

Recommendations for Dublin as a World Class e-City, and Ireland as a World Class e-Nation

e-City Working Group
Dublin Chamber of Commerce

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This material was gathered by members of the Working Group and represents work in progress: it does not record the final deliberations and recommendations of the Working Group.

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The members of the e-City Working Group and Dublin Chamber of Commerce make no representation or warranties about the accuracy of any data or information published in this report. The various metrics gathered, and the conclusions and recommendations made as a result, were produced and published in good faith by the Working Group using publicly available information. The Working Group of course would be delighted to correct any inaccurate data once it has been brought to their attention.

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Executive Summary

This report is a companion to our 2002 Comparison Report of Dublin and other international e-cities. A summary of the 2002 international comparison is given later below in section 1.2.

In this document we analyse the current e-infrastructure and e-agenda in Ireland, and make recommendations in the light of the Comparison Report.

The e-City Working Group was asked by the Dublin Chamber Executive to study Dublin's capabilities as an international e-City and to also make appropriate recommendations. However the Working Group believe that much of our findings can be applied to other cities and towns, and indeed rural areas, across all of Ireland. We very much acknowledge and support the need for a national strategy for nationwide e-infrastructure, and not one that is purely Dublin centric.

We note that over the last twelve months there has been moderate progress on the national e-agenda. Ireland now has an e-Minister, and the Government published its basic plan for e-infrastructure and e-Government in March 2001. ADSL "midband" services are now available on a limited basis, but uptake by both the SME sector and general public to date has frankly been slow. The Government is proceeding with its initiative to provide high quality, optical fibre based, metropolitan area networks in a number of cities and towns outside of Dublin, and intends to make these available on an open access basis to any operator wishing to provide broadband services.

We agree with the Government's own assertions that there is substantial social and economic benefit to a pervasive high quality broadband infrastructure for all of our citizens. We ourselves also believe there is an opportunity to position Ireland as a world class centre of competence in high quality broadband applications and related technology.

Section 6 of this report lists many recommendations that we wish to make. However our key recommendation at this time is the urgent need to develop a comprehensive, holistic and coherent national plan for a high quality e-infrastructure, including nurturing its widespread adoption by our society. Pragmatism is needed, and there needs to be a balance between short term, medium term and long term actions and goals; and between the needs of rural areas and the needs of the urban majority. The development of a holistic, phased plan for the national infrastructure – backbone, backhaul, and especially the last mile is now of very high priority. Stability of Government policy is now critical if operators are going to invest further in the Irish broadband infrastructure.

We believe that this plan should be developed in an open collaborative manner, involving the appropriate Government departments and agencies; telecommunications operators; business community, including especially the SME sector; the socially disadvantaged community, and the general public as appropriate. Models for such a Stakeholders Group exist elsewhere, most notably in our neighbour in the UK.

We believe that the implementation of the plan should be co-ordinated by the e-Minister, and that the process should be transparent and open. In particular we urge regular reporting to the public on the status of Government related implementation, including the e-Government programme.

We believe that the Government's initiative on high quality, optical fibre based, metropolitan area networks is extremely timely and valuable, and we want to ensure that the broadband industry, including content providers and application extenders and developers, are extremely well positioned to take advantage.

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1 Background to Recommendations

This report is a companion to our 2002 Comparison Report of Dublin and other international e-cities. A summary of the 2002 international comparison is given later below in section 1.2. In this document we analyse the current e-infrastructure and e-agenda in Ireland, and make recommendations in the light of the Comparison Report.

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1.1 The 2001 Recommendations

We published our 2001 recommendations on 17th December 2001. Our key recommendations at that time are listed below, together with a summary of the responses to these recommendations. Overall, we are pleased that most of our recommendations last year have come to be implemented.

1.1.1 *E-City Leadership for Dublin*

“Dublin, and Ireland, need a distinct and visible leadership. A new Ministerial position, probably at Minister of State level, should be created and charged with vision and implementation. This e-Commerce Minister should be located within the Department of the Taoiseach and have direct influence on all Government Departments.”

Last year we deplored the lack of leadership and definition of a national e-agenda plan. Since then, the Government published the “New Connections” document¹ as the national e-agenda plan, and Ms Mary Hanafin has been appointed as the national e-Minister, within the Department of the Taoiseach. She has a direct liaison role across all Government Departments. Combining her role with that of Chief Whip is an interesting innovation which we did not anticipate, but on reflection we believe is reasonable in helping assure full support across Government for the national e-agenda. However combining these two roles also with that of Junior Minister for Defence appears to be ambitious, and, with enormous respect, we have some concerns about her ability to proficiently manage her time and attention between the three roles.

1.1.2 *Lead by Example:*

“The Government REACH Initiative should be fast-tracked and advertised so that the public can more efficiently interact with public services via the internet than more traditional forms: the public sector will benefit through re-utilisation of resources.”

In the last year the Government has put together an extremely impressive list of e-government projects, in most areas of national Government. There are approximately 150 projects, of which quite a number are operational, and the rest of which are under development. The Government is currently evaluating a call for tenders for the development

¹ Available at www.taoiseach.gov.ie/upload/publications/1153.pdf

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of a central hub, or broker, which can provide a single point of access and unified view of all e-government services to the public.

The momentum behind the national e-government programme is good. We have some concerns that the general public, both private citizens and corporates, may be unaware of the range of services currently available, and our recommendation of 2001 for further advertising these to the public remains.

1.1.3 e-Infrastructure

“Give Dublin (and Ireland) a world class broadband infrastructure: Many actions are needed here, and the Government should be extremely proactive in removing obstacles, and accelerating availability.”

There has been some progress on the e-infrastructure: ADSL services are now at last available. Flat rate internet access is apparently imminent. However we anticipate much more substantial progress over the next 12 months as the Government stimulates 5Mbps quality broadband services via the national MAN programme (c.f. section 3.2).

1.1.4 Regulatory Environment

“Establish a legal and regulatory environment which greatly encourages investment in broadband infrastructure and establishment of e-businesses and information society services.”

At the time of our 2001 report, it appeared that the Telecommunications Bill had stalled. The Bill was subsequently enacted in the spring of 2002. The role of the Regulator has recently been extended and changed to the Commission for Communications Regulation.

1.1.5 Easier consumer access devices

“Make Dublin, and Ireland, a Global Showcase: Stimulate demand and use of the internet and the broadband infrastructure by the general public by providing commercial incentives for low cost, simple to use, access devices.”

One of our main recommendations in 2001 was to stimulate consumer demand for the internet via simpler access devices than PCs. We felt that PCs are overly complex for many members of the public, compared to other consumer devices. We also feel that they are generally aesthetically unappealing, as well as sometimes noisy and cumbersome as consumer equipment.

Last year we also postulated that the small population of Ireland could make it an attractive location for trials of new devices. We note that the Isle of Man has similarly been targetted as a trial location in Europe for the testing of 3G mobile telephony technology.

Consumer devices for the internet have not greatly improved in the last 12 months, but there is likely to be new internet capable devices for e.g. PDAs.

We make further recommendations to stimulate demand and interest in the internet later in this report.

1.1.6 Venture and Seed Funding

“Improve the availability of venture funding and, at this time, seed funding in particular. There are role models such as the Tel Aviv

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example here, and Enterprise Ireland should be the co-ordinating agency.”

A year ago, capital was extremely limited for new ventures as investors sought to protect their portfolio companies in response to longer times to achieve exit for their investments. Currently we believe that venture and seed capital has eased slightly, and we believe that a good team and business proposition should be able to find funding in today's environment.

1.1.7 Computer Literacy and Training

“Basic Computer Literacy and Internet Training should be made available to all members of the general public, SMEs, schools and third level institutions. We believe that the already marginalised, the un-skilled, and the un-employed also merit particular attention. The awareness of what courses are already available, and the motivation for taking them, needs to be increased. Internet training, and more deeply driven IT literacy, needs to be more widely promoted and adopted by the SME sector.”

Computer literacy has improved slowly over the last year. However we remain conscious that without a compelling reason to learn how to use the internet, that many members of the public will choose to remain computer illiterate. There are a wide range of courses accessible and available: the issue is more that some remain unconvinced that they should bother. Thus in this year's report we later below identify specific applications which should draw a wider audience from the public to the internet.

1.2 The 2002 Benchmarking

We summarise on the next page our findings from our companion 2002 report.

As in 2001, we have concerns about Ireland's international competitiveness from the perspective of quality of broadband infrastructure. While we very much welcome the appointment of the national e-Minister, we continue to have concerns about overall co-ordination, leadership and implementation of a credible national e-strategy. While we view the entrepreneurship capacity of the economy to be good, our labour competitiveness clearly gives concern to many. The legal and regulatory environment continues to improve, but is not yet world class. Capital availability for new projects and new ventures has clearly diminished in the recent past. The taxation and incentives environment is reasonably good. There remains commitment to resolving digital divide issues, but our sense is that many of the socially disadvantaged have yet to benefit from the social and economic advantages of a world class e-environment.

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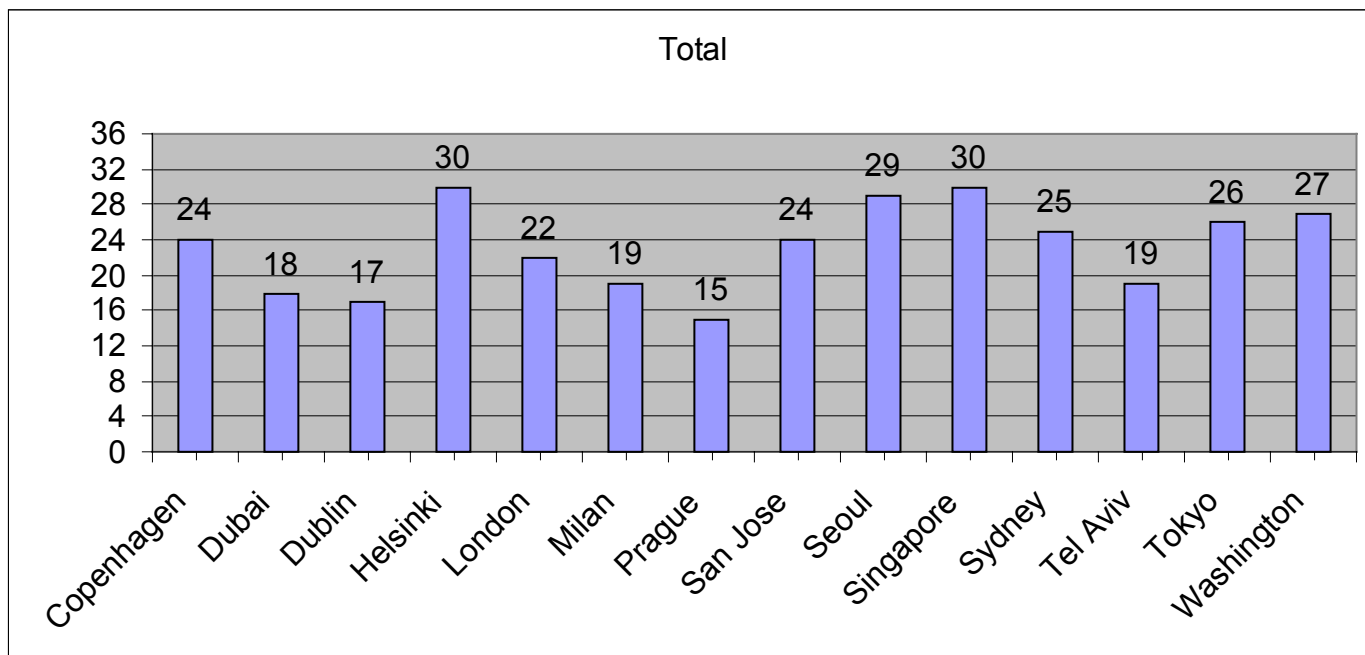
1.2.1 E-City Comparison Summary²

	Copenhagen	Dubai	Dublin	Helsinki	London	Milan	Prague	San Jose	Seoul	Singapore	Sydney	Tel Aviv	Tokyo	Washington
Leadership	●	●	○	●	●	○	○	○	●	●	●	○	●	○
Infrastructure Quality	●	●	○	●	○	●	○	○	○	●	●	○	●	○
e-Infrastructure Competitiveness	●	○	○	●	○	●	○	●	●	●	●	○	●	●
Labour Competitiveness	●	○	○	●	○	○	●	●	●	○	●	○	●	●
Entrepreneurial	○	○	●	●	●	○	○	●	●	○	●	○	○	○
Legal/Regulatory	●	○	○	●	●	○	○	○	●	●	●	○	●	●
Capital Availability	○	○	○	●	●	○	○	●	○	●	●	○	○	○
Taxation/Incentives	○	●	○	○	○	○	○	○	●	●	○	○	○	○
Digital Divide	●	○	○	●	○	○	●	●	●	●	○	○	●	○

² Please note that you require the Lucida Sans Unicode font to view this table correctly

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Also reproduced from our main report, the “moon” chart above can be summarised as a bar chart, with scores of 0 (“no moon”) to 4 (“full moon”) for each of the nine categories, thus giving a maximum possible score of 36:



From this, we observe there are three bands of e-cities in those surveyed in our study.

- Those with excellent attributes for a world class e-city: Helsinki, Seoul and Singapore
- Those with very good attributes: Copenhagen, London, San Jose, Sydney, Tokyo and Washington
- Those with only moderate attributes: Dubai, Dublin, Milan, Prague and Tel Aviv.

In particular we note that Dublin is positioned second last, using our qualitative metrics, and within the set of e-cities which we studied. The general reasons for this position were summarised at the start of this section.

1.3 Introduction to some terminology

Throughout our report, we use some terminology which may be unfamiliar to those readers without a background in the broadband debate. A glossary of terms used in this report is in any case included in section 8.

We generally use broadband as a term to denote the provision of internet related services and applications over high speed transmission networks.

As a guide, a single A4 page full of text in this document consists of about 5,000 bits: thus a transmission speed of one kilobit per second (KBps) would transmit approximately one fifth of such an A4 page per second. ISDN services typically transmit at 64Kbps, and thus would transmit just under 13 such A4 pages a second. In this document, we consider this a relatively slow rate, and sometimes use the term narrowband to describe such transmission services.

