LLU DSL Lines		
		Total	Retailed by incumbent or its ISP	Provided to other operators/ ISPs		Fully unbundled	Shared access lines	LLU as a % of total lines
				Wholesale DSL product	DSL inter-connection			
Austria	207,750	198,000	160,000	38,000		9,750	0	5%
Belgium	637,982	632,575	551,814	80,761	1,025	3,077	2,330	1%
Denmark	390,693	330,903	321,645	0	9,258	47,912	11,878	15%
Finland	280,000	215,000	206,000	0	9,000	43,500	21,500	23%
France	2,099,933	2,037,000	1,320,000	717,000	20,000	2,659	60,274	3%
Germany	3,850,000	3,600,000	3,600,000	0		230,000	20,000	6%
Greece	359	0	0	0		359		100%
Ireland	5,369	4,445	4,249	196		209	715	17%
Italy	1,529,019	1,375,000	975,000	400,000		154,000	19	10%
Luxembourg	8,970	8,300	8,290	10		670	0	7%
Netherlands	714,746	544,333	544,249	0	84	97,913	72,500	24%
Portugal	109,543	109,248	90,722	18,526		295		0%
Spain	1,303,316	1,293,567	985,053	173,543	134,971	9,749		1%
Sweden	473,395	459,300	341,000	116,000	2,300	5,308	8,787	3%
UK	1,095,600	1,090,000	550,000	540,000		3,600	2,000	1%
Total/Average	12,706,675	11,897,671	9,658,022	2,084,036	176,638	609,001	200,003	6%

3.2 LLU in the US¹³

The US is one of the countries with early start of Local Loop Unbundling. However, it has been subject to numerous legal disputes with several cases being decided in the Supreme Court. This has culminated in the Triennial Review by the FCC and the recent order. This order could not resolve significant differences among the various commissioners and a number of controversial issues have been pushed down to the state regulators for a final decision. The following tables provide information on the provision of high speed internet lines and the extent of unbundling by the incumbents.

¹³ In the Matter of "Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers" etc., Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, FCC, USA, Released: August 21, 2003

US High-Speed Lines by Type of Provider as of December 31, 2002
(Over 200 kbps in at Least One Direction)

Types of Technology	Lines				Percent of Lines		
	RBOC ²	Other ILEC	Non-ILEC ³	Total	RBOC ²	Other ILEC	Non-ILEC ³
ADSL	5,584,776	572,078	314,862	6,471,716	86.3	8.8	4.9
Other Wireline	756,120	144,108	315,980	1,216,208	62.2	11.8	26.0
Coaxial Cable	*	*	11,349,035	11,369,087	*	*	99.8
Other	*	*	761,434	824,538	*	*	92.3
Total Lines	6,401,996	738,242	12,741,311	19,881,549	32.2 %	3.7 %	64.1

Source: Table 5, High-Speed Services for Internet Access: Status as of December 31, 2002, FCC

Reporting Competitive Local Exchange Carriers
(End-User Switched Access Lines in Thousands)

Date	Total End-User Lines	Acquired From Other Carriers				CLEC-Owned	
		Resold Lines		UNEs ¹		Lines ²	Percent
		No.	%	No.	%		
Dec 1999	8,194	3,513	42.9	1,959	23.9	2,723	33.2
Jun 2000	11,557	4,315	37.3	3,201	27.7	4,042	35.0
Dec 2000	14,871	4,114	27.7	5,540	37.3	5,217	35.1
Jun 2001	17,275	3,919	22.7	7,580	43.9	5,776	33.4
Dec 2001	19,653	4,250	21.6	9,332	47.5	6,072	30.9
Jun 2002	21,645	4,478	20.7	10,930	50.5	6,236	28.8
Dec 2002	24,766	4,662	18.8	13,709	55.4	6,396	25.8

Source: Table 3, Local Telephone Competition: Status as of December 31, 2002, FCC

Reporting Incumbent Local Exchange Carriers
(End-User Switched Access Lines in Thousands)

