

Cross-Departmental Team on Infrastructure and PPPs

Telecommunications Working Group

Report March 2002

Section 1: Overview

1. The Working Group was established as a subgroup of the Cross-Departmental Team on Infrastructure and PPPs in September 2001, with representation from the following Departments and agencies: Arts, Heritage, Gaeltacht and the Islands, Education and Science, Enterprise, Trade and Employment, Environment and Local Government, Finance, Forfás, Public Enterprise, Taoiseach. It was asked to identify and agree priorities for action by Government agencies to facilitate the provision of broadband infrastructure and services at the required world-class levels in Ireland. This is a key strategic issue for Ireland's future competitiveness. It is also a complex issue, both in technology and in policy terms.
2. Since the Government's decision to liberalise the market early from December 1998, telecommunications policy has two broad strands: firstly to develop a fully-competitive market to support required investment by the private sector, and secondly, to pump prime the required investment in a strategic way through use of public funds where the required infrastructure and services were not being delivered quickly enough by the market. In that regard, the Group noted the funding programmes under way by the Department of Public Enterprise under the current and previous National Development Plans.
3. The Group has assessed the broadband situation in Ireland. **It concludes that the primary problem is not at the national or regional level. The key deficit is in local access broadband networks. This results in a lack of availability of affordable 'always-on' local level access to high-speed data transmission services.** The Group also notes that all parts of the State are not served by competing providers.
4. Three key questions arise for policy in Ireland at present:
 - What needs to be done to facilitate the provision of a widely-available, always-on, open access and cost-effective and affordable broadband network with significant private sector involvement and with a role for the State in providing the necessary seed capital, within a three-year timeframe?

- What is the minimum level of infrastructure and services that we require in the short-term?
 - Can a genuinely competitive market for broadband services ever be achieved in a situation where the physical network at local level is owned by a vertically-integrated dominant provider? Should ownership/management of any publicly-funded local area access network be separated from provision of application services?
5. A programme of Government supported action on broadband needs to be driven by and public support harnessed in the context of a clear vision for the future of these services in Ireland and how they contribute to the national goal of sustainable economic and social progress and balanced regional development. The Group recommends Government adopt the following in this regard:

The Government wants to see the widespread availability of open-access, affordable, 'always on' broadband infrastructure and services for businesses and citizens throughout the State within three years, on the basis of utilisation of a range of existing technologies and broadband speeds appropriate to specific categories of service and customers. We wish to see Ireland within the top decile of OECD countries for broadband connectivity within three years.

In the medium-term, we expect that broadband speeds of 5mbit/s¹ to the home and substantially higher for business users will be the minimum standard within 10 – 15 year for broadband. We will aim for Ireland to be the first country in Europe to make this level of broadband service widely available for its people.

The State's role in this area is confined to provision of seed capital. Actions undertaken to meet the three-year objective will ensure that any infrastructures put in place with Exchequer assistance are capable of being upgraded to meet the longer-term target.

6. The strategy recommended for Government action to address the identified deficit in local access networks is as follows:-
- Local access networks starting with the priority areas already identified and agreed, to be procured on a PPP-type basis at national level with relevant local authority involvement (as a continuation and development of a process model already underway in DPE).
 - The precise technology will depend on the local circumstances and projected demand. In line with the norm in PPP arrangements, output specifications will be determined, rather than input specifications. In many urban areas with volume demand, fibre optic cable may be the optimum solution. Wireless or DSL technologies etc. will be the most appropriate solution in other cases. The network will include either ducting and dark

¹ The minimum speed at which video on demand becomes possible

fibre, or other technology equipment and bases, as appropriate, but will include hubs and terminators in all cases and will provide bearer services. The key point is that the technology risk should lie with the private sector partner

- The open-access local networks would be managed by the PPP operator(s) who would be operator-neutral (a PPP process on similar lines has been initiated by DPE). In effect, this involves creation of a “carriers’ carrier” who provides services for other telecommunications companies, but does not compete for end-user customers.
- No service provider should be allowed to gain any unfair or anti-competitive advantage by virtue of participation in the proposed PPP. This will mean complete separation of the ownership and management of local access networks involving public funding from provision of services to customers and that the PPP partner contracted to manage the network or any local part of it would not be allowed provide application services to end-user customers. The objective is to foster real competition amongst service providers companies on the basis of price and service and not on the basis of exclusive access to infrastructure.
- It is important that provision of funding for such local access networks continues to be prioritised under the existing NDP measure provision
- PPP contracts involve an element of capital risk sharing, with a significant portion of that risk to be taken by the private partner. In this case, we expect that the operational cost risk would be taken entirely by the private partner. This means that at a minimum, the private partner would meet operating costs from charges levied on service providers who use the facility – charges would be determined as part of the PPP process and we envisage a growing capital input from the private sector over time.
- Phase 1 should involve elements of the strategy and different technological solutions (wireless, fibre optic, etc.) being trialed and prototyped in a specified number of locations and should commence as soon as possible. The purpose of the trial phase is to identify issues and test assumptions about costs, technical difficulties, technology, network configuration and cost-effectiveness, private sector interest and consumer response.
- Subsequent implementation phases would depend on successful implementation of phase 1 and would target additional priority areas to be identified and agreed at that stage and would build on the learning and experience of Phase 1. The extent of targeted network coverage – and hence the extent of possible Exchequer exposure – would be specified for each phase. The intention is that the Exchequer investment in the local access networks in Phase 1 will be leveraged to encourage significant private sector investment in subsequent phases. This will be done by migrating the local projects to be funded in Phase 1 to the proposed national PPP-type entity.