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ASDL technologies use ordinary telephone cable to transmit (over limited distances of at most a few kilometers) at up to approximately 1Mbps, or approximately 200 such A4 pages a second. We occasionally use the term midband to describe such transmission services. The latest generation of mobile telephony networks, 3G, have yet to be deployed in Ireland: they too are typically midband services up to 1Mbps.

We generally reserve the term broadband to imply transmission speeds above 2Mbps, and more particularly video quality broadband to imply a transmission speed at 5Mbps or higher, sufficient to carry live TV or cinema video streams.

We also distinguish between symmetric and asymmetric transmission systems. Symmetric transmission is critical for applications such as telephony and video conferencing, and highly desirable for web site provision. Asymmetric systems by contrast offer high transmission speeds in one direction compared to the other: ADSL networks for example typically offer midband services from the network to the consumer, and narrowband from the consumer to the network. Low cost satellite transmission services are also asymmetric: broadband from the satellite transmitter to the receivers, but no return path directly from the receivers back to the transmitter. Either another transmission system must be used for the return path (eg a dial up telephone link, or ISDN), or for a full symmetric solution, the receiver must also invest in a transmitter himself.

We distinguish too between realtime connections, and store and forward. Realtime connections are used to provide a direct connection between two or more parties. Store and forward allows batching of information to be delivered as convenient by the network, and perhaps even overnight. A telephone provides a realtime connection; the postal service is store and forward.

Finally, there are three categories of infrastructure needed to establish a national broadband system: last-mile, backhaul and backbone. Backbone infrastructure provides foundations for inter-city and inter-region connectivity. Backhaul infrastructure provides metropolitan access in a particular city, town or local area. Last mile designates the connection of individual buildings and sites to the backhaul network. In addition to these three designations, there is of course also the need for international connection of the backbone infrastructure to other nations, and which we do not consider in this report.

2 The Current Realities

The entire population of Ireland is similar to just many moderate sized European cities, is less than major ones, and naturally has a much lower population density than any single city. The population and density of Dublin itself matches only smaller European cities. For operators of broadband services, the potential market for broadband in Dublin, or nationwide, is thus restricted, and the implementation costs relatively higher, in comparison to commercial opportunities elsewhere.

Commercial operators require credible business reasons for installing and operating broadband services. In addition to the market scale issue which Dublin and Ireland present to operators, the sovereignty of our State also imposes its own regulatory issues. There is not the political will across Europe for a single, European wide, telecommunications regulator. Although the principles involved are broadly harmonised, there are differences in national regulatory schemes, which in turn increase the costs to broadband operators in addressing the entire European market.

In the Irish market, the large commercial customers, and specifically some foreign multinationals, are the obvious main opportunities for broadband operators. The business case for serving these customers is reasonably clear. Further, foreign and indigenous multinationals presumably factor the telecommunications costs of undertaking business operations here into their overall strategy of locating operations in Ireland. Arguably they are thus not overly concerned by the level of broadband charges in the context of a holistic evaluation of the positive fiscal incentives, and in particular corporate taxation rates.

For broadband operators, there is thus a distinction between the attractive opportunity to serve a limited number of large commercial customers, and the questionable market from the broader domestic and SME sector.

2.1 The SME and domestic sectors

Many of the Dublin Chamber's members are small and medium enterprises (SMEs). The business cases for broadband operators to serve the SME and domestic sectors is arguable. The market opportunities, by international standards, are small, and the costs of service rollout and regulatory compliance may be difficult to commercially justify, given the relatively limited revenue opportunities. Direct competition from other operators merely increases the commercial risk.

It is uncertain whether the market demand and expectations from the SME and domestic sectors can increase the confidence of the broadband operators in the potential revenue opportunities. From the perspective of the operators, on the positive side, both the SME and domestic sectors are captive markets, which cannot relocate elsewhere, unlike the foreign or even the indigenous multinationals. However on the negative side, uptake by SMEs of broadband is currently limited. At the moment many SMEs apparently view ISDN costs as prohibitive, and likewise to the extent that it is available, ADSL.

Flat rate internet access in principle should address the concern of some SMEs, and other potential customers, that the "clock is ticking away" while they stay online, but in practice the current Irish charges for flat rate are extremely uncompetitive³ compared to other e-cities⁴.

³ Eircom's I-stream ADSL product offers a flat rate service starting at €89 per month for a single user, going up to €169 per month for unlimited multiple users. However these rates are metered megabyte downloads, and only the top of the range fees allow completely unmetered usage. Eircom's wholesale line rental to other operators is €16.97 per month, which is 70c more expensive than that which eircom charges to its own retail customers. UTV Internet are now offering a flat rate metered service in Ireland for €29.99 per month. In the UK, similar services are now available at less than €20.00 per month.

⁴ Our companion report noted, for example, that in Sydney dial up users can stay online indefinitely for the cost of a local call, i.e. €10cents. While this is not directly comparable to ADSL quality broadband, it shows that narrowband at least can be used always on.

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However on 24th October last, the Minister for Communications, Marine and Natural Resources made a policy directive to the then Office of the Director of Telecommunications Regulator (ODTR)⁵ that operators in Ireland must introduce flat rate internet access, at a price yet to be determined, within a period yet to be defined. When implemented, flat rate internet access should encourage SMEs to more proactively make use of the internet.

Based on experiences elsewhere (for example London and the UK market) we however remain cautious about the merits of flat rate internet access for dial up connections. Experience has shown that consumers tend to dial up and leave their connections open for lengthy periods, even if they are not necessarily actively using the internet. In these situations, telephone exchanges can become clogged by what are actually inactive connections, thus reducing the capacity not only to other dial up internet connections, but of course also to all voice calls in general. Telephone systems were naturally originally designed for relatively short voice calls, and not for long duration calls supporting internet access. The solution to congestion of dial up lines due to idle internet connections is to promote other access technologies more suitable for internet connection, and/or offload traffic (even voice) to adjacent IP equipment: we thus suspect the introduction of flat rate internet access may encourage operators to promote other offerings ahead of dial up access.

For domestic users, we suspect a discouragement to going online is the sense of urgency and pressure to quickly complete the online session, and thus reduce cost. Thus the provision of a flat rate, time independent, fee should alleviate this. A second discouragement is the latency delays in waiting for web pages to load and the network to respond. We believe that broadband offers a more relaxed environment in which to explore the internet. It provides an unhurried environment in which individuals are more likely to find communities of interest to them, and provides a more convenient and easier to use way of exploration and learning, than the time limited, frustrating delay filled sessions which are currently the unfortunate norm in Ireland. We sense that broadband operators may have more successful marketing campaigns by reducing their emphasis on speed of downloads, and emphasising more the unhurried quality of interaction that broadband enables.

Finally we suspect that access to quality broadband could become a driver for house price increases. For this reason alone, it is important that high quality broadband becomes widespread and pervasive, rather than the privilege of occupiers of certain urban suburbs.

2.2 The cost of a quality national broadband infrastructure

Last September, the Ovum published an analysis⁶, commissioned by the then ODTR of the cost of implementing a quality nationwide broadband infrastructure over the period 2002-2007. Various assumptions were made, including demographic patterns, and the direct operational cost of maintenance of the system. Business activity related costs, such as marketing of the infrastructure, were however not included. For a nationwide coverage of 85% of the population, and with 60% of the population actively using the infrastructure, the investments necessary were predicted as follows⁷:

- 512Kbps infrastructure, sufficient for email, and document transfer: €450M
- 2Mbps infrastructure, sufficient for moderate quality streaming video: €2B
- 5Mbps infrastructure, sufficient for TV quality video: €4.1B

Ovum state that a major factor in the full cost of €4.1B they indicate for a widespread 5Mbps infrastructure, is the need to improve the current backhaul infrastructure. 5Mbps could not

⁵ The Office of the Director of Telecommunications Regulation (ODTR) has recently been re-constituted as the Commission for Communications Regulation (ComReg).

⁶ Available as document 02/79 on www.odtr.ie

⁷ It should be particularly noted that these costs do NOT take into account the availability of State funded MANs, as discussed later in section 3.3.2. Ovum state the reason that they did not take these into account was uncertainty at the time of their study of the timescales for availability of the MANs.

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be run over most of the copper based wiring currently used to connect individual premises to the local telephone exchange, both due to the distances involved (transmission rates over copper deteriorate with distance) and in some cases to the quality and age of the copper cabling itself.

2.3 Political Realities

The desirability, and financial feasibility, of a national high quality broadband infrastructure has not, in our opinion, in general been as widely debated by the political community nor by the general media as other issues relating to the national infrastructure and quality of life.

There has been some limited political discussion about the advantage of a broadband infrastructure to aid regional development, and to de-centralise economic activity away from Dublin. There has certainly been lively lobbying conducted by protagonists within the Information and Communications Technology sectors, including organisations such as the Irish Software Association, and by the ICT forum of the Irish Business Employers Confederation. Finally both the Chambers of Commerce of Ireland and of course ourselves in the Dublin Chamber of Commerce have added our concerns to the debate.

We hope that this document, and its recommendations, will stimulate a broader discussion on the desirability and feasibility of a high quality national broadband infrastructure.

A major contribution to the broadband agenda was made by the Government in their New Connections document⁸, published in March 2002, and which we discuss below in section 3. We have been a little disappointed that this document has not been subject to public discussion and appraisal by all political parties, and we wonder whether all the parties support this policy document or would have alternative or complementary proposals.

We suspect that for many currently outside of the broadband debate, the key questions are how important is a national broadband infrastructure, in the face of additional priorities such as the transportation infrastructure, our health service, and capital investment in the education sector? Given a difficult national financial environment, should we really be investing in broadband? We ourselves for example believe that it is not socially acceptable to prioritise quality broadband linkage to a primary school if there are urgent health and safety issues endangering the very fabric of that school. We give our own views on the strategic social and economic importance of broadband throughout this document, and in particular in section 4.

⁸ "New Connections" Government Action Plan, March 2002, available at www.taoiseach.gov.ie/upload/publications/1153.pdf

3 The Government's Vision

If we want Dublin-wide, and nationwide, high quality broadband services, it is clear that the broadband operators are unlikely to provide such services under the current market conditions (c.f. section 2). The Government thus views high quality broadband adoption as requiring a new and different strategy to realise the potential of the Information Society.

An Taoiseach, Bertie Ahern, wrote, as recently as last March⁹, that:

- "Information Society ... is bringing about the single most dynamic shift in the public policy environment in the history of the State."
- "The implications are generally accepted to be as far reaching as those of the industrial revolution"
- "Our engagement with the challenges and opportunities of this agenda *is central*¹⁰ to future economic and social development."

The New Connection document further states¹¹

"Our relatively small size as a country gives us the capacity to act quickly. It also brings an opportunity to show, *through effective leadership*, what can be achieved."

and¹²:

"The availability of adequate bandwidth and of affordable, always-on access to advanced telecommunications services *is fundamental* to Information Society objectives. It is critical to our competitiveness in terms of *attracting and retaining foreign direct investment*, and ensuring *balanced regional development*. It is critical to realising the opportunities presented by online provision of government services. And it is critical to unlocking the potential of ICTs to *address issues of social disadvantage and exclusion*.

Ensuring development of the national infrastructure that is necessary *for the delivery of advanced telecommunications services is therefore the single strategic priority of greatest underlying importance* to our economic and social development as an Information Society.

In the medium term, we expect that broadband speeds of 5Mbps¹³ to the home and substantially higher for business users will be minimum standard within 10-15 years 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 New Connections Government Action Plan is visionary and is a carefully considered analysis and commitment by our Government. Being the *first* country in Europe to make high quality (minimally 5Mbps) broadband services widely available is an extremely ambitious goal, and is an aggressive challenge and gauntlet thrown down to the rest of Europe. We understand that the European Commission has suggested that all Member States should strive to provide 5Mbps services to their citizens over the next few years. According to the September Ovum report, such an infrastructure in Ireland will cost of the order of €4.1B (c.f. section 2.2).

For comparison, as we note in our companion report, the Korean Government has continued its aggressive national broadband rollout, despite the current global downturn in technology, by confirming earlier in January of this year its commitment to invest €10B in the technology

⁹ Forward to the "New Connections" Government Action Plan, March 2002.

¹⁰ The emphasis here, and subsequently, is our own: we highlight what we understand as the key, publicly affirmed, national strategic imperatives of our Government.

¹¹ "New Connections" Government Action Plan, March 2002, page 5

¹² "New Connections" Government Action Plan, March 2002, page 6

¹³ The minimum speed at which TV or cinema quality video becomes possible.

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industry, under the catchphrase of “Global Leader, e-Korea”¹⁴. In particular, the Korean government have publicly committed to a nationwide 10mbps broadband network to the home by 2005.

Meanwhile closer to home, Prime Minister Blair in the UK has stated that “the UK will have the most extensive and competitive broadband market in the G7 by 2005”. In November 2002, he announced that every primary and secondary school in the UK will have broadband internet access by 2006. Connections will also be made available for every GP surgery, hospital, primary care trust and health authority in the country. Higher bandwidth will be provided across the entire criminal justice system. The commitment is part of a broader £6 billion investment in ICT over three years, designed to transform government services - including over £1 billion towards providing key public services with broadband connectivity¹⁵.

The Irish Government has, since its re-election, appointed Minister Mary Hanafin TD as the specific individual who is publicly accountable for the implementation of the New Connections document, and reporting directly to the Taoiseach¹⁶.

In conversations with our group, and elsewhere, Ms. Mary Hanafin has stated she is determined to be publicly seen to successfully implement the New Connections strategic plan.

3.1 The Government’s e-Government initiative

One of the major commitments in the New Connections document is Government’s e-Government programme¹⁷. This is a development of the Government’s 1999 Action Plan. To date approximately 150 projects have been funded from a €109M Information Society Fund, across a wide range of government departments and agencies. Some of the key services involved include the Revenue Online Service; FÁS e-recruitment; Land Registry and property ownership; Junior and Leaving Examination results; CAO applications and status; driving test applications; Government, both central and local, e-procurement; public service recruitment; national sheep identification system; e-forms for online application to a range of public services; social welfare services; a single site for all local authority library catalogues; status and roll out of physical infrastructure projects nationwide; and skills training for the farming community. The range of such e-services is extremely impressive, and we commend the Government for the very wide range and comprehensive e-government services currently in progress, and as described in the Appendix to the New Connections document. We comment further on the e-Government programme, and in particular the recent newspaper reports of “cut backs” and re-allocation of responsibility from the Information Society Policy Unit for e-Government projects back to the Departments concerned, later in section 5.3.4.