Date ¹	Total Lines	End-User Lines	Provided to Other Carriers					
			Resold Lines	UNEs			Total UNEs and Resold Lines	Percent of Total Lines
				Without Switching	With Switching	Total		
Dec 1997	159,008	157,132	1,743			133	1,876	1.2
Jun 1998	161,810	159,118	2,448			244	2,692	1.7
Dec 1998	164,614	161,191	3,062			361	3,423	2.1
Jun 1999	167,177	162,909	3,583			685	4,268	2.6
Dec 1999	187,294	181,308	4,494	1,004	489	1,493	5,987	3.2
Jun 2000	188,171	179,762	5,098	1,696	1,616	3,312	8,409	4.5
Dec 2000	188,304	177,642	5,388	2,436	2,838	5,274	10,662	5.7
Jun 2001	187,208	174,861	4,424	3,162	4,761	7,923	12,347	6.6
Dec 2001	185,517	172,044	4,014	3,679	5,781	9,460	13,474	7.3
Jun 2002	182,487	167,472	3,475	4,061	7,478	11,540	15,015	8.2
Dec 2002	179,971	162,743	2,744	4,259	10,225	14,484	17,228	9.6

Source: Table 4, Local Telephone Competition: Status as of December 31, 2002, FCC

The US Telecommunications Communications Act 1996 states that incumbent LECs have a duty to:

provide, to any requesting telecommunications carrier for the provision of a telecommunications service, nondiscriminatory access to network elements on an unbundled basis at any technically feasible point on rates, terms, and conditions that are just, reasonable, and nondiscriminatory

The Act also establishes a general federal standard for use in determining the UNEs that must be made available by the incumbent LECs :

in determining what network elements should be made available ... the Commission shall consider, at a minimum, whether – (A) access to such network elements as are proprietary in nature is *necessary*; and (B) the failure to provide access to such network elements would *impair* the ability of the telecommunications carrier seeking access to provide the services that it seeks to offer.

The Commission first addressed the unbundling obligations of incumbent LECs in the *Local Competition Order*, which, among other things, adopted rules designed to implement the requirements of the Act. In addition, the Commission established the Total Element Long Run Incremental Cost (TELRIC) methodology, a forward-looking, long-run, incremental cost methodology, for the states to use in setting actual rates for UNEs.

Following several court verdicts on the Order and its implementation, the FCC in its Triennial Review clarified its position taking into account the direction from the courts, its own experience, and the experience of the telecommunications industry over the last seven years. The FCC noted that:

While unbundling can serve to bring competition to markets faster than it might otherwise develop, we are very aware that excessive network unbundling requirements tend to undermine the incentives of both incumbent LECs and new entrants to invest in new facilities and deploy new technology. The effect of unbundling on investment incentives is particularly critical in the area of broadband deployment, since incumbent LECs are unlikely to make the enormous investment required if their competitors can share in the benefits of these facilities without participating in the risk inherent in such large scale capital investment. At the same time, continued unbundling for the network elements provided over current facilities appears to be necessary in many areas under section 251 of the Act, especially with respect to mass market customers.

The Unbundling requirements are based on the Impairment Standard according to which a requesting carrier is impaired when lack of access to an incumbent LEC network element poses a barrier or barriers to entry, including operational and economic barriers, which are likely to make entry into a market uneconomic. Such barriers include scale economies, sunk costs, first-mover advantages, and barriers within the control of the incumbent LEC. The Commission's unbundling analysis specifically considers market-specific variations, including considerations of customer class, geography, and service.

Mass Market Loops. Incumbent LECs must offer unbundled access to stand-alone copper loops and subloops for the provision of narrowband and broadband services. Subject to a grandfather provision and a transition period, incumbent LECs do not have to provide unbundled access to the high frequency portion of their loops. Incumbent LECs do not have to offer unbundled access to newly deployed or "greenfield" fiber loops or to the packet-switching features, functions, and capabilities of their hybrid loops.