- Once a critical mass is achieved, we would anticipate that the market response to future implementation proposals will include a growing capital cost element.
 - Control and monitoring of standards (e.g. civil engineering, equipment fibre spec. data encapsulating and system interoperability protocols) and ensuring of open access by the DPE
 - The question of leveraging public service data traffic to incentivise private sector participation in provision of the local access networks should be explored.
 - During the implementation phase, the potential for Government Departments and agencies to encourage creation of demand to be kept under review, so as to ensure that demand for services emerges in tandem with the infrastructural bottleneck being resolved. There is particular scope for the industrial development agencies, the Educational sector and the Health services to take lead roles in developing of new, cost-effective and innovative ways of delivering their services that would utilise a high broadband capacity once it becomes available at affordable cost to users.
 - Open access be granted as a matter of priority to State-owned sites for the construction of co-location sites. This would serve to advance the e-Government agenda and act as a spur to the private sector (it may require legislation).
 - The final phase of the Strategy will involve State withdrawal.
7. The key questions arising from our work and our interim conclusions were presented at workshops in mid-February facilitated by DPE and Forfás for key industry and user representatives. These workshops provided a useful opportunity to test the interim conclusions and seek industry and consumer response to the key questions arising. This dialogue needs to continue. This should include exploring whether there would be any interest in the idea of a number of operators in the industry coming together in a new legal entity to provide shared infrastructure on the proposed PPP basis.
8. **These and other implementation issues should be addressed in detail in the course of an intensive preparatory implementation phase we recommend take place over the next three to four months.**

Regulation

9. Any legal and regulatory barriers to **convergence** of and competition between technologies should be removed as soon as possible. This means that, in general, licences should not be exclusive² and any service company should be able to provide voice telephony, TV and Internet access combined on competing technology platforms. It also means that the question of a multi-service

² There may, however, be a case for exclusive licences for a defined period, to address under-served regions, test new technologies, or address a particular public policy issue

provision licence should be seriously examined with a view to early action.

10. In the short-term, we consider that the ODTR should be asked by the Department of Public Enterprise to bring forward a strategy as soon as possible to secure unbundling of the local loop. If additional powers are required to enable the Office to achieve ULL in practice, then necessary legislation should be brought forward as a priority. **We also regard it important that a resolution to the delay in making DSL available should also be found by the parties concerned immediately.** It should be noted that progress in this area would have a very significant short-term impact in terms of Ireland's standing in international league tables.

Costings

11. €200 million is allocated to the NDP eCommerce measure 2000 – 2006. The cost of our proposals insofar as the priority areas identified by the industrial development agencies and targeted already by DPE under the NDP calls can be accurately estimated as soon as firm market prices are available in respect of the local authority-led projects that have been submitted under the current NDP call and we will return to this issue later in the year.
12. The PPP process will allow for market testing of a range of phasing options. Assuming that implementation is prototyped in a specified number of locations first, then subsequent phases should be timed so as to maximise the private sector contribution. However, PPP market exploration should include testing of interest in the maximum range of phasing options.

Section 2: Broadband network

Broadband

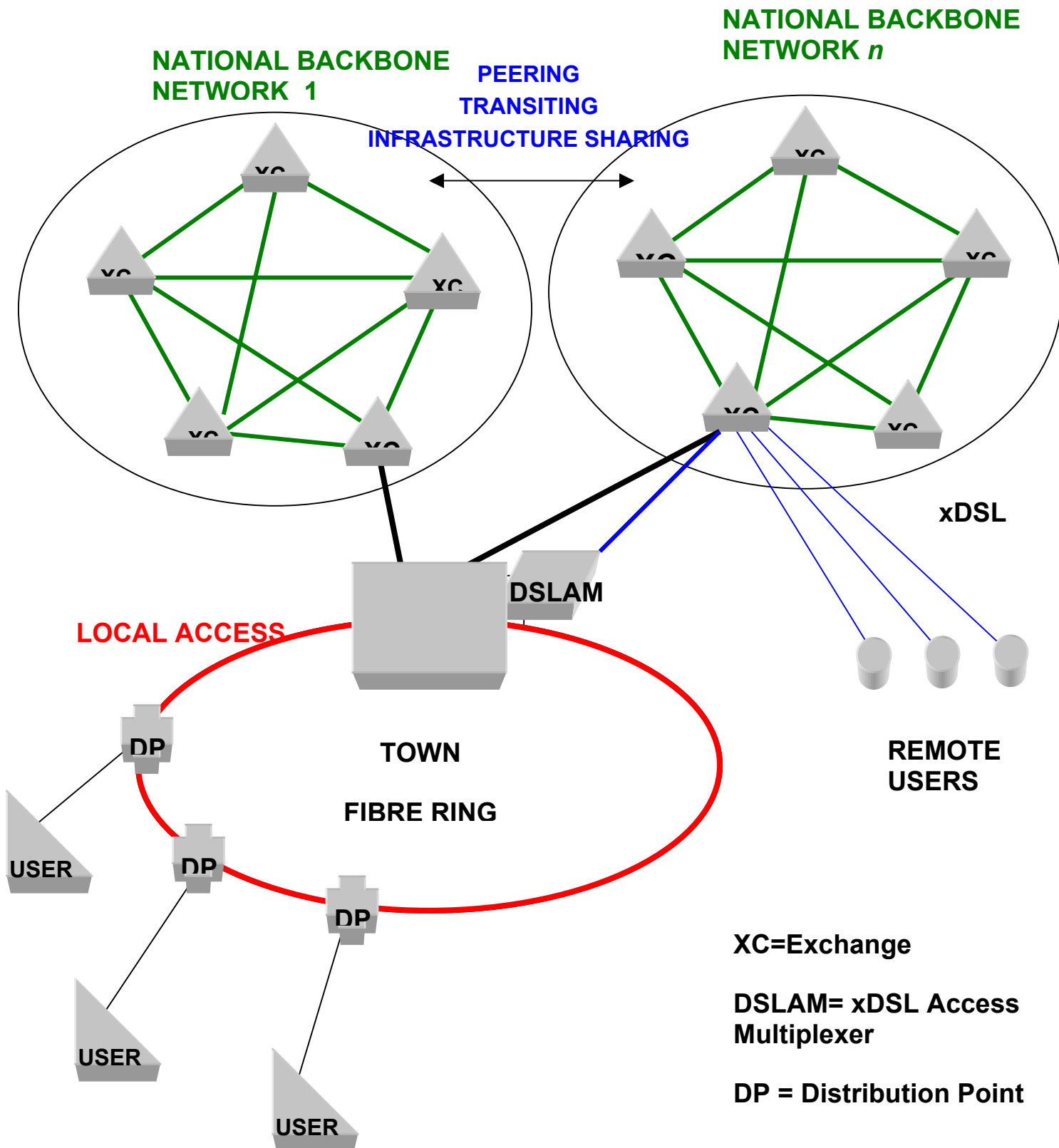
13. In the telecommunications industry, the term *broadband* is used to refer to high-speed data transmission services. It is also used to refer to the enabling infrastructure that carries those services. The basic telecommunications infrastructure consists of copper wires, coaxial cable and fibre optic cables. These elements can, with appropriate technology, deliver varying levels of broadband service to meet different demands.
14. The national telecommunications network consists of (a) international cables, (b) national and regional ‘backbone’ fibre optic cables, (c) local access networks (also referred to as ‘metropolitan’ area networks) within urban areas and (d) copper/coaxial connections to the individual consumer. **This is presented in Table 2 overleaf (for illustrative purposes, the table depicts a fibre optic local access system to illustrate the relationship between the local access network and the local loop and national backbones respectively.** As indicated earlier wireless and mixed systems will be more appropriate in specific areas). Ireland has relatively good international broadband links and a developing national and regional broadband backbone network. The key deficit is in local access broadband networks.