We suspect however that one of the greatest consequences of the national e-Government plan has yet to be thought through. As the various projects are implemented, there are clearly substantial implications on the business processes and the work practices of the civil servants in the departments and agencies concerned. It is uncertain whether the local managers, staff and the unions concerned have been fully briefed on these developments, and in particular whether the opportunities for re-allocation of resources which are freed up by an extensive e-government environment are fully understood.

¹⁴ Korea Times, 27-01-2002

¹⁵ <http://education.guardian.co.uk/elearning/story/0,10577,843769,00.html>

¹⁶ The central nature of IT strategy to a Government is a common theme which we reported in our companion report: for example in London with the e-Minister and Secretary of State (Patrica Hewitt) with overall responsibility for the Government’s e-agenda, and the e-Envoy (currently Andrew Pinder MP, who has a background in technology himself from Logica) has complete responsibility for policy across the full spectrum of e-government and e-commerce; in Tel Aviv in May 2002, the Government decided to establish all the necessary infrastructures for e-Government and to organise all related activities under the Prime Minister’s office; and of course in Singapore where strong central government has determined the city’s e-agenda.

¹⁷ “New Connections” Government Action Plan, March 2002, pages 15-23

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As the specific Minister publicly accountable for the New Connections, we encourage Minister Hanafin to publish monthly updates on the progress of the implementation of the New Connections vision, noting the specific individuals and organisations responsible for each task, and the status of their work against expectations. We believe that the public in general is largely unaware of the depth of work being undertaken, and the range of services already available or emerging within the next year --- this is a substantial opportunity to provide better services to our citizens.

3.2 The Government's Metropolitan Area Network (MAN) Programme

The New Connections strategic plan also provides the background¹⁸ to the MAN programme.

The MAN programme was announced in March earlier this year, by the then Minister for Public Enterprise, Ms. Mary O'Rourke TD¹⁹. The €230M National Broadband Strategy is a part of the National Development Plan (NDP). The first phase invests €60M (90% of which is from public funds) into MANs in 19 priority²⁰ towns²¹ before the end of 2003. The remainder of the 67 towns similarly identified as priorities within the NDP will follow within by the end of 2005, and all 123 towns in the State with populations exceeding 1,500 individuals each will be similarly provided before 2007.

The timing of the MAN programme has been fortuitous. The cost of optical cabling and associated equipment has fallen very dramatically over the last year, and it is understood that the Government has been able to procure at very attractive prices, including options for additional purchase for the further phases of the programme, which are locked to the current low prices. All equipment is centrally procured, guaranteeing common technology across all the MANs.

It should be noted that the September Ovum report on the cost of a quality broadband infrastructure for Ireland (c.f. section 2.2) did *not* consider the impact of the MAN programme. Ovum acknowledge the announcement of the MAN programme in their report, but state they did not take its impact into account since they were uncertain at their time of writing last summer, of the timing of the availability of the MANs. With a State sponsored MAN programme addressing the backhaul issue, together with the fall in the price of optical based telecommunications equipment, the full cost of a 5Mbps infrastructure should now be less than the reported Ovum figure.

The MANs are extensive in each location: for example, the MAN ring for Cork will be 53km in length, and passes major retail streets, primary and secondary schools, third level institutes, hospitals, major housing estates, major industry parks, and civil facilities including fire stations and garda stations.

Each MAN is reasonably resilient to failure. In contrast and in some cases, some operators have reputedly installed optical cable in some locations on an as needed basis, resulting in a "hub and spoke" architecture which may not be particularly resilient. This would be a concern for, for example, remote medical applications (c.f. section 4.5).

Each MAN installation will allow operators three levels of choice of access: to the physical ducting, to individual optical cables, and to ranges of frequencies available on each specific optical cable.

¹⁸ "New Connections" Government Action Plan, March 2002, pages 6-9

¹⁹ www.irlgov.ie/tec/press02/March8th2002.htm

²⁰ As identified by Enterprise Ireland and Irish Development Authority.

²¹ Athlone, Ballina, Carlow, Carrick-on-Shannon, Clonmel, Cork, Dungarvan, Galway, Gaoth Dobhair, Kilkenny, Letterkenny, Limerick/Shannon, Manorhamilton, Mullingar, Port Laoise, Roscommon, Tullamore, Waterford and Wexford.

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The individual Local Authorities in whose jurisdictions the MANs are located will not operate and maintain the networks. Instead expressions of interest for tendering of the operation of a Managed Service Entity (MSE) have been solicited by the Government via the Official Journal of the European Communities. When appointed (during 2003), the MSE is likely to be a telecommunications operator, but not necessarily one already present in the Irish market.

The MSE will be responsible for operating, maintaining and repairing as required the collection of MANs nationwide, while respecting the general strategic objectives of the Government, and wholesale access to broadband capacity to operators wishing to target specific regions. While historically some Local Authorities may have viewed the rollout of broadband as their opportunity to obtain revenue as a local tax from telecommunication operators, the new national programme is emphasising the strategic importance of broadband access to regional economic and social development, and thus it is in the local strategic interests of the Local Authorities to fully co-operate.

The national MAN programme is being co-ordinated by the Department of Communications, Marine and Natural Resources, together with a team of external experts. Particular attention is being paid to insisting on common technology standards across the nationwide collection of MANs, including the connections to national backbone networks.

The overall objective of the MAN programme is to provide operators with relatively low cost access to fibre optic based²², very high capacity, cable systems in the towns involved. Operators which have already laid their own fibre optic cabling, possibly with assistance from the public purse, in specific locations can of course continue to use it, presumably at a lower cost to them than using the MSE operated alternative. In due course and after the first phase of 19 cities and towns, it is likely that the MSE will on a case by case basis, evaluate whether to install a MAN in each of the remaining 104 towns in conjunction with the local authorities concerned, or whether instead to purchase existing infrastructure from an operator, to the extent that such infrastructure is already available and of appropriate quality of service and resilience (c.f. section 3.3.2.3).

Alternative broadband technologies, based for example on wireless or satellite systems, clearly can also be used. Currently however it is uncertain whether these alternatives will have the equivalent symmetric transmission capabilities and capacities²³, in reliable fashion²⁴ and a reasonable price point²⁵. To the extent that these technologies develop, it is not inconceivable that the Government would extend the MAN programme with a further public private partnership initiative to encompass cableless broadband solutions.

Dublin has not, at this time, been included in the MAN programme. We understand that the Government's view is that, given Dublin's population density, and the degree to which some operators have already laid optical cable in parts of Dublin, no further risk taking or public investment is needed in the capital city. It would be ironic indeed if the quality and price of broadband available to the general public and SMEs in cities and towns outside of Dublin was more attractive as a consequence of the MAN programme than that available within the capital.

²² Currently. The ducting being laid by the Local Authorities can of course be re-used in the future to lay new "cable" based technologies should these subsequently emerge. The ducting is being made available as one of three levels of access which can be chosen by operators.

²³ Gigabit per second capacities are difficult to achieve in a symmetric fashion with certain specific technologies, but are routine with optical fibre systems.

²⁴ Some satellite based systems, and some wireless technologies, are currently prone to a greater or lesser extent to weather based disruption.

²⁵ Particularly for installation costs, for very high speed, symmetric, broadband.

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3.2.1 Relationship to National Spatial Strategy

As noted in the section above, the nineteen towns selected for phase one of the MAN programme are: Athlone, Ballina, Carlow, Carrick-on-Shannon, Clonmel, Cork, Dungarvan, Galway, Gaoth Dobhair, Kilkenny, Letterkenny, Limerick/Shannon, Manorhamilton, Mullingar, Port Laoise, Roscommon, Tullamore, Waterford and Wexford.

On the 28th November last, the National Spatial Strategy (NSS) was published. Of the nineteen MAN sites, the following are their designation under the NSS:

- NSS Gateway and phase one MAN site: Athlone/Mullingar/Tullamore; Cork; Galway; Letterkenny; Limerick/Shannon; Waterford
- NSS Hub and phase one MAN site: Ballina; Kilkenny; Wexford
- Phase one MAN location, but not designated in the NSS: Carlow; Carrick-on-Shannon; Clonmel; Dungarvan; Gaoth Dobhair; Manorhamilton; Port Laoise; Roscommon
- NSS Gateway, but not phase one MAN site: Dundalk; Dublin; Sligo
- NSS Hub, but not phase one MAN site: Castlebar; Ennis; Killarney; Mallow; Monaghan; Tralee; Tuam

Our obvious recommendation is that those locations designated under the NSS but not a phase one MAN location should be rapidly addressed by the MSE once the MSE is in place. The MSE should do so in conjunction with the incumbents, as we note later in section 3.3.2.3.

However we also give a strong recommendation that those locations which are phase one MAN sites but which have not been designated under the NSS should nevertheless still continue to participate in the phase one MAN programme. We would not be in favour of diverting investment from these locations to NSS designated locations. Our views are that the medium term e-agenda should make 5Mbps widespread nationwide (and not just in NSS designated locations); and that the MSE and incumbents should co-operate to insure this occurs.

3.3 The Impact of the Government's Initiatives

The e-Government and MAN initiatives, amongst others also presented in the New Connections document, will foster broadband infrastructure rollout and associated usage. We discuss the impact of both initiatives in the following sections.

3.3.1 The e-Government Applications

In general, we are impressed and supportive of the range of e-Government services available and under development by the State. We believe that once fully deployed, and integrated through a common access broker for the public, they will position Ireland as a leading nation for e-Government services. We respect the Government vision, and trust that it will be implemented in a timely and co-ordinated fashion, under the guidance of the e-Minister. There is of course the corresponding issue as to what opportunities this in turn will provide to streamline the civil service itself, and improve its internal business processes: there is otherwise little point in developing, at some expense and effort, a fast electronic means to join the back of a very long queue of requests waiting for service.

One key area which we believe could benefit from an even greater urgency is the e-enablement of the health sector. In New Connections, a number of e-Health pilot projects are listed for delivery before the end of 2002, including for electronic health records; appointments for hospital services; and access to laboratory results. During 2003, a single point of access for the public for all relevant health information services, and an online client identification database, are both identified. We believe that the early and successful deployment of these and other e-health applications could not only have substantial social

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benefits to the public, but also add momentum to the public acceptance and support of the broadband agenda.

For the business and SME sectors, we view the e-procurement initiative²⁶ within the e-Government programme as extremely important. A broad e-procurement service, and in particular for routine and non-strategic items, is an excellent stimulus to the SME sector to encourage suppliers to tender for procurement transactions. Since the launch of the service in March 2001, there has been a very positive impact on the number of responses to public tenders – up to four times the number when compared to tenders advertised offline²⁷. It has produced cost savings to local and central Government through a more competitive tendering process, and interestingly has reduced the tender advertising costs into newspapers for Local Authorities, of the order of €100K per year in some specific authorities. It has eased the apparent perception of some SMEs that the civil service is a difficult customer with whom to do business, by taking too much time or cost. Streamlining the procurement procedures for central and local Government, Agencies and even semi-States, is one very major incentive why SMEs should go online. The current web site is largely informational only, and in due course it will be extended so that tenders in every case can be submitted back online. Eventually the entire tender process will be online, from tender document preparation, through tender award, to contract negotiation and management.

SMEs can equally be attracted online by e-procurement opportunities in the non-Government sector. While several large corporations in Ireland already offer e-procurement, it might well be desirable that future State grant aid to corporations via Enterprise Ireland and the IDA should be made conditional on those corporations providing online e-procurement opportunities in respect of their own operations, to the Irish SME sector.

The examples being set by the e-Government programme are laudable. They are providing and will continue to offer world class e-government services to our citizens and the business community. They should make the process and procedures for interacting with government and associated agencies much more efficient, transparent and informative. Not only do they provide stimulus to the SME sector and the general public to go online and use e-services, but they can also help encourage and drive corporations, both indigenous and foreign multinational, to provide equally good online services.

3.3.2 The MAN Programme

There are a number of very positive aspects to the MAN's which we welcome:

- The very fact of committing to this plan is a commitment from the Government to support the role-out of an e-infrastructure in Ireland;
- Fortuitous timing means that just as the State is purchasing the telecommunications equipment needed to build the MAN's, the price of infrastructural equipment has dramatically fallen;
- In focussing on the development of the MAN's, the Government has shown prioritisation and prudent allocation of limited Government funds;
- And were further funds to become available, in the medium term Ireland should have a very well developed and world class backhaul infrastructure over which a number of competing providers can provide services to end-users.

We believe however that the problem now in Ireland is less about deployed infrastructure, than it is about the economics of IP service provision across this infrastructure. Neither the Government nor the private sector can afford to continually lose money on investments in infrastructure. Given this we have some fundamental observations.

²⁶ c.f. www.etenders.gov.ie

²⁷ Irish Independent Digital Ireland, 28th November 2002, p7

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3.3.2.1 Last Mile Prioritisation

The MAN's provide a basis for extra competition in backhaul access; and competitive alternative backbones are already in place. The remaining infrastructure issue is with the last mile.

For the majority of users, the issue of last mile access is not directly addressed by the MAN's, and only a minority of public sector interests are likely to be physically close enough to directly connect to these networks. Ireland cannot afford to leave the issue and economics of the last mile infrastructure to the MAN programme, to the incumbents or to chance.

We specifically consider that priority should be now be given to regulating for the unbundling of access to the last mile "at the kerbside". Currently operators can gain unbundled access to local loop: however they are still reliant on the local loop itself – ie on the copper cable between the exchange and the customers of the incumbent. In turn the physical length and quality of this copper cable may limit the transmissions speeds available to and from the exchange and the customer. Extending unbundling right to the kerbside would allow operators to install their own equipment very much physically closer to customers, allowing higher transmissions speeds where demanded (c.f. section 5.3.6).