Enterprise Market Loops. Incumbent LECs are no longer required to unbundle OCn loops. Incumbent LECs must offer unbundled access to dark fiber loops, DS3 loops (limited to 2 loops per requesting carrier per customer location) and DS1 loops except at specified customer locations where states have found no impairment

Subloops. Incumbent LECs must offer unbundled access to subloops necessary to access wiring at or near a multiunit customer premises.

Switching for Enterprise Market (defined as DS1 and above). On a national basis, competitive LECs are not impaired without unbundled local circuit switching when serving the enterprise market. However, a more geographically specific record may reveal such impairment in particular markets and thus allow states to rebut this national finding based on certain operational and economic criteria.

Switching for Mass Market (defined as DS0). On a national basis, competing carriers are impaired without unbundled local circuit switching when serving the mass market due to operational and economic barriers associated with the incumbent LEC hot cut process. State commissions are required to approve an incumbent LEC batch hot cut process, or make a detailed finding that such a process is not necessary.

Packet Switching. Incumbent LECs are not required to unbundle packet switching, including routers and Digital Subscriber Line Access Multiplexers (DSLAMs), as a stand-alone network element.

Signaling Networks. Incumbent LECs are only required to offer unbundled access to their signaling network when a carrier is purchasing unbundled switching.

Call-Related Databases. When a requesting carrier purchases unbundled access to the incumbent LEC's switching, the incumbent LEC must also offer unbundled access to their call-related databases and, if the incumbent LEC does not provide customized routing, to operator service and directory assistance (OS/DA) services.

OSS Functions. Incumbent LECs must offer unbundled access to their operations support systems (OSS) for qualifying services.

The Commission specifically addressed broadband issues by providing substantial unbundling relief for loops utilizing fiber facilities:

- 1) no unbundling of fiber-to-the-home loops;
- 2) no unbundling of bandwidth for the provision of broadband services for loops where incumbent LECs deploy fiber further into the neighborhood but short of the customer's home (hybrid loops), and
- 3) no requirement of line-sharing an unbundled element.

The decision to refrain from unbundling incumbent LEC next-generation networks is expected to stimulate facilities-based deployment. With the certainty that their fiber optic and packet-based networks will remain free of unbundling requirements, incumbent LECs will have the opportunity to expand their deployment of these networks.

One of the controversial and significant aspects of the FCC Order was the decision to discontinue line sharing. According to the FCC Chairman:

I also believe the argument that removing line sharing is a form of positive regulatory relief to stimulate broadband is ill conceived. Line sharing rides on the old copper infrastructure, not on the new advanced fiber networks that we are attempting to push to deployment. Indeed, the continued availability of line sharing and the competition that flowed from it likely would have pressured incumbents to deploy more advanced networks in order to move from the negative regulatory pole to the positive regulatory pole, by deploying more fiber infrastructure. This decision actually diminishes the competitive pressure to do so.

However, according to the majority opinion:

We find that allowing competitive LECs unbundled access to the whole loop and to line splitting but not requiring the HFPL to be separately unbundled creates better competitive incentives than the alternatives. This is largely due to the difficulties in pricing the HFPL as a separate element. As we explained in the *Line Sharing Order*, the same physical loop is used

for multiple services, and there is no single correct method for allocating loop costs among these services and the HFPL. Pricing the HFPL thus creates a dilemma: either incumbent LECs are allowed to over-recover their loop costs by fully charging for both the HFPL and the low frequency portion of the loop, or competitive LECs are allowed to purchase the HFPL at a price of roughly zero. Following our pricing rules, most states did the latter. The result is that competitive LECs purchasing only the HFPL have an irrational cost advantage over competitive LECs purchasing the whole loop and over the incumbent LECs. In contrast, allowing competitive LECs unbundled access to the whole loop and to line splitting but not requiring the HFPL to be separately unbundled puts competitive LECs using only the HFPL in a more fair competitive position with respect to other competitive LECs and to the incumbent LECs. Each carrier faces the same loop costs and, if it wishes, each can partner with another carrier to provide service over the HFPL alone or the low frequency portion of the loop alone as it wishes.