Adequacy of physical cable network

15. The Group has assessed the broadband situation in Ireland. **It concludes that the primary problem is not at the national or regional level. The key deficit is in local access broadband networks. This results in a lack of availability of affordable ‘always-on’ local level access to high-speed data transmission services.** The Group also notes that all parts of the State are not served by competing providers. We believe that a vibrant market for advanced data transmission services will drive, by and large, completion of the backbone network by the industry.
16. In a case where a local access network faces non-competitive access terms to the backbone infrastructure, it may be necessary to link an individual town to the nearest competitive point of access. While NDP assistance to ensure balanced regional development in that regard will be required in some instances, by and large, additional State funding of national/regional backbone infrastructures is not the immediate priority; increasing access to and utilisation of the installed backbone and international networks is the priority.

Table

NETWORK ARCHITECTURE



Section 3: International context

17. Although Ireland is a small market in international terms, in many respect it is highly attractive given the base of global industries that have a presence here and the burgeoning indigenous technology and digital industry sectors. However, the availability of world-class broadband services and the IT industry are highly concentrated in Dublin. Our low population density – outside of Dublin and the major urban centres – makes it more costly to provide physical infrastructure and equal access to services throughout the State.
18. The availability of competitive, advanced telecommunications infrastructure and services is of critical importance to future economic growth. The competitiveness of broadband services is a key determinant in inward investment decisions and is critical for indigenous business adopting e-Business and trading internationally. Moreover, it will in future be of growing importance in the **retention** of multi-national investment previously made in the economy.
19. The downturn in the international telecommunications market is due to a number of factors, including investment of some €100 billion by the European telecommunications industry in 3G licences. This has clear implications for the ability of international telecom firms to fund further investment. The world economic slowdown and, specifically, given the 3G context, concern amongst investors of overexposure to this market has further led to reduced funds available for telecommunications investment from the international financial markets. Ireland must compete for the available investment funds within companies. The major telecom players in the Irish market are now part of multi-national companies. Investment decisions involve comparisons being made as between rates of return on capital invested in Ireland and other possible investment markets.
20. The current downturn in investment in the industry worldwide is an important part of the context facing Ireland at present. However, the Working Group does not regard this downturn in the investment market as a rationale in itself for State investment in infrastructure. As indicated above, our concern is the deficit in essential infrastructure at the local area access network level. This very specific part of our broadband infrastructure does not appear to be attracting commercial interest in the necessary capital investment.

Section 4: Current situation in Ireland

Summary of what has been achieved to-date

21. Since 1998, the Government has liberalised the telecommunications market, established an independent regulator, privatised Telecom Éireann, attracted a significant number of global telecom players into Ireland, co-invested in a €230 million regional broadband programme, successfully brought international connectivity to Ireland, enacted a comprehensive modern eCommerce legislative code and overseen significant development of mobile telephony services.

Irish telecommunications market – current context

22. The key factors governing the current state of the telecommunications market in Ireland are:
- Deterioration in the international investment outlook
 - Consequent scaling back of investment plans by operators in Ireland and delayed roll-out of advanced services.
 - Lack of competition between different technology platforms (e.g., DSL, fibre optic, cable, satellite, wireless, Digital Terrestrial Television (DTT)) at national level
 - Comparatively high tariffs and long delivery times for certain key services (e.g. ISDN, leased lines (at specific required speeds), mobile, basic telephony (PSTN,) etc)
 - Regional differences in tariffs and services
 - Pending reform of the current legislative framework for regulation
 - Legal delays on Local Loop Unbundling
 - Low sophistication of use of the Internet by business and residential users.
23. The NDP provision of €200 million is a significant level of investment. While much has been achieved in recent years, others countries are moving forward even more rapidly. A recent OECD survey ranks Ireland poorly with respect to competitor economies. In relation to broadband access availability, Ireland came 25th in 2000 and 27th in 2001 out of 30 OECD members and behind EU candidate countries Hungary and the Czech Republic³. The 2001 Growth Competitiveness Index produced by the World Economic Forum ranks Ireland as No. 11, down from No. 4 in 2000. The fall occurred, not because Ireland's economic fundamentals had changed, but because we do not score at the highest level in terms of technology and innovation. The scale and consequences of the

³ OECD release, October 2001

deficit have been detailed in recent reports from IBEC⁴, the National Competitiveness Council⁵ and Forfás⁶, which make a range of recommendations for action to address this situation.

24. It is worth making the point that the Group understands that many of the required telecommunications industry hardware and software products are, for now at least, significantly cheaper than a year ago because of the downturn in the telecom manufacturing sector. While this is a temporary consideration until such time as the market picks up again, it may be of significance given the scale of investment, recent developments in e-public procurement and the need for technical standardisation across the investment.
25. As indicated already, we believe that development of a comprehensive broadband network both at national/regional and local level will be crucial to our future prosperity. The advantages of moving early could be substantial. Moreover, the risks associated with being late are also substantial. Only three States in the world have or are close to having a comprehensive broadband network connecting all homes and businesses – Singapore, Japan and South Korea. In these cases, the Government decided that it should happen and funded it. In Europe, we understand that a number of Scandinavian and eastern European States have embarked on similar investment programmes.