3.3.2.2 Non-Duplication of existing quality assets

The recent budget saw significant and painful cuts made to a number of areas. Given this background, it is critical that the development of the MAN's represent the best possible use of public funds – from the point of view neither of the private nor public sectors, but from that of the end-user and ultimate customer. Thus if infrastructure of appropriate resilience and quality is already available, we should seek to avoid duplication by new additional fibre, unless it is clear that the best interest of the end-user (himself a tax payer) demands another course of action.

We cannot afford the luxury of a number of competing and simultaneously largely unlit fibre networks. We need to ensure that the critical last mile access problem is addressed, and that operators have a commercial reason for doing so. The MAN's and the MSE would be viewed as a disastrous investment if they never became fully operational due to the last mile issue.

3.3.2.3 Collaboration of the incumbent operators and the MSE

The originally envisaged role of the MSE was probably influenced by the bullish tendency of telecommunications companies of their prospects, and a distinct reluctance to consider sharing or mutual co-operation.

Given the current economic climate, we now believe that many of the operators today may be only too happy to lease - or indeed sell outright - much of their existing optical fibre at attractive rates. There is widespread acceptance that the costs of new optical cable and equipment have dramatically fallen, and that the State has been able to ensure these low prices continue to be available to the State for a period of years, if necessary: thus it is clear that the State will be able to install even further MANs beyond the initial nineteen, at a cost substantially less than, say, a year ago. Such circumstances for the operators, combined with the general financial situation of Government, calls for some reconsideration of the role to be played by the MSE.

Ideally the MSE would ensure the availability of backhaul access, at a competitive wholesale rate to operators, in specifically nominated areas. This then would have afforded the MSE the opportunity to aggressively negotiate with incumbents for the use of their installed infrastructure and, where appropriate, to supplement or replace the existing infrastructure. In the background is the implicit threat that if the terms offered to the MSE by the incumbents are not generous, then further State funds might well be used to circumvent the incumbents networks altogether. Given the new financial climate facing the Government, it is not clear

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whether this flexibility will still exist even given the dramatic fall in the cost of high quality optical cable and associated equipment.

In the situations where the State owned MAN's and privately owned networks are together providing a service to end users, the MSE will have a considerable role in the co-ordination and guaranteed provision of this service. Whilst not described here in any detail, working out how such co-operation will work in practice and how the services should be integrated should naturally be a priority for the MSE once it is appointed.

In the medium term this co-operative approach should ensure the desired network coverage; the desirable increase in competition in last mile access; and significantly higher utilisation rates for the existing infrastructure.

3.4 Revisiting the cost of a national video quality broadband infrastructure

In section 2.2 we noted that that Ovum, for the then ODTR, had analysed the cost of a widely available 5Mbps (minimum) broadband infrastructure for Ireland as €4.1B. This would cover 85% of the population, and with 60% of the population actively using the e-infrastructure. This cost did not take into account additional business related investment, such as marketing the e-infrastructure to the public and business community, or the associated billing system.

The Ovum figure does however exclude the impact of the Government MAN programme. The Government originally intended to invest €230M as a part of the National Development Plan (c.f section 3.2). The first phase was to invest €60M into the MANs for 19 priority towns before the end of 2003; in the event the cost of optical equipment and cabling has dropped dramatically on the international markets, and €30M was allocated by the Government for the first phase on the MAN programme in the Book of Estimates published in November 2002.

The discrepancy between the Ovum figure of €4.1B and the Government National Broadband Strategy of just €230M (or even less perhaps) for the MAN programme for 123 towns across the State is striking. While recognising that the Ovum figure is for a national e-infrastructure with 85% coverage of the whole population of Ireland, and the Government estimate is for a more modest total of 123 towns, we ourselves have not had the resources to try and reconcile these two figures. We naturally agree that it is important to revise and reconcile these analyses together, particularly in the light of falling capital costs for optical cabling and equipment.

However, we anticipate that to succeed in delivering a 5Mbps e-infrastructure widely across Ireland, that the total investment needed from today will be billions of euro, and closer to the Ovum figure. To achieve the e-infrastructure in a reasonable time, a "back of the envelope" calculation might show that collectively the State and the broadband operators need to invest approximately €1B a year for some time to come.

When is this going to happen ? Who can take the risk on such an investment ? What does the Government have to do to foster such an investment ?

We have debated these issues in our working group, and our thoughts are laid out in the subsequent sections of this document.

3.5 Summary: the need for a holistic strategy

The cost, and investment climate necessary, for a national 5Mbps e-infrastructure needs to be accurately assessed.

With the exception of a relatively small number of end-users who will be able to directly connect to the MAN's, there has not yet been an analysis of the last mile access issue in the published overall Government strategy. We are uncertain about the Government's strategy on the balance between short term, medium term, and long term goals, for the entire infrastructure of backbone, backhaul, and last mile access.

The development of a holistic, phased plan for the national e-infrastructure based on IP should be a high priority. We are concerned that in the absence of an embracing, over-arching strategy, the national e-infrastructure will continue as a series of tactical steps, with little co-ordination between the players involved, and with an uncertain outcome and timescale.

4 Why pervasive high quality broadband ?

As we discussed in the previous section, the e-government programme is impressive and already is a valuable service to our society and to our commercial sector. When it is completed, it will certainly be world class. Having a very comprehensive set of government services available online will stimulate use and demand for the internet in Ireland. It should also have the benefit of leading industry by example, and for example encouraging manufacturing companies to ensure that their procurement operations are also online.

However: at the end of the day, it is uncertain whether the total impact of all of these online e-government and industry services will drive sufficient broadband usage so as to provide credible business models, and revenue streams, to operators of high quality broadband. It is very unclear whether the combination of e-procurement services, revenue commission transactions, online patent applications, online driving test applications, online statistical returns – in short, the culmination of all the online services envisioned in the New Connections document, together with similar services from the private sector corporations including online procurement by the manufacturing operations in Ireland – can collectively justify, even given low cost access to a collection of regional MANs, a nationwide minimum of “5Mbps to the home and substantially higher for business users”.

In addition, broadband operators are starting today with, frankly, a sceptical business community and public. The charges for today’s moderate²⁸ broadband services in Ireland are not at all competitive with those available in the leading global e-cities²⁹. While specialist users, and perhaps those individuals interested in adult content, may be willing to pay over the odds for midband, in general there is no particular value or substantial personal or commercial reason given the costs involved to widely use these services – even at moderate quality - today.

Given a more reasonable cost structure, and the pervasive availability of DSL (at a minimum) quality broadband, then it may be that e-working becomes feasible. Today, it is usually not particularly cost effective or efficient for white collar staff to work semi-permanently from home, using remote access to their employer’s computer infrastructure. Our national experiences therefore to date with e-working are limited: however it is obvious that if we could achieve higher rates of e-working, then it would somewhat reduce pressure on our physical transportation infrastructure and the need to commute. So: a lower cost, highly available, midband (at a minimum) infrastructure would certainly make home working a more realistic possibility for some. Pilot schemes are needed where specific companies trial home working more proactively, and then are promoted as case studies to the wider business community. The Chambers of Commerce can play active roles here in identifying and promoting specific opportunities.

At the September 2002 ODTR conference, the MRBI survey commissioned by the ODTR found that Irish SMEs in general were prepared to pay at most 40-60€ per month for broadband services³⁰. We pessimistically suspect that the SME sector currently views broadband services as an additional cost and burden, with perhaps dubious benefits. However, video quality broadband enables new services to be delivered (which we discuss in the following sections), and also opens the door to bundled telephone traffic. We wonder what response the ODTR MRBI survey might have had if the MRBI questions to SMEs had been posed a little differently, so as to emphasise the new benefits which high quality broadband would bring. Symmetric high speed – 5Mbps or more – broadband disrupts³¹ the traditional telephony and video markets. If you are already paying for such broadband and it is widely available (eg nationwide) then there is no technological reason why you should not

²⁸ By comparison to the vision of the New Connection document, today’s ISDN and ADSL services are very moderate transmission speeds.

²⁹ As noted in section 2.1, the recent directive from the Minister of Communications, Marine and Natural Resources for flat rate internet access may change this situation over the next twelve months.

³⁰ The MRBI survey is available via www.odtr.ie as document 02/79.

³¹ c.f Clayton Christiansen’s “The Innovators Dilemma”.

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make as many telephone calls as you wish, for as long as you wish, over the broadband infrastructure at very minimal - if not free - cost.

How would SMEs have responded had the questions been: how much are you prepared to pay if some of your staff could semi-permanently work from home? How much would you be prepared to pay for high capacity broadband services, if all local and nationwide telephone calls were to be provided for free using those broadband services? We also wonder what response would the MRBI have had if they had asked domestic users: how much are you prepared to pay for broadband usage, if your local and nationwide telephone costs were to be bundled for free? What if you could move to a half week in the office, and half week home working?

The opportunities, and threats, provided by quality broadband, “transform the way we interact and do business³²”.

4.1 Why? Because video.

In the previous section, we postulated that the current e-Government applications, excellent as they are, together with similar appropriate industry applications, are nevertheless unlikely to provide sufficient business justification to broadband operators to warrant investment in a pervasive 5Mbps national broadband infrastructure. We feel that the SME and business public may be somewhat sceptical about paying for usage of such a service, and perhaps do not yet fully appreciate the new opportunities it would bring. We believe that it is important to lay out the possibilities: in our view, the key business and consumer driver to quality broadband usage is video.

TV or cinema quality video transmission requires a minimum of 5Mbps: the Government has stated that this is the immediate minimum objective for national broadband, and that we should be the first country in Europe to achieve it. We believe that for the right applications, consumers, the SME sector and of course large corporates, would be prepared to pay usage rates for video transmission that would be lucrative to broadband operators – particularly if low transmission capacity services, such as telephony and online web site browsing, were bundled for free.

We noted in section 3 that the Government is absolutely convinced that “the delivery of advanced telecommunications services is therefore the single strategic priority of greatest underlying importance to our economic and social development as an Information Society. It is critical to our competitiveness in terms of attracting and retaining foreign direct investment, and ensuring balanced regional development. It is critical to realising the opportunities presented by online provision of government services. And it is critical to unlocking the potential of ICTs to address issues of social disadvantage and exclusion.”

While not wishing to be considered pessimistic, we feel it is also important to highlight the likely outcome for Ireland if a pristine e-infrastructure is *not* delivered in the short to medium term. We have already highlighted that other countries are already investing heavily in high quality broadband, and even the UK on our doorstep is fast advancing (c.f. section 3), investing £6B in ICT over the next three years. Ireland already has a challenge to sustain its level of FDI, and move further to a knowledge based society in place of a low cost, manufacturing based economy. Ireland is already falling behind in e-infrastructure today: an OECD study produced in October 2001 ranked Ireland 27th of 30 countries in terms of penetration of broadband technologies³³; as of April 2002, Ireland is 14th internationally out of 18 countries for residential Internet penetration rates³⁴.

Our broadband e-infrastructure is a critical component of addressing this challenge. We further note that it will be absolutely vital for Ireland to have a world class e-infrastructure to

³² An Taoiseach, Bertie Ahern, in the opening sentence of the New Connections document.

³³ The Development of Broadband Access in OECD Countries, OECD 2001

³⁴ Source: Nielsen NetRatings and CIA World Fact book

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compete with the rest of our EU partners as an attractive commercial location for business operations, and even more so were taxation rates to move towards harmonisation across Europe, despite such harmonisation not being a current part of Government policy. For these and other reasons, investing in a high quality e-infrastructure is a major insurance against the risk of returning to a society with low value commercial operations, high unemployment and inevitable high net emigration.

While we endorse the Government's analysis as to why Ireland must invest in e-infrastructure, we offer some further and positive justification as to why investment in a pervasive high quality broadband infrastructure is important. To date, video has not been widely adopted and exploited anywhere with the internet. The main reason has been that a pervasive nationwide video quality infrastructure has not been available, with the exception at this time of Korea. We believe that there is currently a global opportunity to develop competence and expertise in internet video applications, and the extension of classical internet applications with video extensions. We explore some of these in the following sections. We also believe that developing competence in video plays well to our national strengths and heritage in creativity in literature and music. We will be well positioned to become world leaders in this area if we can rapidly exploit a video quality national internet.

If we can develop competence in video based internet applications, we would economically and socially benefit as a world centre for an important technology niche, in the same way perhaps as Finland has become recognised as a world centre for mobile telephone technology. There currently is no clear centre worldwide for video based internet competence, and yet it is clear that in the next ten to fifteen years, video will play a critical role worldwide for the internet, and especially in the US. If we can quickly develop an early competence and recognition, it will help secure the future of our technology sector, retaining and building employment, and moving us on from a manufacturing dominated IT sector.

We stress that there are already convincing economic and social reasons to deploy a 5Mbps (minimum) infrastructure across Ireland: the Government, as we have noted, has publicly summarised these in March 2002. We acknowledge that pessimistically, there is strategic risk to the future of our economy if this e-infrastructure is not deployed in the short to medium term. We on the other hand more positively note that, in addition to the convincing reasons already articulated by the Government, there is also a window of opportunity for Ireland to develop a niche in the sector, which would yield additional positive benefits to the economy.

4.2 Video Conferencing

One obvious video based application for businesses, including the SME sector, is video conferencing. Video conferencing clearly requires symmetric connectivity, and asymmetric broadband technologies are inappropriate.

We believe there is a growing acceptance in the business community of the usefulness and cost advantages of video conferencing, particularly in reducing travel. We note that technology is available today which allows users to participate in a video conference spanning many (in fact in principle, any number, subject to the broadband capacity available) physical locations³⁵. Given the availability of appropriate broadband, the additional cost to any specific site can be limited to a few thousand euro for a digital video camera and projector screen (or even a standard desktop machine).

Video conferencing sessions today tend to be organised in advance, with facilities reserved for a particular time slot. However with a pervasive broadband infrastructure, and widely available digital video cameras (even as low tech as PC videocam attachment), then video

³⁵ See for example the US led Access programme: <http://www.ncsa.uiuc.edu/TechFocus/Deployment/AGiB/index.html> for a screen shot of multiple video conference sessions; and <http://www-fp.mcs.anl.gov/fl/Accessgrid/> for more details of the programme, and <http://www-fp.mcs.anl.gov/fl/Accessgrid/ag-nodes.htm> for a list of participating, including international, sites.