The order also clarified two key components of its TELRIC pricing rules to ensure that UNE prices send appropriate economic signals to incumbent LECs and competitive LECs.

- the risk-adjusted cost of capital used in calculating UNE prices should reflect the risks associated with a competitive market. the cost of capital may be different for different UNEs.
- the use of an accelerated depreciation mechanism may present a more accurate method of calculating economic depreciation.

3.3 LLU in Japan

Japan is considered a striking example of how new entrants took advantage of unbundling and line sharing rules to use the incumbent telco's lines to provide broadband.

Number of DSL subscribers at the end of each year

	DSL	FTTH	CATV
2000	9,723		
2001	1,524,564		1,303,000
2002	5,645,728	206,189	1,954,000
2003 (Oct)	9,590,349	756,211	2,376,000

DSL line provision

	NTT West Area	NTT East Area
Lines provided by NTT East and NTT West	1,584,400	1,967,895
Lines provided by other carriers	2,640,548	3,397,506
Sub Total	4,224,948	5,365,401
Total	9,590,349	
All lines in the above chart are provided using NTT East and NTT West terminal circuits.		

Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications, Japan

Cable operators played a significant role in spurring broadband growth in Japan in the earlier years. In 2000, for instance, Jupiter had 141,000 cable modem subscribers, well ahead of the DSL numbers. Since then, however, growth in cable modem access has been far slower. One factor may be that cable networks pass only one third of Japanese households.

Since March 1999, Tokyo Metallic negotiated with NTT concerning conditions of collocation and interconnection. However, NTT was still marketing ISDN lines instead of developing a DSL offering. In December 1999, interconnection at the main distribution frame (MDF) was realized. Tokyo Metallic then became the first company in Japan to offer DSL in December 1999, followed by other new entrants.

However, the speed of take-up was slow because the ADSL service was only available in metropolitan areas and the price was high. It took a further four months to upgrade NTT's exchanges for ADSL elsewhere. The MPT prescribed conditions for LLU in its revised ordinances in September 2000, in order to solve these problems and promote ADSL. This revised ordinance defines technical conditions and interconnection fees concerning unbundling of facilities that NTT East and West have to mention in their interconnection conditions. NTT was required to offer local loop unbundling and line-sharing (but not bit stream access). In December 2000, NTT was also required to unbundle fiber-to-the-home lines.

Softbank Group, with its subsidiaries Yahoo-Japan and BB Technologies, took advantage of the unbundling rules to launch a new DSL offering in September 2001 that was hugely successful, and NTT also began to compete by cutting prices for its DSL services.

In October 2001, just after the service launch of Yahoo! BB, its competitors found that the company reserved too many collocation resources, such as spaces and electronic capacities in NTT East and West's buildings. At the request of NTT, MPHPT authorized a revision of their collocation contracts with ADSL access providers in December 2001. This revision was to shorten the free resource-reservation duration from one year to six months. Also, the Telecommunication Business Dispute Settlement Committee sent a recommendation in February 2002 to the Minister of MPHPT to improve the collocation rule to avoid disputes. It reported that three cases out of seven that had requested mediation from December 2001 to February 2002 concerned collocation. NTT East and West again revised its contract to introduce the upper limit concerning collocation resources to each ADSL access service provider. NTT also added an article to offer information about collocation resources. MPHPT authorized these in May 2002. Yahoo! BB returned reserved collocation spaces for 9.9 million lines to NTT in June 2002.

In mid-2002, IP telephony service over DSL was added to the menu of Yahoo! BB. In addition, profits mainly came from the sale of contents, advertising and rental and sale of ADSL modems, and not from the monthly fees.

The government has provided financial assistance for fiber-optic networks and broadband access networks.¹⁴ These include:

- no/low-interest financing by the Development Bank of Japan (DBJ) for operators introducing broadband access networks; (no interest for public corporations, low interest for private corporations).
- Operators introducing broadband access networks can apply for a special 6-18 per cent redemption on corporate tax.
- Operators introducing broadband access networks can decrease the tax standard for fixed assets tax by 20-25 per cent.
- TAO guarantees the debt liabilities of operators introducing broadband access networks.