Importance of broadband to Enterprise and Competitiveness

26. Advanced broadband telecommunications in Ireland is now a significant competitiveness issue. Ireland's international connectivity has significantly improved and tariffs are now amongst the most competitive in the OECD. Large corporate users in Dublin in general express themselves satisfied with the provision of the highest levels of broadband services.⁷ However, the key issues are: first, the slow provision, high cost and in some cases lack of high capacity broadband services in key regional locations. These users require access to competitive, low-cost, fixed-rate, always-on broadband services. The broadband requirements of firms vary depending on the speed of access required and business processes being undertaken and need to be provided using appropriate technological solutions, varying from upgrading of the existing copper wire network to direct provision of fibre optic cable.

Importance of broadband to Education sector

27. The development of e-learning, specifically as regards the provision of educational products/resources and services to schools, teachers and learners and for lifelong learning, **is dependent on the availability of broadband services**. The effective utilisation of the Internet in schools is being held back by the absence of low-cost, always-on broadband services. This is in contrast to most other EU member States where high-speed bandwidth especially via cable and xDSL are increasingly available in classrooms. This places Ireland at a disadvantage.

⁴ Telecommunications in 2001: A New Urgency (IBEC, February 2001)

⁵ NCC Submission on Telecommunications – Key Competitiveness Issues (NCC, September 2001)

⁶ Development Agency Regional Broadband Priorities, July 2001 (Forfás, July 2001)

⁷ Analysis report on Broadband Investment in Ireland, for Forfás, September 2001

28. Over £40m (€50.8m) of public monies has been invested in hardware and software for schools to date and a further investment of €107.92 million is planned over the next three years. However, at first and second level, the lack of bandwidth and high access costs are inhibiting the use which can be made of the equipment available and thus limiting the progress which can be made within the school system towards equipping students for the Information Age. The development of open and distance learning and of Adult Education generally are also crucially dependent on the availability of quality bandwidth at reasonable cost. While considerable progress has been made at third level towards providing a level of access which compares favourably with international standards, consideration of proposals such as the possible expansion of the HEAnet to all schools, thus providing them with a uniform, high quality level of access to the Internet, is seriously impeded at present. Over the last two years, the network between all third-level institutes was upgraded to multiple 155Mbits links and significantly enhanced levels of international connectivity have been provided through the Global Crossing initiative for participation in international research networks and projects, including Internet II and Next Generation Internet (NGI).

Importance of broadband to e-Government

29. The electronic delivery of public services, consequent on the Government's Action Plan for the Information Society, and the extended decentralisation programme, are critically dependent on the countrywide availability of affordable, reliable and high-quality always-on broadband telecommunications services (for voice, data and video applications). On behalf of the public service, the Department of Finance is about to enter a contract for the provision of, inter alia, VPN data services in core locations around the country. However, despite the Government's requirement for bandwidth-on-demand, the market was only prepared to provide these services using fixed bandwidth leased lines to a limited number of aggregation points of presence. Consequently, this contract will not affordably facilitate public service sites of any significant distance from these points of presence. Accordingly, these latter sites could immediately make use of local access infrastructures provided on the basis set out in this Report. In addition, sufficient flexibility in the contract would allow those sites facilitated by it to migrate their connectivity to these infrastructures where they proved more affordable and offered greater levels/flexibility of services.

Section 5: Principles underpinning our approach

30. Liberalisation of the telecommunications market was strategically important. Competition has brought about improved quality and choice of services for business and domestic customers. The appropriate role for the State is one of regulating the free market, rather than direct provision of commercial services. However, a strong case currently exists for strategic intervention on the part of the State to ensure that the necessary investment is made in local access infrastructure. The nature and extent of this investment will vary, depending on the project involved.
31. There are difficulties of market distortion and private sector displacement that could be associated with significant levels of State involvement in this area unless we are very clear about what we are trying to achieve, the principles underlying and the limits to State investment and the need to ensure that State funding should not inadvertently replicate current structural or competition problems in the industry. The Group considers that the optimum level of private sector involvement, on an open-access and pro-competitive basis, should be sought in meeting the specific infrastructure deficit we have identified.
32. A comprehensive review of progress in achieving the proposed approach set out in this strategy and of the rationale for the State's continued involvement should be undertaken after eighteen months, on the basis of indicators to be agreed in advance for evaluation purposes.

Ensuring value for money

33. The Working Group is anxious to ensure that any future State funding of initiatives in the area of broadband gives rise to:
 - Provision that meets reasonable and anticipated demand and avoids long-term stranded assets
 - No financial exposure for the State beyond the level of committed finance
 - No displacement of the private sector in areas of investment that are capable of generating a commercial return and co-investment by the private sector where possible
 - Competitive provision of broadband services by operators and application service providers.
34. In line with the requirements for Exchequer capital funding generally, it is imperative that all funding proposals be rigorously analysed and that a compelling strategic case for any State investment be established having regard to overall industrial, labour force, spatial and other relevant policies. All potential costs need to be clearly identified. Adequate project management arrangements and subsequent impact evaluation vis-à-vis original objectives and agreed indicators need to be in place.