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meetings may become as routine as person to person telephone calls, and multi-party telephone conference calls today.

4.3 Video messaging and Video telephony

It is possible and occasionally routine today to annotate text based email messages with a video clip. Some corporations equip all their desktop machines with a small video camera, allowing staff to send video messages, rather than just written text messages. We expect this style of email communication to become increasingly popular with the business community and the general public, particularly as video cameras become bundled as part of the usual standard hardware accompanying any new PC. The major internet application is of course email, and people have found the internet a wonderful way of routinely communicating: video mail makes the medium even easier to appreciate.

Video clips by email paradoxically do not require high quality broadband. Because emails are transmitted on a store and forward basis, the latency to transmit a video clip over a midband or even narrowband link usually is not a major concern.

However we believe that as the general public become more used to sending video clips by email, it will rapidly become their expectation that they should be able to have a realtime, video dialogue as well – or in fact instead. Only if the recipient is not currently “logged on”, should the “system” offer a facility to leave a recorded video message. Video telephony will therefore rapidly become the expectation: and it in turn clearly needs a symmetric, video quality broadband connection. There are some demonstrations today in the Dublin area of realtime asymmetric video (for example, watching live television on a mobile phone), which serve to stimulate public interest. However currently the video quality is poor, and to our knowledge there are not yet Irish demonstrations of symmetric video telephony. With the advent in higher quality transmission infrastructures, video telephony services will undoubtedly result.

4.4 Skilled teaching resources for education

Video conferencing, as discussed above and in particular for multiple-party participation from several different physical locations, is also clearly a valuable new tool for schools and education. Specialist teachers can be shared amongst multiple classrooms with local supervision³⁶. In Ireland, this could become a valuable national strategy, given the increasing demands for high quality education, and a shortage of specialist teachers, particularly in technical and scientific subjects at Leaving Certificate level. Note that such video conferencing does not imply a reduction in use of teaching staff: staff are still required locally in each classroom to maintain discipline, while the specialist content is interactively taught over a realtime, symmetric³⁷ video link. The cost to each location is a digital camera, projection device and screen, and the service cost of the (symmetric) broadband connection.

Third level institutes and universities would also benefit from sharing skilled specialists for teaching and education. In the current fiscal climate it would be compelling to be able to use a skilled lecturer to deliver material to multiple sites, and so reduce duplication across our third level system, including of course international visiting professors. As in the use of realtime symmetric video in schools discussed above, this approach would differ from broadcast television in allowing interactive dialogue with the instructor. There would also clearly be an opportunity and desire to archive lectures, and thus facilitate revision of material

³⁶ In our companion report, we noted that in Haifa (population 275k) in Israel there is a municipal project focused on the experimentation, testing and assimilation of ICT in education.

³⁷ And thus different from broadcast TV education such as The Open University: here, students can interactively dialogue with the specialist instructor over the video link.

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and access in the future to particularly noteworthy presentations made by scarce professionals.

As an aside, the routine delivery of presentations across multiple sites in the third level institutions (and of course schools) naturally requires a stable, video quality service. While we are aware of the current video quality Heanet³⁸ network, we suspect that in its current form that this network is oriented towards research use by computer network scientists, and therefore may not currently have the stability and operational quality for routine daily use as a multiple site video conferencing service.

4.5 Remote medical diagnosis, monitoring and advice

Video conferencing can also help in medical sector, and has particular attractions in Ireland in helping to treat and provide routine care for rural populations remote from main medical centres. There have already been trials on this basis in Munster, allowing general practitioners (GPs) and dental practitioners in rural areas to interactively dialogue with remote experts at national medical centres, including the patient being examined by the remote expert. This clearly makes local health care and prevention more effective, and saves on the number of costly trips which rural patients have to make to major urban health centres.

A further application area is the continual, or periodic, remote monitoring of senior or infirm patients with chronic problems, obviously subject to their own prior approval, or that of their guardian as appropriate. The monitoring equipment can be including medical devices such as blood pressure and heart rates, and wireless strap-on devices are becoming available in the consumer health market.

Using video conferencing for remote medical diagnosis clearly requires not only symmetric connections, but also a reasonable confidence that the underlying network is resilient to temporary failures of equipment or connections.

4.6 Security applications and remote monitoring

A further obvious video based commercial application is remote monitoring and security. Low cost digital video cameras can be monitored and controlled from a central location, perhaps reducing the cost of an extensive on site security team, as long as rapid response can be assured in the event of an incident. Having a pervasive video quality broadband infrastructure available would also reduce the cost of remote sensing and monitoring systems, since the necessary cabling would be generally already available.

Remote video inspection of a property, including domestic properties, by an approved alarm monitoring agency, also becomes possible. This in turn might reduce the number of callouts by named key holders and the Gardai due to false alarms.

Remote monitoring applications can use asymmetric broadband connections. Commands to the remote instrumentation can be conveyed using a narrow bandwidth path.

4.7 Movie (cinema film) on demand

The obvious video based application for domestic usage is movies on demand. Worldwide there have been several city wide³⁹ and regional wide⁴⁰ rollouts, and trials, of movie on

³⁸ A high quality broadband network sponsored by the Higher Education Authority, linking many of our third level universities and institutes together, and also to international peers.

³⁹ E.g. in HongKong, and in which one Irish vendor was heavily involved.

⁴⁰ E.g. in Atlanta

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demand and home shopping broadband networks. In some cases, the low population density has made the cost of optical fibre rollout, at the time of particular projects, prohibitively expensive to support the actual usage. Optical fibre costs have fallen in the last two years, and with sharing of the infrastructure for multiple applications as described in this document, this problem should now not be so severe. In other cases, a project has failed because of lack of collaboration and fear of competition from other content providers and distributors, and in particular from broadcast TV channels and news feeds. We comment further on this particular point later below.

We reported in our companion report how in Milan the cable operator Fastweb has approximately 1,800km of optical fibre in the city and plans for 2,400km by 2003. It currently has 100,000 customers in the city, 85,000 of which are residential⁴¹. The company has also launched personal video recording services on its fibre-to-home IP network. Users will be able to record a week's worth of programming from nine national channels, onto video servers located at the head-end of the operator's network.

We suggest a near term demonstration project be developed in conjunction with the Irish media industry to collaboratively trial movie on demand services over video quality broadband.

Movie on demand can use asymmetric broadband connections. Commands to the remote movie players can be conveyed using narrow bandwidth paths.

4.8 Broadband and media production

There is little doubt that in due course high capacity broadband will be used as a complementary medium to broadcast digital television. The symmetric capability of broadband clearly also enables true interactivity, and remote audience participation. We can expect the "Broadcast Channel" as a new media industry medium, and we can anticipate substantial investments by the major TV and film media production and distribution companies.

If Ireland is indeed "the first country in Europe to make this level of broadband service widely available for its people", then there is an obvious opportunity for Irish companies, including RTE, to become leaders in broadcast television over the internet. There is an obvious opportunity for for a wide range of specialist video content to be available on demand, at all times, covering education, health, lifestyle (cooking, gardening, sports tuition, the arts, music, news, weather, etc.). Existing media companies like RTE have vast audio and video archives of content which can be "mined" by individuals over broadband networks.

The emergence of consumer priced broadcast quality digital cameras and desktop PC based editing has facilitated the emergence of small new media production companies to deliver specialist video on demand – to both Irish and international audiences. There is already in the UK a working demonstration of such media content on the subscription based portal Video Home Networks over DSL in London.

A report by OC&C Strategy Consultants and KPZ Europe, published in July 2002 by the UK Department of Trade and Industry, pinpoints the attraction of compelling content as the most likely driver of broadband uptake. The report recommends: forming a cluster of creative industries using broadband, for £1.5m; a broadband public-service delivery pilot, with government creating and distributing broadband content, costing £1m to £2m; a tourism portal, for up to £1.5m; and, the most ambitious of the lot, a broadband channel that would be "a Channel 4 for the broadband age". The latter would handle content commissioning, business development and distribution for the nascent broadband content industry. A pilot for the channel would cost between £5m and £10m of public money for its first year of operation, and the report envisages this being matched by investment from industry. Such a

⁴¹ The cost charged to residential users is €50 per month.

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bold move is necessary, it argues, because the US has a large number of well-funded multi-media groups which can export their broadband material to the UK, stifling the growth of any indigenous industry. It would be interesting to consider a proposal in Ireland to foster the broadband content industry.

There is also a clear opportunity to attract further foreign direct investment from major international media companies, including in partnerships with local Irish companies. There are also opportunities in digital media creation and management: currently there is apparently a severe world shortage of post-production film making facilities: Ireland could enter this market using high capacity broadband to reach the major international film studios.

Media preparation and production requires symmetric connections, although not necessarily in realtime. Instead large media files can be transmitted on a store and forward basis, possibly over midband links.

4.9 Broadband and Digital Terrestrial Television (DTT)

The Digital Terrestrial Television licencing process in Ireland failed to deliver a market solution for the development of a digital multichannel offering and interactive services on the terrestrial platform. This market failure presents a serious question about the roll out of the Information Society to all citizens in Ireland, given the comparative costs of analogue and digital based TV services, and also of internet based PCs. With the failure of the multiplex licencing process, the market is unlikely to deliver the investment required for the roll out of Digital Terrestrial Television.

The Report of the Forum on Broadcasting advised the Government as follows;

“From the point of view of the national interest, it is desirable that a digital terrestrial broadcast system be realised to provide the infrastructure for the kind of ‘information society’ that is essential if Ireland is to take a leadership role in the world of e-commerce. As a matter of urgency, the issue of digital terrestrial television should be revisited in an attempt to provide a countrywide system as part of the national infrastructure. The Minister for Communications, Marine and Natural Resources should keep under review the impact of digital television on the role of RTÉ”

Almost a third of Irish households are already subscribing to multichannel digital television services. With a growth rate in excess of 1,500 subscribers a week, the outlook for digital television in the Irish market appears positive – no. 3 in Europe in terms of penetration. However these digital services are only available on a subscription basis and in fact enhance the digital divide between those that can afford such services, and those who cannot.

In the absence of DTT, however the longer term outlook for broadband cable services is not so positive. Paradoxically the cable companies will need to discontinue analogue broadcasts to second and third sets in a household, if they are to free up the bandwidth necessary for broadband interactive services. DTT could provide the most cost effective solution for delivering multichannel TV to these additional household TV sets. The cable companies therefore all agree that they must have a strategy for switching off analogue services on cable networks. It is only when they achieve this freeing up of cable bandwidth that they can introduce the “triple play” of TV, telephony and broadband access to the internet. This move will require a solution for the low cost delivery of the most popular UK channels to second and third sets in the home. The UK model of “Free to View” DTT provides this option – if the rights issues can be resolved.

The simple situation where UK channels can be received on analogue aerials will no longer happen in the digital world. When analogue transmission service inevitably shuts down in the UK, many Irish viewers may have to resort to subscription services to maintain reception.

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The “Free to View Model” is based on a cheap set top box of around €100 with access to between 6 and 16 free to air television channels (RTE1, Network2, TV3, TG4, BBC1, BBC2, ITV1, Channel 4, Channel 5, ITV2, Sky One, Sky News, BBC News 24, ITN, CNN, BBC3, BBC4, E4). This service would be available free of subscription charge. Charges could be levied for internet access and a small number of additional pay per view services. The complex legal questions surrounding programme rights, need to be resolved.

There is a view that the only way that DTT can happen in Ireland, is by some form of Government supported venture. One area which is currently under consideration is whether the bandwidth allocated to DTT could be used for a combination of wireless broadband and local/community broadcasting service.

There is finally the issue of how the approximately €30M required investment in the digital network is to be financed. It is unlikely that indigenous broadcasters would be willing to be the sole funders of such investment. A pervasive video quality broadband infrastructure would of course be the basis for a solution. DTT will probably provide the most cost-effective solution for addressing the digital divide, and could be more than self financing from an exchequer standpoint when the value of the freed up analogue spectrum is taken into account.

4.10 Broadband, Community Television and Audience Participation

It is worthwhile contemplating the disruption that true interactivity can bring to the current broadcast industry. Up until the 1960s, broadcast radio was largely uni-directional, in the sense of complete lack of audience participation. Broadcasters broadcast what they believed was appropriate to audiences, and what they thought audiences wanted. Any feedback from audiences, to the extent that feedback was entertained, was limited to letter writing: and indeed some broadcast programmes consisted of reading selected audience letters and commenting upon them.

RTE and specifically Gay Byrne changed this, not just in Ireland but also as a model adopted overseas. Gay Byrne introduced the highly innovative, and frankly brave, step of taking live telephone calls on air during his programmes. For the first time, members of the public could directly speak live on air, and the programme presenter had to be sufficiently skilled to manage the conversation, and specifically in terms of appropriate content. Today, live telephone calls are routine on chat shows, and indeed some programmes consist of little else.

With the advent of digital video, and suitable broadband, is there not a further obvious development about to happen? Members of the public will no longer contribute by audio telephone: they will contribute by live video. Digital video cameras are already relatively low cost and naturally could be directly connected to a broadband connection, and no doubt video mobile phones will gain acceptance as mobile telephony technology in due course moves closer to realtime symmetric video quality transmission. Live audience participation by video will become routine, and the public will watch (and join in) the broadcast video programme on the same consumer devices.

What then? Will there be a need for news channels to have reporters in the field? Can members of the public – any member of the public with a suitable consumer video device – carry out the same work, live in the field? Our view is that in fact there will still be a role for professional reporters and investigators, but their role may become essentially of finding appropriate individuals to interview, or even to retain as part time amateurs. Can the news service of any TV station then adopt a similar news collection model as a global station such as CNN? CNN's strength and attraction comes from having an extensive global team of reporters, currently equipped with video cameras and moderate capacity video satellite phones as appropriate. What if broadband digital video cameras and video mobile phones were even more popular across the globe today than PCs? The role of the news station

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then becomes one of correlator, analyst and commentary -- the reporting of events from the field becomes trivial.

From the perspective of transmission technology, the key point here is that symmetric video quality broadband enables audience participation, instead of the unidirectional, broadcast nature of asymmetric transmission.