¹⁴ MPHPT, "Outline of the Telecommunication Business in Japan", October 2002

3.4 New Zealand considers LLU¹⁵

The New Zealand Commerce Commission is conducting a mandatory review of access to the unbundled elements of Telecom New Zealand's local loop network and access to the unbundled elements of, and interconnection with, Telecom New Zealand's fixed Public Data Network (PDN). The Commission released its draft report in October and is expected to release the final report in December.

According to the draft report the Commission has concluded that there are productive, allocative and dynamic efficiency benefits from unbundling.

The Commission is not convinced that unbundling will reduce the overall level of investment in telecommunications networks. It is not clear from overseas empirical evidence that unbundling has the deleterious effect on investment predicted by many commentators. Purchasing unbundled loops, as opposed to, for example, wholesale Digital Subscriber Line products, requires the access seeker to invest in DSLAMs and equipment at local exchanges, such that the quantum of investment is increased overall. Likewise, there are potential gains from service and application innovation as a result of further broadband take-up under unbundling.

The Commission recognises that the management and resolution of technical and practical issues is critical to the successful implementation of LLU. The Commission has the ability to draw upon the experience of national regulators in United States, Europe, and Australia in developing industry codes and practices, and managing potential conflicts between incumbents and new entrants.

The Commission's assessment of the technical and practical issues has led it to conclude that it is technically and practically feasible to implement unbundling in New Zealand.

3.5 Malaysia considers "ANE"

The Malaysian Communications and Multimedia Commission (MCMC) issued a "Public Consultation Paper on Effective Competition in the Access Network," in July 2003. The paper "aims to obtain comments from the stakeholders regarding the need and timing for the introduction of access to network elements (ANE), methods and modalities of access and necessary change, if any, envisaged in the existing regulatory framework. " The paper expressed the view that, "While many arguments have been made that ANE discourages infrastructure development, in reality, ANE is complementary to, rather than a substitute for, infrastructure investment. It also concluded that ANE provides the following benefits:

1. It stimulates service-based effective competition;
2. It avoids the unnecessary duplication of the Access Network; It is a major step towards achieving effective competition; and
3. It achieves less environmental disruption.

Following the public consultation the MCMC has decided to go ahead with ANE¹⁶.

¹⁵ Telecommunications Act 2001: Section 64 Review and Schedule 3 Investigation into Unbundling the Local Loop Network and the Fixed Public data network, Amended Draft Report, October 2003, New Zealand Commerce Commission

¹⁶ A Report on Public Consultation On Effective Competition in the Access Network, 18 November 2003, Malaysian Communications and Multimedia Commission (MCMC)

4. Anti-competitive practices in Internet and Broadband provision

In light of the current situation regarding unbundling and bitstream access described above, incumbents' first mover advantage, coupled in some cases with predatory pricing and other anti-competitive behaviour, appears to be pre-empting the market for high speed internet services over the telephony network.

4.1 Deutsche Telecom margin squeeze¹⁷

In Germany, (Deutsche Telecom) DT offers local loop access at two different levels. Besides the retail subscriptions to end customers, DT also offers unbundled access to the local loop to competitors, which allows them direct access to end-users. DT is thus active on the upstream market for wholesale local loop access to competitors and on the downstream market for retail access services to end-customers.

DT holds a dominant position on both the markets. DT is the only German network operator having a network with nation-wide coverage. In order to provide a variety of services to end users, new entrants need access to this infrastructure on a wholesale basis. Regarding retail access, even after five years of competition, DT still has around 95% market share and the remaining 5% are divided up between a large number of DT's competitors.

DT's retail prices for analogue and ISDN lines are regulated under the German price cap system, in which a price adjustment guideline is set for a basket of services. Retail tariffs for T-DSL are not subject to any advance regulation. The prices of T-DSL services are set by DT at its own discretion, but may be reviewed ex post.