Section 6: Policy issues for Government

Overall strategic objective

35. Telecommunications are the key to the future and if Ireland moves fast, we have an opportunity to position ourselves to become one of the richest per capita countries in the world by 2020. Currently, the key priorities in the Government's overall strategy for national development include:

- Maintenance of a supportive climate for business and investment
- Building and sustaining a world-class traded goods and services sector and increasing the competitiveness of innovation in the internationally trading indigenous sector
- Identification of niche industries (e.g. genomics, nanotechnology, biotechnology, internet services) to be targeted for scientific and technological research and development through Science Foundation Ireland (SFI) and through a continuation of the successful strategy followed by IDA since the early 1980s
- A new emphasis on research and development and linking our third level institutions with business, which includes significantly increased support for innovation and a focus on attracting leaders in innovation (e.g., National Digital Park, Digital Media Hub, etc.)
- Continued emphasis on human resources development and active social inclusion measures to enhance the skills level of the population and maximise the opportunity for all citizens to participate in the economy
- Investment in roads, public transport, power, waste & water, education, health and other key infrastructure
- fostering balanced regional development by facilitating further development of the existing Gateways identified in the National Development Plan (Dublin, Cork, Limerick/Shannon, Galway and Waterford) and the focused development, as regional gateways, of a limited number of strategically placed centres to be identified in the context of the forthcoming National Spatial Strategy

We believe that the achievement of widely available, open-access, affordable broadband infrastructures and services should be seen as an objective ranking in importance with these other national development priorities.

36. Roll out of a comprehensive and affordable broadband network would:

- Promote internationally trading, technology-based start ups in new economy areas

- Enhance our attractiveness for new foreign direct investment in the ICT area
- Enhance our capacity to retain existing such investment by giving Irish-located companies the potential to remain internationally competitive.
- Protect ongoing productivity growth and competitiveness in Irish industry by reducing costs. Use of broadband and related ICT applications is capable of reducing total costs significantly for industry.
- By stimulating demand, enhance the capacity of existing investment in backbone infrastructures to make a return.
- Disperse low-cost, always-on broadband Internet access across all regions and thereby support Government regional development policy.
- Help create a knowledge and information-based society
- Increase international access to and demand for Irish Internet sites and content on the internet and hence commercial opportunities for eCommerce in Ireland.
- Bring about real competition amongst telecommunication service providers, reduce consumer costs and enhance choice and consumer control
- enable gateways identified under the forthcoming National Spatial Strategy to achieve a critical mass of development to support their regional development role in the NDP 2000-2006
- Work towards a fully inclusive information society.

37. In this context, three questions arise for policy in Ireland at present:

- What needs to be done to facilitate the provision of a widely-available, always-on, open access and cost-effective and affordable broadband network with significant private sector involvement and with a role for the State in providing the necessary seed capital, within a three-year timeframe?
- What is the minimum level of infrastructure and services that we require in the short-term?
- Can a genuinely competitive market for broadband services ever be achieved in a situation where the physical network at local level is owned by a vertically-integrated dominant provider? Should ownership/management of any publicly-funded local area access network be separated from provision of application services?

Guiding vision

38. A programme of Government supported action on broadband needs to be driven by and public support harnessed in the context of a clear vision for the future of these services in Ireland and how they contribute to the national goal of

sustainable economic and social progress and balanced regional development. The Group recommends Government adopt the following in this regard:

The Government wants to see the widespread availability of open-access, affordable, 'always on' broadband infrastructure and services throughout the State within three years, on the basis of utilisation of a range of existing technologies and broadband speeds appropriate to specific categories of service and customers. . We wish to see Ireland within the top decile of OECD countries for broadband connectivity within three years.

In the medium-term, we expect that broadband speeds of 5mbit/s to the home and substantially higher for business users will be the minimum standard within 10 – 15 year for broadband. We will aim for Ireland to be the first country in Europe to make this level of broadband service widely available for its people.

The State's role in this area is confined to provision of seed capital. Actions undertaken to meet the three-year objective will ensure that any infrastructures put in place with Exchequer assistance are capable of being upgraded to meet the longer-term target.

39. This objective is in line with the recommendation in the National Competitiveness Council '**Statement on Telecommunications - A Key Factor in e-Commerce and Competitiveness**', published in late 1998, which set out two broad objectives for Ireland:

to be a world leader in digital business and as a hub for electronic commerce;

to be a world leader in the provision of broadband telecommunications services.

40. National objectives were also set out in the **Action Plan on Implementing the Information Society in Ireland (1999)**.

"If we are to maintain and build on our economic success of recent years, and ensure that all of society can participate in the Information Society, it is vital that Ireland becomes both an early mover and a global player in the information Society. Failure to take action could mean that much of the strong economic performance of recent years could be lost, particularly as international companies who have chosen to locate activities here would be likely to move to other more advanced countries."

41. The **National Development Plan 2000-2006** (Para 4.73) set out two objectives in this field :

- *the development of the Irish communications sector so that it ranks in the top decile of OECD countries in terms of service range,*

quality, availability and price; and

- *the establishment ofa favorable climate for the development of electronic commerce and digital industries*

Section 7: Working Group's recommendations

42. The following needs to be in place to realise the vision proposed:

- Affordable broadband infrastructure and services to be widely available
- A range of alternative and complementary technology solutions (e.g., fibre optic cable, wireless, satellite, xDSL, etc.) to be promoted
- Ease of market entry for telecommunications operators (of any size) for all types of telecommunications services
- Radically higher levels of competition in the telecommunications market, both local and national.

43. To this end, we need strategic interventions to:-

- Facilitate the provision of open access local networking infrastructures (having regard to the current NDP calls)
- Ensure the provision of open access backbones, with national voice and data transit facilities and with access to national/international peering exchanges
- Bring as much as possible of proprietary local and national infrastructures into competitive cost-based, open-access usage.

Priority areas for action

44. **The Group has identified a number of areas for priority action.**

Essentially, these can be seen as grouped in the following categories:

- **Provision within three years through a PPP process of open-access local networks (managed by the PPP operator(s) who would be operator-neutral), in the priority areas identified by the industrial development agencies and targeted already by DPE under the NDP calls and having regard to the forthcoming National Spatial Strategy. It is key that the operation of these PPP local area networks be separated from provision of retail broadband services to end-users**
- **Promotion of accelerated development of a range of alternative and complementary technology solutions (e.g. fibre optic, wireless, satellite, xDSL, etc.)**
- **reform of regimen in relation to ducting**

Provision of local open access networks

45. We believe market forces alone will not remedy the deficit in local open-access network infrastructure we have identified. It would be extremely difficult for suppliers to make a profit from multiple competing local access infrastructures,

outside of a limited number of particularly attractive locations.