The majority of our television content today is under the control of international television operators, including satellite broadcast services. While we do have RTE and TV3, and thus have some control over content, editorial supervision of our television is becoming beyond our national control.

A video quality national broadband infrastructure, coupled with consumer digital video devices, radically changes the situation. In the same way that we already have community radio stations, community television becomes quickly feasible. It is our understanding that under the current legislation in Ireland, a license is *not* required to operate such as service today: since the community television would not be "broadcast" over the wireless spectrum, but instead piggybacked on a video quality broadband service provided by a broadband operator, no broadcast license is needed. Web sites providing video clips are already common on the internet: a community television service would use existing internet technology to deliver live (and recorded) video.

We propose the near term establishment of a community TV station over video quality broadband in which an emphasis would be given to live community participation by video call in to station.

4.11 Broadband and e-Shopping

Globally, the growth of e-retailing has in general been disappointing, after the initial surge during the dotcom era. Ireland in fact has one of the world's most successful e-retailing operation, in Buy4Now⁴², which has been very positively cited by the global retail industry. However acceptance of e-retailing by the general public, both in Ireland and elsewhere, has been hindered by a lack of trust "in the internet". The issues relate to trust in electronic payment, and trust in the quality of goods purchased over the internet.

4.11.1 e-Payments: *Business to Consumer*

There are a number of trends in e-payment today: the increasing controls put in place by banks; slow supplier/customer adoption rates; and the occasional poor image that can be traced back to older models of e-payments via financial electronic data interchange.

While there are a growing number of new e-payment products, over 90% of business to consumer payments for internet transactions are still credit card based. There is a public perception that there is significant fraudulent use of credit cards when cards are used for internet payments, and this is undoubtedly a major barrier to growth of e-business. Research in this area throws up a number of interesting issues:

- Internet based credit card payments have a fraud level approximately ten times greater than the level when a physical card is presented
- Very little of this fraud relates to the theft of credit card numbers in transit on the web
- The bulk of the fraud perpetrated is by cardholders denying a transaction, and receiving reimbursement

⁴² www.buy4now.ie

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- The key to eliminating the bulk of internet credit card based fraud is proof of identity during the transaction
- Such security can either be achieved by an additional step in the credit card process, or via a host of new e-payment products.

4.11.2 e-Payments: Business to Business

Globally, internet commerce has been mainly focussed on business to consumer activities, with high volume, low value transactions. Business to business (B2B) issues are different, with different solutions. Secure B2B payment platforms generally involve versatile B2B middleware available from a number of vendors. Leading B2B payment systems are starting to incorporate electronic security signatures, smart cards and encryption technologies.

4.11.3 Strengthening e-payments

Many businesses choose to outsource the payment aspect of their electronic transactions, with companies such as CyberSource providing the secure infrastructure. Whether e-payment activities are outsourced or not, electronic payments (whether or not online on the internet) need to be strengthened, for example by smart cards and bio-metrics⁴³.

However, with the unified billing systems provided by all broadband operators which we presented in section 4.14, e-payments become easier. A customer can pay for an online purchase using services provided by his/her broadband operator. Credit can be provided as a part of the service by the operator, and/or prepaid accounts can be offered. The operator could even offer "e-purse" capabilities⁴⁴, and include direct debit from a customer's bank. Such services are already provided today by some of the mobile telephone operators world wide.

To promote electronic currency, the Government could perhaps consider taking a leadership in Europe and introducing the "e-euro"! This would be derivative in concept to the e-dirham introducing by the Government of Dubai in February 2001, and discussed in our companion report. The e-dirham was specifically created to enhance the usage and add to the security of e-commerce, and we would be intrigued to analyse whether there would be any particular advantage to a similar scheme here.

There of course remains the problem of robust identification of the customer, over the broadband link. Ideally this would be bio-metrical in nature, but a password based approach would probably suffice, and if used properly, would be securer than just the numeric identification of a credit card as is used today for e-payments.

4.11.4 Using video to gain trust with the e-retailer

A further major impediment to e-retailing has been how to trust in the quality and appropriateness of the goods being purchased. For standard items such as books, CDs and cereal packets there has been little problem. But for items such as clothing, furniture, kitchen appliances and many others, many members of the public feel uncertain about buying such goods online. Online video clips of the proffered goods can help, but the clips can be poor quality and slow to load and play over the internet. However even with broadband to improve quality and speed, such video clips are still pre-prepared, and as such display the good in a way which the e-retailer wishes.

With symmetric video broadband, an entirely new approach becomes feasible. An online customer can dialogue, in real time and video, with a shop assistant. The assistant can be

⁴³ Computer based measurement of body features such as finger-prints or facial features. There are some Irish vendors today of such technology.

⁴⁴ There are Irish vendors for e-purse technology today.

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quizzed, and can offer advice. The assistant can show goods, and demonstrate their usage. The customer can even develop a level of trust with a specific assistant, returning to him/her on multiple occasions, both using the internet and, perhaps from time to time, physically in person in the retail store.

We are certain that e-retailing will become very much more popular with video capable broadband. The opportunities are substantial for Irish companies to become e-retailing world leaders, and with a global market, if Ireland is indeed the first European country to widely deploy video capable broadband.

We propose an e-retailing technology demonstrator, encompassing realtime video dialogue with the retailers involved, and secure e-payment technology, stressing convenience and ease of use.

4.11.5 Using video to get help: the help desk opportunity

Ireland has developed as one of the world's major help desk centres. Several global hotel chains, airlines and car reservation companies base their help desk operations here. Several global software and hardware companies base their front line help desk operations here. The national help desk industry however has been under threat for some time from other international locations with lower labour and telecommunications costs.

Currently all these companies use audio links to talk to their customers worldwide. What if help desk assistants were available via a symmetric realtime video connection? We believe that those companies which can first offer video connectivity to their help desk staff will rapidly develop competitive leadership in their industries.

We believe that quality video technology would help build trust in remote interaction with retailers and the service industry, and may also help move the help desk industry in Ireland to a new level ahead of international competition.

We also note that help desks are a natural application of e-working (c.f. section 4) – not only can the customer be remote from the help desk centre, but also the help desk staff themselves can be remote from the help desk centre, and working from home. Help desk staff are already routinely tracked by their management using automated tools to record session lengths and productivity: such tools can of course monitor help desk work actually done at home. Help desks offering realtime video links to their customers can also be provided by help desk staff e-working from home – assuming that a national video quality broadband e-infrastructure exists, not just for commercial users, but for domestic users and the general public.

What if our local and central governments, and associated agencies, also provided online video based help desks? We believe re-introducing the human aspect into e-government services, would substantially help overcome the inertia and, frankly, suspicion and fear that some members of the public appear to have in using e-government services. We believe that all of the REACH initiative and e-Government services (c.f section 3.1) would become world leading if they were extended with real time video connecting the public with the civil service.

We propose that at least one REACH application be extended in the near term to demonstrate remote video dialogue with the civil servants involved.

4.12 Broadband and Supply Chain Management

e-Procurement and e-supply chain initiatives are gaining momentum due to volatile markets, downward price trends and overall cost pressures. Areas of interest include overall supply

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chain visibility, on line auctions and the potential empowerment of remote offices. The widespread availability of video quality broadband could accelerate these trends.

Ireland currently has a world class reputation for manufacturing, in particular for IT and pharmaceutical products. Nevertheless there is a clear risk to the loss of manufacturing operations to lower cost economies, and in particular to China⁴⁵. However we can retain much of our manufacturing expertise and employment by outsourcing lower skill subassemblies to overseas locations while retaining control over the supply chain, and continuing to assume responsibility for delivery of the end product. Indeed some of the multinationals operating here have already adopted such a strategy⁴⁶. A world class broadband infrastructure would help implement this strategy and reinforce our reputation as a world leader in delivering complex IT and pharmaceutical products.

4.12.1 Overall supply chain visibility

Many larger IT manufacturing companies ("OEM's") are re-engineering their materials procurement and inbound logistics processes. Traditional processes required a relatively large in-house procurement team managing an extensive number of parts from a large pool of vendors. Such processes resulted in excessive resources being required, as well as unacceptable levels of material handling, warehousing and paperwork. The ability to process updated information based on real customer demand was limited to monthly updates in many cases, and weekly updates in others. Given the multiple legacy systems in many OEM's, even the weekly updates were inaccurate by the time the processes were completed. Many companies reacted dynamically through ongoing firefighting, second guessing systems and sheer heroics! A popular solution has been to select a small number of tier one supply chain management companies ("SCM's") to manage the procurement and logistics functions.

Such programmes can only operate efficiently if there is real time demand and information sharing throughout the supply chain, from customer to SCM to manufacturer. Unfortunately many smaller manufacturers and SMEs do not have sophisticated IT infrastructures. However, provided these organisations have internet access, many of these problems can be overcome. Modern ERP systems offer internet browser functionality, and thus can be used remotely by commodity suppliers to a major manufacturer, which itself uses an ERP package. The smaller commodity suppliers only need internet access to access to information, such as stock levels held on behalf of the commodity supplier, close to major manufacturer; forecasted and actual usage on a daily basis; projected on hand stock levels (based on both forecast and actual run rate); and invoice generation reports, and status of future remittances.

4.12.2 On line auctions

A number of companies now host on line auctions⁴⁷. So far, this has pertained to commodities at the lower end of the cost scale, but there are advances to include numerous commodities. As an example, through its e-procurement portal, 'Siemens Global Platform', the Siemens objective is to control 90% of all purchasing activities for the group through this portal by 2004.

Although the suppliers have been quite wary of these auctions, which can diminish customer loyalty and increase ease of switching, there are also advantages for both the supplier and customer participants. The suppliers often have significant barriers to entry – many are frustrated in their sales efforts by trying to get appointments or the attention of very busy prospective customers. Auctions by their nature provide more opportunities for inclusion as traditional barriers are eroded.

Video quality broadband would significantly enhance online auctions activities and functionality. Videoconferencing would enable visibility of prototypes, samples and

⁴⁵"China: The Global Factory", Business Week, June 2002.

⁴⁶ For example, Apple in Cork and Microsoft in Sandymount.

⁴⁷ e.g. eBreviate.com

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specifications. The set up and training of participants, which is currently time consuming and expensive, could be done on an interactive basis. Finally greater interaction with suppliers can lead to collaborative development of new solutions and products.

4.13 Broadband based directory services

We note that some online yellow page, white page and green page directory services are being extended with the provision of audio and video clips⁴⁸. For example, when seeking a restaurant of a particular cuisine, not only is the address provided, but also a street map showing the location; a video clip showing the location of the building and a tour of the restaurant's dining area; and an audio or video clip from the chef presenting this evening's menu.

Live video connections seem a natural extension of such directory services, and enhance the marketing opportunity for their clients.

4.14 The Added Value Opportunity for Broadband Operators: Billing

We note that it is our view that the broadband operators have a substantial opportunity to add value to video based broadband adoption by flexible content provision and billing. The convenience of having a single, aggregate (and possibly prepaid) bill to consumers and SMEs would be valuable, and in itself worth paying for.

The Japanese NTT Docomo experience has shown the world that the growth of subscribers and usage can be driven by quality content provided over a common infrastructure by very numerous content providers. As we noted earlier in section 4.7, some domestic video on demand and home shopping projects elsewhere in the world have stumbled on precisely this issue, with competition from established content providers and distributors.

We also note that SMS service providers in effect implement a micro-billing service, allowing small value transactions to be accounted, billed and audited.

We support the view that in fact the most valuable asset any broadband operator has is its own customer base, rather than for example infrastructure buried in the ground.

Broadband service operators in Ireland should be strongly encouraged to provide billing aggregation services for content providers⁴⁹. A consumer, including an SME, should thus be able to have a single consolidated bill itemising all interactions with content providers. A broadband services operator could then build its own revenue from royalties from content providers, as in the NTT Docomo model. Consolidated billing services also provide broadband operators with opportunities for services to retailers, as we discussed above in section 4.11.3.

4.15 e-work revisited

We made some observations about e-work in Ireland in the introduction to section 4. We noted that midband services suffice for much white collar e-working, assuming of course that midband services are widely available to domestic users. There is much that could be done to promote e-working case studies and examples, including in the SME sector, and the Chambers of Commerce have an important role to play.

⁴⁸ e.g. www.pagesjaunes.fr

⁴⁹ There are some Irish vendors of such technology today.

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In the light of the video quality broadband applications we have discussed in the sections above, it is noteworthy to highlight that these in turn may further stimulate e-working. An example is help-desks (see section 4.11.5). Not only can a help desk be remote from the customer, but also the help desk worker can be an e-worker.

In general, the success of e-working depends on the level of trust between the employer and the employee, and to what extent the employee can work physically in isolation, but electronically part of a team. Some commercial activities, such as help desks, third level teaching (c.f. section 4.4) and other professionals (for example medical, c.f. section 4.5) seem to be natural candidates. In other cases we suspect that employers would be encouraged to experiment with e-working of their staff, on a part-time basis at least, if managers were able to occasionally place a video call (c.f. section 4.3) to their staff to monitor progress on work at home.

4.16 Summary of the potential of video applications

We firmly believe that implementation of the New Connections strategy, and in particular the strong commitment to broadband speeds of 5Mbps as a minimum to the home and substantially higher for commercial use, can be justified if - as a simultaneous national strategy - there is a commitment to stimulating video broadband applications. We believe that this would uniquely position Ireland as the global leader in video broadband, and would consequently stimulate and retain further foreign direct investment (FDI) as well as strengthening our indigenous industry. We also believe that this would yield a viable business model for broadband operators, in turn stimulating competition and development.

The benefits to our society at large would naturally include economic, in terms of new jobs created and new skills cultured. However we also believe there would be a social return by more efficient, and thus better, delivery of health care services and high quality education, particularly in rural areas remote from such specialist knowledge. We believe that community television services may be an attractive social complement to community radio stations. We believe that e-Government services would become revolutionary if coupled with real time video. We finally believe that as a result of widespread video broadband there may be an even greater national social cohesion through better and more frequent communication and dialogue.

5 The need for an e-strategy plan

A year ago, one of our major concerns was the lack of leadership and the development of a national e-agenda and plan.

Since then the New Connections document has been published and subsequently Ms. Mary Hanafin has been appointed e-Minister.