With effect from June 1997 DT was required to offer its competitors fully unbundled access to the local loop. Under German telecommunications law, charges for access to the local network must be cost-oriented and must be authorised in advance by the regulatory authority.

In order to compare wholesale and retail services, this decision uses a weighted approach to prices and costs. All forms of retail access (analogue, ISDN and ADSL) are aggregated on the basis of the number of each variant that the established operator has marketed to its own end-users. The comparable wholesale and retail services are found to be fully unbundled local loop access and retail access in all its variants, i.e. analogue, ISDN and ADSL. If the average retail prices are below the level of the wholesale charges, it can be concluded that there is a margin squeeze. The established operator's product-specific costs for providing its own retail services need to be considered only if the average retail prices are above the level of the wholesale charges. In that case there is a margin squeeze if the product-specific costs exceed the positive spread between the retail prices and the wholesale prices.

DT argued that all of the charges at issue were imposed by the regulatory authority, so that DT was left no scope for independent commercial decisions against which competition proceedings might be brought at Community level. If there is any infringement of Community law, the Commission should not be acting against an undertaking whose charges are regulated. According to the Commission, even though the charges in both cases are subject to sector-specific regulation, DT has a commercial discretion, which would allow it to restructure its tariffs further so as to reduce or indeed to put an end to the margin squeeze.

The Commission's assessment revealed that for the period 1998 through 2001, DT charged competitors more for unbundled access at wholesale level than it charged its subscribers for access at the retail level. This constitutes a clear case of margin squeeze, because it leaves new entrants no margin to compete for downstream retail subscribers. As of 2002, prices for

¹⁷ Commission Decision of 21 May 2003 relating to a proceeding under Article 82 of the EC Treaty (Case COMP/C-1/37.451, 37.578, 37.579 — Deutsche Telekom AG), Official Journal of the European Union, 14.10.2003

wholesale access were lower than retail subscription prices but the difference was still not sufficient to cover DT's own downstream product-specific costs for the supply of the end-user services. Even after the latest reduction of the wholesale prices by the German regulatory authority (RegTP), which became effective on 1 May 2003, this margin squeeze remains in place.

In line with the gravity and duration of the abuse, the Commission levied a fine of € 12.6 million.

4.2 Wanadoo: Predatory pricing¹⁸

Wanadoo is a 72% owned subsidiary of France Telecom. This decision relates to two ADSL services provided by Wanadoo, both allowing download speeds of 128 kbit/s and upload speeds of 512 kbit/s. The first is the Wanadoo ADSL service, launched in November 1999, while the other is the eXtense service, launched in January 2001. The two services are very comparable. However, in the case of the ADSL service, the subscriber concludes two separate contracts, one with France Telecom for the supply of the ADSL access service known as Netissimo, the other with Wanadoo for the supply of the Internet access service proper. In the case of the eXtense service, the subscriber concludes a single contract, with Wanadoo, which provides the whole of the service (ADSL access + Internet access). The inception of the abuse coincided with the deployment of the eXtense facility, which came at the same time as the stepping-up of Wanadoo's commercial efforts.

Community case law applies two tests to establish whether an abuse in the form of predatory pricing has been committed. If variable costs are not covered, an abuse is automatically presumed; if variable costs are covered, but total costs are not, the pricing is deemed to constitute an abuse if it forms part of a plan to eliminate competitors. The two tests have been applied in the Commission's decision, for the periods before and after August 2001.

In this instance, the Commission carried out adjustments to costs and revenue so as to take account of the characteristics of a strongly growing market. In particular, customer acquisition costs were spread and written off over a number of years.

It emerged from the Commission's investigations that the prices charged by Wanadoo were well below variable costs until August 2001, and that in the subsequent period they were approximately equivalent to variable costs, but significantly below total costs. Since the mass marketing of Wanadoo's ADSL services began only in March 2001, the Commission considers that the abuse started only on that date.