46. Therefore provision of a level of basic infrastructure on an open-access, operator neutral basis is needed to overcome the cost barriers to entry and ensure real competition amongst service providers. This level must (as in the current DPE NDP calls), consist of either ducting and dark fibre⁸, or other technology equipment and bases, as appropriate, but will include hubs⁹ and terminators¹⁰ (also known as customer drop connections) in all cases and will provide bearer services.
47. The strategy recommended is as follows:-
- Local access networks starting with the priority areas already identified and agreed, to be procured on a PPP basis at national level with relevant local authority involvement (as a continuation and development of a process model already underway in DPE). At a technical level this would mean in respect of future statutory funding
 - That public funding would only be made available for proprietary access equipment (e.g., xDSL) at hubs (co-location spaces)
 - State funding for DSL would only be provided where at a minimum affordable symmetric DSL would be on offer¹¹
 - no State funding for backbone networking infrastructures except where they provide open-access transiting for voice and data and terminate at co-locations spaces
 - publicly-funded hubs etc. should be to a common specification.
 - The precise technology will depend on the local circumstances and projected demand. In line with the norm in PPP arrangements, output specifications will be determined, rather than input specifications. In many urban areas with volume demand, fibre optic cable may be the optimum solution. Wireless or DSL technologies etc. will be the most appropriate solution in other cases. The network will include either ducting and dark fibre, or other technology equipment and bases, as appropriate, but will include hubs and terminators in all cases and will provide bearer services.

⁸ **dark** as opposed to **lit** fibre. Dark fibre is unused fibre laid in advance and available to lease to operators who will light it to carry their own traffic (e.g. data, voice, TV distribution etc.)

⁹ **Hubs** are managed co-location spaces for the operator equipment which provides the advanced services (DSL, etc.) we wish to make available, interconnection facilities for operators to pass their local traffic onto open access national backbones and links to Eircom exchanges (to which they should be contiguous) to ensure low cost and speedy provision of xDSL). They can be envisaged as the box that connects local fibre to national networks and competing operators' traffic to each other and the world network

¹⁰ ducted fibre is accessed via chambers. To minimise the costs for operators in providing low-cost voice and data services to customers, these chambers should be equipped with equipment to access the fibre. This negates the need for each operator to have its own equipment for this purpose.

¹¹ ADSL is not suitable for e-business in that the upstream bit rate is not sufficient to support Internet access to services hosted by a business

The key point is that the technology risk should lie with the private sector partner

- The open-access local networks would be managed by the PPP operator(s) who would be operator-neutral (a PPP process on similar lines has been initiated by DPE). In effect this involves creation of a “carriers’ carrier” who provides services for other telecommunications companies, but does not compete for end-user customers.
- No service provider should be allowed to gain any unfair or anti-competitive advantage by virtue of participation in the proposed PPP. This will mean complete separation of the ownership and management of local access networks involving public funding from provision of services to customers and that the PPP partner contracted to manage the network or any local part of it would not be allowed provide application services to end-user customers. The objective is to foster real competition amongst service providers companies on the basis of price and service and not on the basis of exclusive access to infrastructure.
- It is important that provision of funding for such local access networks continues to be prioritised under the existing NDP measure provision.
- PPP contracts involve an element of capital risk sharing, with a significant portion of that risk to be taken by the private partner. In this case, we expect that the operational cost risk would be taken entirely by the private partner. This means that at a minimum, the private partner would meet operating costs from charges levied on service providers who use the facility – charges would be determined as part of the PPP process and we envisage a growing capital input from the private sector over time.
- Phase 1 should involve elements of the strategy and different technological solutions (wireless, fibre optic, etc.) being trialed and prototyped in a limited, specified number of locations and should commence as soon as possible. The purpose of the trial phase is to identify issues and test assumptions about costs, technical difficulties, technology, network configuration and cost-effectiveness, private sector interest and consumer response.
- Subsequent implementation phases would depend on successful implementation of phase 1 and would target additional priority areas to be identified and agreed at that stage. The extent of targeted network coverage – and hence the extent of possible Exchequer exposure – would be specified for each phase. The intention is that the Exchequer investment in the local access networks in Phase 1 will be leveraged to encourage significant private sector investment in subsequent phases. This will be done by migrating the local projects to be funded in Phase 1 to the proposed national PPP-type entity.
- Once a critical mass is achieved, we would anticipate that the market response to future implementation proposals will include a growing capital

cost element.

- Control and monitoring of standards (e.g. civil engineering, equipment fibre spec. data encapsulating and system interoperability protocols) and ensuring of open access by the DPE
- The question of leveraging public service data traffic to incentivise private sector participation in provision of the local access networks should be explored.
- During the implementation phase, the potential for Government Departments and agencies to encourage creation of demand to be kept under review, so as to ensure that demand for services emerges in tandem with the infrastructural bottleneck being resolved. There is particular scope for the industrial development agencies, the Educational sector and the Health services to take lead roles in developing of new, cost-effective and innovative ways of delivering their services that would utilise a high broadband capacity once it becomes available at affordable cost to users.
- Open access be granted as a matter of priority to State-owned sites for the construction of co-location sites. This would serve to advance the e-Government agenda and act as a spur to the private sector (it may require legislation).
- External evaluation to be built into each operational phase to ensure value for money and effective achievement of objectives and that the objectives remain appropriate as circumstances change.
- The final phase of the Strategy will involve State withdrawal.

Subsequent phases

48. As indicated above, it is proposed to commence the process with a Phase 1 intervention. Subsequent phases will seek to maximize private sector investment and will be contingent on successful implementation of Phase 1. Satisfactory evidence of private sector interest in making capital investment and remuneration of operating costs from network operating income are key issues in this context. It is envisaged that subsequent phases will target additional priority areas that have been identified. The objective, as set out in paragraph 38, is to have widespread availability of advanced broadband infrastructure and services within three years, subject to the availability of the necessary public and private sector funding. The intention should be to cover the remainder of the 67 towns already identified as priorities in the National Development Plan within three years and, if this is successful, move on to cover all 123 towns in the State with a population over 1,500 within five years. The 67 towns are the essential target for achieving widespread broadband availability within three years. The provision of competitive broadband in all of these towns is critical to the industrial promotion efforts of the industrial development agencies. However, the extent to which these are realizable deadlines and targets will depend on the success of Phase 1 and the availability of necessary public and private funding. In advance of the availability of firm tender prices and of

further consultations with the private sector about its willingness to invest, these targets and timescales are necessarily somewhat tentative. Therefore, it is proposed, later this year, to review the Strategy's progress in achieving the overall objective in the light of the experience gained and propose any necessary modifications, including revised targets and deadlines as appropriate.