We view both developments as substantial progress, but we remain convinced that the New Connections document is more of a status summary on the e-Government programme and an aspiration for a video quality pervasive broadband infrastructure, than a national e-agenda and associated plan. We believe there is an urgent need for a thought through, co-ordinated and resourced strategy and actionable plan to foster usage of e-infrastructure in Ireland, as a driver to e-infrastructure deployment.

We noted in section 3.4 that the full cost a pervasive video quality broadband infrastructure is likely to require of the order of a billion euro of investment a year, for the next few years.

Ireland does not today have the financial resources for speculative development that both the telecommunications industry and the Government in general did a few years ago, and nor can we afford more years of inertia. We cannot risk a poorly thought out, poorly co-ordinated and weakly executed strategy. Ireland needs to develop a clear national e-infrastructure strategy, which is underscored by supportive public policies.

Having virtually unanimously moved to a laissez-faire approach to the telecommunications market in the 80's and early 90's, many governments worldwide are now back actively involved in directing or influencing developments in this area. There would appear to be three main strategies in which policy makers in general are moving this agenda forward:

- foster an environment which has supported the development and roll out of broadband technologies – an approach favoured in e.g. the UK.
- directly finance the roll-out of these technologies, as in e.g. Korea and Singapore.
- aggregate their significant buying power and leverage it strategically to provide an economic justification for the roll-out of broadband in areas where there would otherwise be no economic justification, such as in e.g. parts of Canada

We believe Ireland needs a combination of these approaches. There needs to be co-ordination of the nurturing of an appropriate environment, with direct finance such as the MAN programme, and the aggregation of demand.

The preparation of a well thought out, cohesive and coherent e-Infrastructure strategy should:

- help align the policies and strategies of central and local government;
- serve as the basis for the prioritisation of actions by Government, thereby focussing funds;
- provide the roadmap and the medium term policy stability that will allow the public and private sector to together align their goals;
- ensure the best possible use of State funds through the elimination of duplicate infrastructure;
- and work in tandem with other Government strategies such as the National Spatial Strategy.

A balance is needed between ambitious vision and an unworkable reality; between short term, medium term and long term actions and goals; and between the needs of rural areas

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and the needs of the urban majority. The development of a holistic, phased plan for the national infrastructure – backbone, backhaul, and especially the last mile must be a high priority.

There is currently little publicly visible planning for broadband development for those areas, including Dublin, which fall outside the ‘priority areas’ as defined by the National Development Plan. In essence the majority of urban areas - and hence the majority of the country’s SMEs and population - are apparently not covered by the existing strategy.

A number of different time horizons need to be considered: short term (less than 3 years), medium term (3 to 5 years) and long term (greater than 5 years). A holistic plan should identify what specifically is feasible and credible for a video quality broadband service in the short term, given the reality of the infrastructure today, including the pilot MAN programme; how that will be broadened pervasively in the medium term; and what the future is beyond this in the long term.

The division of responsibility between the public and the private sector needs to be articulated. As importantly, the allocation of clear responsibilities for particular tasks within the public sector needs to be visible and accountable. It is necessary to build on the compelling vision of 5Mbps pervasive national infrastructure, by developing a workable and credible strategy which can be further divided into manageable action items. The responsibility for each of these action items should then be allocated to either the public or private sector or a combination of the two.

Named individuals who will be publicly responsible for delivering their actions on time should be appointed, and as with any major project, a timeline to implementation should be developed.

The e-Minister should be responsible for driving completion by the Public Sector and should report regularly to the public – probably monthly – on progress.

The e-Infrastructure strategy be technology neutral in so far as possible, and a commitment affirmed that Government will restrict its actions to those of a facilitator and not those of an operator.

Where it is in the best interests of the end user, a policy of non-duplication of infrastructure should be adopted. Infrastructure should, where ever possible, be shared. This can be achieved by a combination of suitable regulation, appropriate wholesale rates, and the co-operation of retail broadband operators with the MSE.

Rather than draft such a strategy in isolation, we recommend that the strategic e-agenda and plan are developed with the co-operation of all relevant government departments, in conjunction with the industry, and with some form of end-user involvement. It is in this context that we feel a Stakeholders Group, discussed below in section 5.2, encompassing the Government, operators and end users has a role to play. We feel that the e-Minister and the Information Society Policy Unit should also play the key role in the development and continual updating of this strategy.

5.1 Realistic aspirations

Ireland cannot afford to be a laggard with respect to broadband infrastructure, but it also appears ambitious to become the world leader: we should accept this fact. We should instead aspire to have a widely available, competitively priced, high quality e-infrastructure in Ireland. We should aspire to be in the top 2/3^{rds} of European countries when next reviewed by the OECD.

The current e-infrastructure aspiration of a pervasive, 5Mbps minimum, broadband infrastructure to every citizen in the State is probably unrealistic in the short term. We do not share a common political philosophy or demographic profile with the leading broadband

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countries. Thus we are unlikely to have either the funds from central Government or the density of population to justify the investments in e-infrastructure that have in some cases been made elsewhere. We should accept that it is unlikely that we will ever be able to match the e-Infrastructure in the exemplar countries such as Korea. Instead, we should be actively seeking to learn lessons from the likes of Korea, and reconcile our own infrastructure goals to what is appropriate and achievable in our own specific context. What “world-class” will specifically mean in practice at any given time will depend on what is happening in other countries, and our aspirations should be regularly reviewed to reflect this. We ourselves have made the assumption that in five years time, “world class” implies widespread (but not total) availability of 5Mbit/s minimum connections to SME and domestic users. This therefore should be our medium term target.

We emphasise an aspiration for widespread, but not ubiquitous, availability of these bandwidths. Given our low population density, we believe that the cost implications of constantly striving to provide an equal level of broadband service throughout the State would be financially crippling. For 85% coverage, Ovum have suggested a figure of €4.1B (c.f section 3.4), albeit without considering the positive impact of the MAN programme, but on the other hand not including commercial costs such as a marketing programme. Having regard to these cost issues, and conscious of the needs of the National Spatial Strategy, we suggest that differing targets should therefore be set for rural and urban areas in the short to medium term, with a longer term aspiration of providing a uniform service nationwide.

5.2 Advisory Group

The State has generally benefited from the involvement from time to time of international experts in the shaping of telecommunications and e-Infrastructure policy in Ireland. These should now be complemented by a domestically based group, which shares a common understanding and appreciation of the particular difficulties to be encountered in the Irish market.

In the UK a Broadband Stakeholders Group⁵⁰ was established in April 2001. Its membership is open to any interested party, and now consists of some 200 organisations, and some 400 individuals who regularly meet. The main objective of the Group is to advise the UK Government on broadband strategy. The Group has produced two major reports and sets of recommendations to date, in November 2001 and November 2002. The first set of recommendations were widely adopted by the Government as the basis for their national broadband strategy. This approach ensured the buy-in of most parties to the newly developed strategy and ensured that what was suggested was workable in practice. The second set of recommendations have only just been published, and the main foci are how to sustain the penetration rates of broadband adoption across the UK; how to reach out to rural areas; and how to even further stimulate competition.

In Ireland, the Information Society Commission reports to the e-Minister and the Department of the Taoiseach on matters relating the development of Ireland as a knowledge society, the reduction of digital divide in our society, and makes appropriate recommendations⁵¹. The Commission draws on input from a wide base across society, and advises Government on actions it considers appropriate and timely. IBEC also has both the Telecommunications Industry Forum (TIF) and the Information and Communications Technologies (ICT) forum. The TIF is largely comprised of the telecommunications operators, and the ICT forum is likewise comprised of computer and software companies (both indigenous and international). Both lobby the Government on behalf of their respective industries.

We have no desire to suggest the replacement of the Information Society Commission with an equally cross societal group equivalent to the UK Broadband Stakeholders Group, and nor do we wish to suggest yet another mechanism for industry lobbying to Government. Nevertheless, we believe there are aspects of the UK approach which would be attractive in

⁵⁰ www.broadbanduk.org

⁵¹ Its latest reports, published in December 2002, are available at www.isc.ie

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Ireland, and which we believe are currently absent. Our view is that currently Government does by and large not benefit from the advice and high level knowledge available from industry and commercial operators in Ireland, which can be proffered in a vendor neutral manner in the national interest of deploying a high quality e-infrastructure. We deferentially and with all due respect and caution suggest that our own Working Group has been a neutral forum for critical and positive discussion, involving broadband operators, broadcasters, the software industry, the digital content industry, ICT consultants and advisors, the SME sector through the Dublin Chamber, the city of Dublin through Dublin Corporation, and some major commercial broadband users.

Based on our own experiences and Working Group, we recommend that the Government establish a vendor neutral Advisory Group on the e-infrastructure plan and implementation. This Group should have two major purposes. Firstly it should assume the burden of forcing the pace on e-Infrastructure by collectively agreeing how to plan, fund and implement national e-infrastructure development. Secondly it should aggressively resolve any problems that stand in the way of the roll-out and implementation of such a strategy.

The stakeholders would include not just the various Government departments, but also the broadband operators, and end users including the general public and the business community. The membership should bring together as a minimum the Department of Communications, Marine and Natural Resources; the Department of Finance; the Regulator; the operators; a representative of ALTO; a representative of IBEC TIF and ICT; a representative from the Information Society Commission; and a representative of end users.

Currently the parties to the development of e-infrastructure do not collectively meet on a regular basis. Bringing together all these key participants should ensure greater co-ordination of actions in this area, and should ensure that costly mistakes are not made. Equally it should ensure that any new strategies are reasonable and credible before implementation.

We recommend that the Advisory Group is chaired by the e-Minister and administered by the Information Society Policy Unit (ISPU) of the Department of the Taoiseach. It would bring together the relevant public and private sector groups which are party to developing e-infrastructure. The agenda for this group should be focussed – forcing the pace on e-Infrastructure, and collectively tackling any problems that arise in a timely fashion. The Advisory Group should meet regularly (perhaps monthly), and report its work on six monthly basis to public plenary forums.

5.3 Aspects of the plan

As we have just noted above, our major recommendation is the very urgent development of a holistic plan for national e-infrastructure and usage stimulation, via a Stakeholders Group; followed by the transparent implementation of the plan.

We outline below some further consideration for the plan.

5.3.1 Support Environment

Left to their own devices, the private sector is unlikely to provide the e-infrastructure called for in our aspiration. Hence Government has an important role in creating a supportive environment for the roll out of a national e-infrastructure. In this context innovative approaches need to be considered as regulation in itself will not deliver this environment.

One of the pre-requisites of any major infrastructural investment is an environment in which there is medium term stability of Government policy. Companies need a stable medium term environment to facilitate, plan and justify major infrastructural investments, especially those

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that have a longer term pay-off period. Just as Foreign Direct Investors require a reasonable guarantee of policy stability prior to committing their investments in Ireland, so too do those companies investing in e-infrastructure require similar policy stability now.

A new national strategy is needed that provides a medium term year vision and supports it with a stable set of policies, and a detailed actionable plan of implementation. Poorly considered policies undermine committed investment which may have already been made by private sector companies.

Central Government departments should co-ordinate policy together under a common e-agenda, and will equally require tighter co-ordination of central & local government actions. The co-ordination of the implementation of the e-agenda should be the clear responsibility of the e-Minister Mary Hanafin.

Despite the downturn in the world economy, competition rather than direct financial provision from Government should still generally be regarded as being preferable. Currently in Ireland we have some very limited competition in ADSL provision, but significantly we do not have strong competition from cable technology. In global e-cities with a similar social and administrative philosophy to our own – e.g. Washington rather than say Singapore - broadband provision is offered from a range of competing technologies: cable operators, telephone operators, and wireless operators. Competition between these providers has been behind much of the development of a midband market in such locations.

The focus on developing competition in the Irish market needs to begin with measures to bring about effective alternatives in the broadband market - alternatives to incumbent providers and alternatives to a single primary means of access. This means a focus on competing technologies; significant and continuing pressure on wholesale prices for bit-stream access; and further efforts to re-invigorate the unbundling process, including at the kerbside (see section 5.3.6).

There will naturally be areas of the country where provision of a duplicate broadband infrastructure is likely to be unsuccessful and could perhaps be counter-productive in undermining existing investments. Competition is not a panacea. In no other area has so much investment been so far unrealised - hundreds of millions of Euros, and much of it Government money - than in the development of alternative, nominally competing broadband fibre infrastructures. Much of this currently lies unlit - a testament to short term planning and weak judgement.

In all cases consideration should be given as to whether the needs of the end user are best served by competing infrastructure, or enhancing existing infrastructure. The most important point is the cost and quality of the service available to the end-user. From a cost viewpoint this is likely to call for non-duplication of infrastructure where possible. In some locations a resilient backhaul infrastructure already exists, of sufficient quality to equip a broadband last mile infrastructure up-to 2Mbps. There are thus opportunities for co-operation between the MSE and the incumbent operators. However the business model needed to justify the roll out of this last mile access is typically currently absent.

5.3.2 Financial

Attitudes towards large scale direct financial support for the roll out of e-Infrastructure vary widely across the countries we have examined, and are very much a function of the governing political philosophy. Whilst it is clear that such direct financial support energises the sector, it should also be realised that much can be achieved without huge investment by the State. As we noted in section 3.4, Ovum recently presented an analysis which showed that in their view, some billions of euro will be needed to provide a pervasive high quality broadband infrastructure in Ireland. This investment is clearly not going to come from the State, and the private sector will only be able to source the money from the markets if there is a reasonable assessment of profit.

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In the case of Ireland, the Government's involvement in the development of the e-Infrastructure network should be concentrated in developing an environment supportive of private sector investment in this area, and in strategically using Government's own demand for broadband. We note later below (c.f. section 5.3.4) that by aggressive professional management of the Government's own IT environment, there are likely to be very considerable cost savings which could be invested in the national e-infrastructure. Whatever limited financial resources there are available from the State, should in the first instance, as is the plan with New Connections, be targeted at those areas of the country where the private sector are unlikely to adequately invest either due to demographics or the longer break-even horizons involved.

However indirect financial support also has the potential to move the market in a substantive manner.