Wanadoo suffered substantial losses up to the end of 2002 as a result of this practice. The practice coincided with a company plan to pre-empt the strategic market for high-speed Internet access. While Wanadoo was suffering large-scale losses on the relevant service, France Telecom, which at that time held almost 100% of the market for wholesale ADSL services for Internet service providers (including Wanadoo), was anticipating considerable profits in the near future on its own wholesale ADSL products.

From January 2001 to September 2002, Wanadoo's market share rose from 46% to 72%, on a market which saw more than a five-fold increase in its size over the same period. The level of losses required in order to compete with Wanadoo had a dissuasive effect on competitors. At the end of the period during which the abuse was committed, no competitor held more than 10% of the market, and Wanadoo's main competitor had seen its market share tumble. One ADSL service provider (Mangoosta) went out of business in August 2001. The effects of

¹⁸ European Commission, Press Release, Brussels, 16 July 2003, High-speed Internet: the Commission imposes a fine on Wanadoo for abuse of a dominant position.

Wanadoo's conduct were not confined to competitors on the ADSL segment, but extended to cable operators offering high-speed Internet access.

The abuse came to an end in October 2002, with the entry into force of new wholesale prices charged by France Telecom, more than 30% down on the previous prices charged. Since then, the French high-speed Internet access market has been growing much more rapidly and in a more balanced way as far as the various competitors are concerned.

In view of the gravity of the abuse and the length of the period over which it was committed, the Commission is imposing a fine of €10,35 million.

4.3 BT FRIACO (Flat Rate Internet Access Call Origination): Rate structure¹⁹

On 17 September 1999 WorldCom wrote to BT giving details of its proposal for a FRIACO charging methodology. The FRIACO service requested by WorldCom consists of single tandem call origination on an unmetered basis, with charging based on capacity rather than on volumes of traffic. BT rejected the request citing concerns about network capacity and the principle of capacity charging. WorldCom considered that BT's reply failed to meet its requirements on a number of counts and made its formal complaint and reference for direction to the Director General on 24 December 1999.

In December 1999 BT announced a new retail product providing unmetered Internet access, called SurfTime, which it would launch in the spring of 2000.

According to Oftel there was a serious risk that, without unmetered wholesale interconnection for internet calls originated on BT's network, competition in the provision of unmetered retail internet access products would be restricted or distorted. WorldCom and other licensed telecommunications operators ("OLOs") wish to be able to provide services to customers in competition with BT's SurfTime service, under which the whole of the internet access product would be provided by the OLO. To do this, an operator requires a wholesale call origination product from BT since approximately 80% of all calls made in the United Kingdom originate on BT's network. However, such a service is only currently available from BT either on a metered basis, or includes retail elements, which are not required by OLOs for them to provide, unmetered retail services to consumers.

If OLOs purchase BT's metered wholesale call origination product, they are exposed to forecasting risk, as they have no certainty about the extent to which their unmetered retail products will be used. If call volumes per customer exceed their forecasts, OLOs' payments to BT will increase directly in line with the higher volume of calls, but their (flat-rate) income from each customer will remain the same. The lack of an unmetered wholesale call origination product therefore has the potential to create a situation under which an operator offering a retail unmetered service would suffer a margin squeeze.

BT argued that BT Retail will also buy the metered Standard Services from BT Network on a pence-per-minute basis. The SurfTime service is, however, presented to consumers on a flat-rate basis. So, if BT Retail's forecasts are too low it will nevertheless have to pay BT Network on a per-minute basis and sustain a loss. BT Retail, therefore faces the same risks as other operators.

Oftel did not accept BT's argument that it faces the same risk as an OLO. Oftel took the view that BT does not face similar risks when its position is assessed on an end-to-end basis. Any losses incurred by BT's retail operation would be purely notional and offset by notional profits in its network business. There are two main reasons for this. First, the metered