Opening up national and regional backbone infrastructures

49. Significant fibre optic cable investments have already been made or planned by semi-state bodies (e.g., ESB, CIE, Bord Gáis). Some NDP grant aid is subject to third-party access provisions. These contractual clauses should be pursued by the Department of Public Enterprise. Semi-states owning networks should be encouraged to make them available on an interoperable and open-access basis. All these backbones would then be operationalised at the lowest possible cost and utilisation significantly increased. We want to foster 'bandwidth sharing' and efficient peering and in general, every effort should be made to bring national and regional backbone infrastructures into open access usage. Access by service providers to the proposed local access networks could, where possible, be conditional on relevant backbone infrastructures in their ownership being available to open-access and on application of industry norms in these circumstances in relation to peering and transiting.

Current NDP call for proposals

50. The Group is aware that a number of individual applications received from public authorities under the current NDP call are aligned with this strategy. Provided that they meet management and other criteria these should be prioritised for funding, and require to be closely aligned and co-ordinated. The alignment of all Exchequer funding under the NDP with the national priorities and goals set out above will continue to be important going forward.

Encouragement of competition between different technologies

51. As provided for under the new regulatory framework for communication networks and services, recently adopted by the EU¹², any legal and regulatory barriers to **convergence** should be removed as soon as possible. This means that, in general, licences should not be exclusive¹³ and any service company should be able to provide voice telephony, TV and Internet access combined on competing technology platforms. It also means that the question of a multi-service provision licence should be seriously examined with a view to early action.
52. In many rural and other underserved areas and for the domestic and small business sector generally, wireless and other technologies offer the most appropriate broadband solution. (DPE's VSAT pilot supports a specific option). It is therefore vital that policy continues to support the deployment of such technologies. Recent regulatory reform - which removes the requirement to obtain planning permission for integrated antennae on existing structures - is a

¹²

http://europa.eu.int/information_society/topics/telecoms/regulatory/new_rf/index_en.htm

¹³ There may, however, be a case for exclusive licences for a defined period, to address under-served regions, test new technologies, or address a particular public policy issue

welcome and very significant step forward in that regard.

Market regulation

53. The ultimate objective of existing initiatives and the suggested approach is to ensure that we have an open-access infrastructure widely available, that low start-up costs and ease of market entry in turn support vigorous competition in provision of services and that the pro-competitive and open-access local network will again in turn facilitate open-access to the national and regional backbone networks.
54. In the short-term, we consider that the ODTR should be asked by the Department of Public Enterprise to bring forward a strategy within three months to secure unbundling of the local loop. If additional powers are required to enable the Office to achieve ULL in practice, then necessary legislation should be brought forward as a priority. We also regard it important that a resolution to the delay in making DSL available should also be found by the parties concerned quickly. It should be noted that progress in this area would have a very significant short-term impact in terms of Ireland's standing in international league tables.

National co-ordination

55. Achievement of the Government policy goal set out in paragraph 38 above will require a sustained commitment and action across a range of Government Departments and agencies. It will also require constant attention as technology and market conditions change with rapid speed. The Group agrees that the agenda needs to be driven forward at national level and that this will involve co-ordinated action across a number of Departments including Public Enterprise; Taoiseach's; Finance; Enterprise, Trade and Employment; and Environment and Local Government. The following functions, which draw on the existing role of the Department of Public Enterprise, fall to be discharged at national level:
 - Overview of national broadband policy and requirements and strategic planning
 - Management of the Exchequer funding to be made available
 - Award of one or more PPP contract(s)
 - Defining, control and monitoring of standards (civil engineering, equipment fibre spec. data encapsulating and system interoperability protocols) and open access
 - Negotiation of inclusion to the greatest extent possible of existing backbone infrastructures in an open-access arrangement
 - Liase with the industrial development agencies about increasing awareness abroad of Ireland's advanced position in the telecommunications area

- Liase with appropriate bodies (e.g. social partners, industry groups and others) on demand side initiatives as appropriate.
- Monitoring implementation of this report's recommendations, identifying obstacles or further opportunities that arise during the implementation process and formulating recommendations to address these.

Government investment

56. €200 million is allocated to the NDP eCommerce measure 2000 – 2006. The cost of our proposals insofar as the priority areas identified by the industrial development agencies and targeted already by DPE under the NDP calls can be accurately estimated as soon as firm market prices are available in respect of the local authority-led projects that have been submitted under the current NDP call and we will return to this issue later in the year.
57. The PPP process will allow for market testing of a range of phasing options. Assuming that implementation is prototyped in a specified number of locations first, then subsequent phases should be timed so as to maximise the private sector contribution. However, PPP market exploration should include testing of interest in the maximum range of phasing options.

Local ducting and fibre networks

58. To minimise the cost and disruption caused by the road openings relating to telecommunications networks, it is necessary to ensure that -
- there is good forward planning for future telecommunications needs
 - local authorities have adequate control over necessary road works
 - ducting is, as far possible, provided as part of new infrastructure build and, in the case of existing infrastructure, at the same time that other ducting is being installed
 - there is a common set of planning and local authority guidelines for the installation of telecommunications infrastructures to provide consistency, transparency and certainty
 - the draft ducting guidelines prepared by the Department of Public Enterprise in consultation with the Department of Environment and Local Government and local authorities are adopted as a national standard.
 - road trenches and/or ducting is shared by telecommunications operators as far as possible.
59. The Group is aware that the Department of Public Enterprise's Communications (Regulation) Bill and additional pending legislation (the Department of the Environment and Local Government's broader Control of Road Openings Bill) will provide greater control to local authorities in this area. Insofar as the telecommunications industry is concerned, the Group considers it important that local authorities have effective power to ensure that sharing of ducting becomes

the norm. Legislation should also provide for the application of common technical standards - to apply in all local authority areas - to be drawn up by the DPE and DoELG.