¹⁹ Determination relating to a dispute between British Telecommunications and Worldcom concerning the provision of a Flat Rate Internet Access Call Origination product ("FRIACO"), Published on 15 February 2001, OFTEL

wholesale charges paid to BT Network (both by BT Retail and by OLOs) are based on an average cost. This wholesale charge is substantially above the marginal cost incurred by BT's network business in providing the additional call volumes (at any time of day). This means that BT's actual costs do not rise with call volumes in the same way as payments by OLOs using metered call origination. Secondly, marginal network costs do not grow proportionally with call volumes originating from individual customers. A large increase in call volume from an individual customer is likely to entail greater use of the network's off-peak period. During the off-peak period, the network has spare capacity. Hence, the marginal cost to BT of such a call is at (or not materially different from) zero. An increase in call volume from each individual customer would not necessarily therefore cause BT's costs to rise in line with increased call volumes (or, indeed, at all). However, if OLOs only have a metered call origination service available from BT, they would be required to pay on a pence-per-minute basis for such extra calls.

Oftel determined that BT must make available FRIACO for Internet traffic.

4.4 BT Surf: Bundling and predatory pricing²⁰

On 2 November 2000, British Telecommunications plc ("BT") provided formal notification to the Director General of Telecommunications, of a number of price changes and new tariff packages for residential customers that came into effect on 1 December 2000. These included two new packages offering *off-peak Internet access calls on an unmetered basis*.

BT Surf Together, priced at £14.99 (including VAT) per month, provides the lower voice call prices associated with the BT Together package and unmetered off-peak Internet access calls.

BT Talk & Surf Together, priced at £19.99 (including VAT) per month, also provides the lower voice call prices of the BT Together package with both unmetered off-peak internet access calls and unmetered off-peak local voice calls.

BT's product, Surf, is part of an unmetered tariff for off-peak Internet access. A customer needs, in addition to purchasing Surf from BT, to contract with an Internet Service Provider (ISP) that has decided to offer its services in conjunction with Surf. This ISP will purchase call termination from a network operator and will set a price to the consumer for call termination and Internet service provision.

On the basis of information available to the Director before he commenced this investigation he suspected that the Surf element of the Packages was being offered below the cost of provision and that BT would fund the shortfall from profits made on residential voice calls or from wholesale call origination. On the information available to him at the time, the Director suspected that this would be likely to have materially anti-competitive effects.

In the United Kingdom BT holds a dominant position in the market for wholesale call origination on fixed telecommunications networks and it also appears to the Director that BT is currently dominant in the markets for local and national retail voice calls for residential customers on fixed telecommunications networks.

The Director suspected that BT's behaviour might have the effect of distorting competition in the markets for retail internet access and wholesale termination of internet calls through horizontal and/or vertical leveraging.

- The horizontal leveraging would be from BT's apparent dominance in the markets for local and national retail voice calls for residential customers on fixed telecommunications networks in the United Kingdom, into Internet access markets by means of bundling.

²⁰ Investigation by the Director General of Telecommunications into the BT Surf Together and BT Talk and Surf Together pricing packages - May 2001, OFTEL

Specifically the Surf element would be offered in a bundle together with voice calls at a marginal price below cost.

- The vertical leveraging would be from BT's dominance in the market for wholesale call origination on fixed telecommunications networks in the United Kingdom into internet access markets by means of a margin squeeze.

Either or both of these practices could lead to a detrimental effect on consumers through a restricted choice of unmetered internet access packages and possible higher prices, lower quality of service, less innovation etc resulting from a less than effectively competitive market.

In order to test for the possible existence of horizontal leveraging (from retail voice calls into retail internet access), it is necessary to consider whether *the marginal price of Surf in the Packages is sufficiently high to cover the long run incremental costs (LRIC) of providing Surf.*

In order to test for the possible existence of a margin squeeze or vertical leveraging (from wholesale call origination into internet access), it is necessary to *consider whether the marginal price of Surf in the Packages is sufficiently high to cover the LRIC incurred by BT's retail arm.*

The Director concluded that it is not clear that, at the current prices, BT is or will price Surf below cost in the Packages. Furthermore, the Director considers it unlikely that, even if the price was below cost, a material anti-competitive effect would result on current prices, because of the availability of sustainable 24/7 packages. In these circumstances, the Director does not therefore consider that BT's current pricing of the Packages constitutes an infringement of the Act.