60. The terms of any future planning permissions should make it obligatory for the developer to lay ducting and transfer it to the local authority when building urban roads, housing and industrial estates. We understand that the Department of Environment and Local Government is considering issuing an administrative circular to local authorities to this effect.

North/South dimension

61. Both the North and South of Ireland face the same issues in relation to broadband. InterTrade Ireland has already initiated a Digital Island Group which provides a useful vehicle to examine further the benefits that may arise from considering broadband services in an All Ireland context and the scope for joint actions.

Annex A: Membership of Working Group

Deaglán Ó Briain, Department of the Taoiseach: (Chair)

Aedan Hall, Department of the Taoiseach:

Margaret O'Brien, Department of the Taoiseach (Secretary)

Ciarán Ó hÓbáin, Department of Arts, Heritage, Gaeltacht and the Islands

Ruth Carmody, Department of Education & Science

Michael English, Department of Enterprise, Trade & Employment

Jim Humphreys, Department of Environment & Local Government

Tom Sheridan, Department of Environment & Local Government

Niall Ó Donnchú, Department of Public Enterprise

Roger O'Connor, Department of Public Enterprise

Jim Duffy, Department of Finance

Tim Duggan, Department of Finance

Paul Byrne, Department of Finance

Declan Hughes, Forfás

Annex B: Glossary

- **ADSL** Asymmetric digital subscriber line – a communications technology which allows an ordinary telephone to be used for high-speed (broadband) communications. The fact that it is asymmetric makes it particularly useful for Internet access
- **Alternative carrier** an operator other than an incumbent operator which connects directly to the end customer
- **Always-on** Telecoms services (particularly Internet access) which is always available, negating the need to dial up
- **ASP** Application service provider – an organisation which takes on specific applications such as payroll or server backup and manages those applications over high-speed communications links. Also, application service provision
- **Backbone** On the Internet or other wide area network, a backbone is a set of paths that local or regional networks connect to for long-distance interconnection
- **Bandwidth** The width of a communications channel, typically measured in kbit/s (in digital systems). This measure gives an indication of how fast data flows on a given transmission path
- **Broadband** A high speed connection which allows communications at speeds higher than can be achieved through basic rate ISDN (144kbit/s)
- **Byte** A group of eight bits used to represent all of the characters on a keyboard. The byte is the basic unit in which data is stored, retrieved and communicated
- **Cable modem** A device that connects a computer to the Internet via a local cable network operator
- **CPE** Customer premises equipment – the in-building equipment necessary to provide services that run over the network
- **Dial-up** Connection to a network using a modem and a standard telephone
- **Digital** The use of a binary code (ones and zeros) to represent information
- **DSL** Digital subscriber line – a family of similar technologies which allow ordinary telephone lines to be used for high speed broadband communications. The family includes ADSL, HDSL, VDSL etc.
- **Ecommerce** The ability to transact business over communications networks
- **Fibre/fibre-optic** Strands of very pure glass that can carry far more information than copper wires over far greater distances
- **Fibre nodes** The new fibre points of presence, including cabinet, power supply and interconnect space
- **Fibre speed** Implies greater speed than can be delivered by technologies such as DSL or cable modem
- **ICT** Information Communication Technology
- **Interconnection** The point at which one network hands over traffic to another network. The price and terms and conditions that apply to the handover are also referred to as interconnection
- **Internet** The world's largest computer network, available to anybody with a PC, a modem, a telephone line and an access provider. It supports the reading of text, graphic and video files and email exchange
- **IP** Internet protocol – the communications standards used by the Internet
- **ISDN** Integrated services digital network – the technical standard used in the public switched telephone network (PSTN)

- **ISP** Internet service provider – an organisation which allows companies and individuals to connect to the Internet
- **kbit/s** Kilobits per second – a measure of how many bits can travel between two points in a second in thousands of bits
- **LAN** Local area network – a network in a building or on a site usually used to connect computers together
- **Leased lines** A leased line is a telephone line that has been leased for private use. Typically, large companies rent leased lines from the telephone message carriers (such as AT&T) to interconnect different geographic locations in their company
- **Local exchange** The telephone company exchange where subscriber lines are terminated
- **Local loop** The copper wires an incumbent has between its exchanges and its customers
- **Local access** The connection between the customer's premises and a point of presence on the exchange carrier
- **Mbit/s** Megabits per second – a measure of how many bits can travel between two points in a second in millions of bits
- **Mobile** An abbreviation commonly used for mobile cellular communications – referring to mobile telephone networks
- **Online** Either simply operational, or an indication that a computer or application is connected to a wider network
- **Peering** The process by which Internet operators of similar size exchange traffic without charging each other. Where operators are not similar then one has to pay the other to handle its traffic
- **POP** Point of presence – a point where a network can exchange traffic
- **Radio access technologies** Technologies (such as LMDS, FWA, Bluetooth, 802.11b) which enable access to the Internet via radio
- **Regulation** The process by which a government agency ensures that a complicated market like telecoms behaves as if it were a competitive market while one player, the incumbent, has an extremely powerful position in that market
- **Satellite** A body in space which receives signals from the earth and beams them to another part of the earth
- **Switching** The process whereby traffic is routed over the network to its intended destination
Circuit switching: a form of switching where data is sent through a network on a path which is reserved for the entire duration of a session
Cell switching: a form of switching where data is assembled into groups of equal size, addressed and sent through a network to its destination
Packet switching: the same as cell switching but with data assembled into groups of variable size
- **Symmetric connection** A connection with the same bandwidth in both directions
- **Upstream** The capacity of a network reserved for carrying information or other signals from the user to a server, exchange or controller
- **VPN** Virtual private network – a service that looks like a private network to the customer but which is delivered over a shared network
- **Wholesale** Sale of goods or services to another party who is not the final consumer of the good or service
- **Wireless access** Access via a system that operates locally without wires
- **XDSL** see DSL