Our recent past, especially in the property market, has shown us that various forms of capital allowances are at least as effective at encouraging desired behaviour patterns by the private sector. If encouraging the build-out of particular infrastructures, the time limited availability of capital allowances for broadband equipment, especially when equipment costs have fallen so much, could be especially effective. A particularly beneficial feature of such allowances might be to encourage investment in the cable network in the main urban areas, which would deliver more substantial competition in the broadband market for the first time.

5.3.3 Innovative financial proposals for quality broadband deployment

We believe that video quality broadband will be the prerequisite to a number of new compelling applications, which in turn will vastly improve today's experience of the internet, and thus foster usage and uptake by the public and business. It is also our fervent belief that it is in the strategic and social interests of the nation to have and exploit pervasive video quality broadband.

We also noted that the Government is pump priming this situation by in the first case implementing a large number of e-government applications, and thus leading by example; and in the second by implementing a number of MANs nationwide in a pilot programme.

Nevertheless we remain unconvinced that there is a reasonable financial argument for the broadband operators to invest heavily in video quality broadband, despite these two major current Government initiatives. On the one hand, while we have identified above some applications, which should be of interest to the public and business community, there is no clear and obvious immediate incentive for the public and business community to adopt video quality broadband. On the other hand, despite the fall in cost of optical telecommunications equipment, a pervasive infrastructure will still remain a heavy financial commitment.

There is still thus some outstanding substantial risk for any broadband operator that the construction of a pervasive video quality broadband service will lead to an adequate financial return in any reasonable timescale.

We seek on the one hand an incentive for the public to go online in large numbers. Equally, we seek an acceptable scenario showing substantial growth in usage by the public and businesses, for broadband operators to risk investment in video quality broadband. Finally we recognise that the Government is itself investing in a pilot video quality broadband infrastructure, although clearly it has no intent in operating broadband services itself.

Faced with this assessment, our thoughts have turned to fiscal measures to encourage the public online. The obvious target is VAT.

Currently VAT is charged in Ireland at the same rate for goods and services obtained online via the internet, as with the established offline outlets. For convenience, we will now use "e-VAT" to denote VAT charged for goods and services ordered online. We understand that

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under an imminent European ruling, it is likely that e-VAT will be charged at the rate payable in the consumer jurisdiction. Thus, a vendor located in Ireland will charge the applicable level of Irish e-VAT to a consumer located in Ireland; the UK level of e-VAT to a UK customer; and the Italian level of e-VAT to an Italian customer. Customers located outside of the EU should not have to pay e-VAT.

In 2001, the total tax income to the Government was approximately 27.9B€. Of this, all VAT receipts were 7.9B€, ie approximately 28%. In the same year, the value of goods and services purchased online was approximately just 200M€. Assuming an applicable rate of 21% e-VAT on these, the total e-VAT receipts would have been about 42M€. Thus e-VAT in 2001 apparently counted for just 0.5% of all VAT receipts, and 0.15% of the total tax take.

The amount of e-VAT collected in 2001 was thus a tiny fraction of the VAT and total tax receipts. This is a direct measure of the currently very limited extent to which the Irish public are currently using online goods and services.

We believe there is a very strong case for reducing the rate of applicable Irish VAT on online goods and services, for a period, so as to encourage the public online. As the public go online and the amount of e-VAT increases, the e-VAT rate can be reviewed on an annual basis at Budget time, and gradually brought back to the offline VAT rate. However we do not wish to reduce e-VAT from the peer VAT rate to the extent that tax revenues from e-VAT greatly diminish: for example, we think a reduction of e-VAT rate to 13% from 21% would be excessive. Instead we suggest that a reduction of approximately 5% from the currently applicable rates would be a sufficient psychological incentive to the general public to switch their purchasing habits online, particularly combined with a more friendly e-retailing environment as we discussed in section 4.11.

It may be argued that a lower rate of e-VAT than offline VAT places offline retailers at a disadvantage to e-retailers. This argument is of course correct: in fact it is precisely the point! Thus, offline retailers will be incented to go online, and provide e-retailing alongside their traditional outlets. If we are to encourage use of a broadband infrastructure, one major tactic will indeed be to foster all retailers to offer online services, in addition to their established channels. Of course, offline retailers, and particularly SMEs, may need assistance to develop the necessary expertise and mentoring to go online: but these facilities are already available and can be developed further.

We go further. VAT is currently charged and collected by the Government for communications services. We advocate that, again for a period and in order to foster usage, that VAT should not be applicable at all on the use of high quality broadband communications services. They should be zero rated for VAT purposes. This will reduce the cost of using broadband, for a time, by the public and by businesses.

We go further still. We believe that the State should forgo tax receipts in the short term for goods and services obtained using the internet, and instead the State should ensure that these finances are instead invested in video quality broadband by the operators. We propose that not only is e-VAT charged at a lower rate than VAT for a time (for example a 5% reduction as discussed above), but that during this period e-VAT is collected by retailers and forwarded to the broadband operators rather than the State, provided the operators concerned are investing in video quality broadband. We believe a lower rate of e-VAT would in fact increase the total tax receipts from e-VAT, particularly if combined with a friendly e-retailing experience for the public, and that this sum can help stimulate video quality e-infrastructure investment.

In effect, we are suggesting that the State forgoes some tax receipts in the short term in order to obtain a national quality broadband infrastructure⁵².

In detail, any retailer would continue to collect VAT from its consumers, including of course overseas consumers and foreign purchasers over the internet. Offline VAT receipts would be

⁵² A reminder that by appropriate professional action, the Government might save even more than the cost of the national e-infrastructure by rationalising its own use of IT – c.f. section 5.3.4

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forwarded to the State, as at present. However the retailer (in fact every retailer which offers an online service) would have to treat e-VAT receipts differently : firstly e-VAT would be charged at a lower rate; secondly, all e-VAT receipts would be forwarded to whichever broadband operator the retailer chooses to use. Every broadband operator would thus receive e-VAT income, from all the retailers which each operator serves. As at present, operators would compete to offer the most attractive level of service to retailers and the business community. Each operator would be allowed to retain e-VAT income against audited and depreciated investment in video quality⁵³ broadband capital equipment : any surplus e-VAT receipts beyond this would be forwarded by the operator to the State. The number of broadband in the State is likely to remain relatively small, and thus a full audit of each of them by the appropriate authorities⁵⁴ to confirm that their e-VAT income has been appropriately invested in high quality broadband capital equipment should be relatively straight forward task.

The scheme of course has a number of variations which need to be considered: e-VAT could be retained as a partial rather than full allowance against capital equipment; the number of years during which the scheme operates needs to be decided ; the rate of applicable e-VAT, and the period during which it is lower than offline VAT needs also to be decided. It is also worth noting that e-VAT receipts from foreign consumers purchasing from Irish retailers would be invested into the Irish broadband infrastructure : i.e. investment would not just be from the Irish State.

In summary, we strongly believe that pervasive video quality broadband is critical to the social and economic future of Ireland. We believe that the Government has already taken a clear lead, by its own example in the services it itself is developing, and by the pilot MAN programme. We nevertheless believe that the general public require compelling fiscal encouragement to overcome inertia and go online. We believe too that operators need fiscal assistance to invest in video quality broadband, and thus that the State should forgo some level of tax receipts, particularly those attributable to online usage, in order to achieve in a reasonable timescale the infrastructure which the nation needs.

5.3.4 A consistent e-Government software architecture, and demand aggregation

Government demand for broadband for use by State agencies, institutions and the public administration can be used in a strategic fashion. As the single biggest national telecommunications customer, the Government can use its 'customer clout' to ensure that e-infrastructure is developed in specific areas where the economics would not otherwise make sense.

In many areas of the country initial private demand for broadband services are unlikely to be sufficient to justify private sector investment. To address this fragmentation of demand, and to generate the immediate body of usage needed to provide critical mass, the Government should intervene to take advantage of its status as the largest single customer in the State. We note that in its recent report, the Information Society Commission made a similar recommendation⁵⁵, although the published report did not provide details on how this might best be achieved.

We suggest that to ensure a consistent IT strategy, and use of the internet, across all sectors of Government and public administration, a Government Chief Information Officer (CIO) should be appointed. Paralleling the role of a CIO in major corporations, the Government CIO should report directly to the Taoiseach (as CEO), and have the budget and full control to implement IT strategic support for all Government functions. The IT budgets of all Government departments and agencies should be under the control of the CIO's office, enforced by the Department of Finance, to ensure co-ordinated investment and a common

⁵³ defined as a minimum of symmetric 5Mbps service to the customer.

⁵⁴ The audit could be by the Revenue Commissioners, but perhaps it would be more efficient for the ComReg to do so since this organisation already regulates the industry.

⁵⁵ c.f. <http://www.isc.ie/downloads/know.pdf>, recommendation 8.

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implementation policy.

We note that there has been a recent report⁵⁶ that the central Information Society fund is to be reduced in 2003 and henceforth, on the basis that it was intended to be a seed fund in the Department of the Taoiseach to stimulate investment in e-Government by the various Government Departments directly themselves. Our view is that the key issue is ensuring that IT investments are consistent and aggregated across all Government spending, regardless of whichever budget lines they happen to fall under at a particular point in time. Thus control and authorisation of IT investment should be under the CIO's office.

The CIO would be responsible for defining a professional common IT architecture for all Government services – ideally local as well as central Government. He/she would ensure that common IT services (such as archiving, authentication, federation of application data models, auditing and logging) would be factored out from all the e-Government applications, and accessed in a re-useable manner as a software services backbone to all the software e-Government business applications. Considerable cost savings would result from this proven modern approach to componentised software architecture. The CIO would insist, in conjunction with the Department of Finance, that every software and hardware procurement fitted the IT architecture, and would not otherwise authorise tax payers investment. In addition the CIO might well identify particular software services and business functions would could be competitively outsourced, thus further reducing IT costs within the civil service.

The costs savings to the Irish State would likely be very considerable indeed, and perhaps even be sufficient to more than justify the national investment in a video quality e-infrastructure.

The Government CIO would differ from the role of the e-Minister, and should not be the same individual, although naturally their objectives should be complementary and aligned. The e-Minister is responsible for the design, monitoring, and implementation of the national e-agenda to the optimum economic and social benefit of Ireland. The Government CIO would be unlikely to be a politician but instead a civil servant or consultant, with substantial large company IT experience at the level of CIO, and would be responsible for co-ordination of all Government IT and communications investments to facilitate Government operations.

5.3.5 Wholesale rates

International practice has largely shown that cheaper wholesale rates, rather than local loop unbundling, has been the spur to the development of a competitive market for broadband services.

The establishment of an MSE will provide low cost wholesale rates for access to the State installed MANs. However wholesale rates should also be pushed down by the Regulator to international norms on the existing infrastructure - both narrowband FRIACO and midband DSL.

Current wholesale rates in Ireland are high relative to our international competitors, just as our adoption rates are low relative to our competitors. Lower wholesale rates are needed and consideration should be given as how to realise and then retain rates at these lower levels.

We recognise that establishing new wholesales rates for services such as DSL is a delicate balancing act. On the one side the desire to establish low wholesales will attract a number of competing providers to the market. On the other, the wholesale network provider should have sufficient return to maintain investment in the network.

⁵⁶ c.f. Irish Independent, 19th December 2002, Digital Ireland, p10

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The establishment of low cost wholesale rates should, if these savings are passed on, translate into cheaper services to end-users and hence higher penetration levels. The reduction of wholesale rates should thus be seen as an absolute priority.

In the future, the widespread availability of a video quality broadband infrastructure will also require attractive wholesale rates, and sharing of infrastructure.

5.3.6 Kerbside unbundling

The incumbent's Telephone Exchanges are usually designed to be at the "Copper Centre" of the area that they serve. This is done in an attempt to minimise the distance to the customers. However, even in city areas, cable distances of up to 5 km are quite common, and in less populated areas, much greater distances may be inevitable.

Current DSL technologies can be deployed up to around a limit of 4.5 km on good quality local copper cables. However, if speeds in excess of 2Mbps are to be considered and provided on a widespread basis over existing cable, it will be necessary to deploy electronics much closer to the end customers, thus reducing the length of copper connection from just the kerbside to the customer premises.

While deploying electronics much closer to the end user is beneficial in terms of the bandwidths that are possible, unbundling of these electronics will be required to increase competition. By regulating for the unbundling of these electronics a range of competing service providers can offer a variety of services to end-user over a single infrastructure.

Typically, industrial and business areas, and indeed residential estates, are served from Distribution Cabinets, which could potentially be developed by the construction of adjacent Equipment Accommodation Modules.

This strategy would effectively decentralise the exchange, and the same principles of unbundling should apply at these locations. This will give rise to certain logistical difficulties in respect of the provision of serviced accommodation, and the number of competing operators wishing to locate at these.

If this is to work then the ComReg will need to play an active role in the provision of serviced accommodation. Furthermore, the provision of wholesale high-bit-rate services, based on these kerb-side locations will need to be closely regulated.

The provision of kerbside electronics in the 'build phase' of new developments is one of the issues that we discuss in section 5.3.7 on changes to the Building Regulations.

5.3.7 Building Regulations

The vision of Ireland as a knowledge economy is based upon access to high quality telecommunications networks and services delivered at an economically derived price. If we are ever going to achieve this knowledge economy the provision of the telecommunications infrastructure in new developments will have to be considered as being analogous to the provision of a reliable electricity supply or clean water.

The bandwidth demands of this knowledge economy will inevitably new require fibre, ducting and kerbside electronics in the medium term. In the development stage it is relatively cheap to provide such services as against the cost once development has taken place. By providing the infrastructure in a planned way at the time of construction the most expensive component of telecommunications (civil works) is reduced by 90% providing the opportunity to reduce the price of services to the end user. This represents a 'least cost solution' for Ireland Inc.

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Currently the telecommunications infrastructure in new developments is seen by some developers as an afterthought with the ducts for copper and fibre cable squeezed in at the last moment, if at all. Equally some developers have come to regard additional income from exceptionally high rates/leases applied to duct infrastructure in business/technological parks as being the norm. Such developers must recognise that the first mile costs of providing access to customers has to be fully cost reflective, and that by securing supernormal profits on the infrastructure deployed, they are substantially increasing the cost base of their tenants.

By mandating the provision of basic infrastructure at this stage, significant costs savings will be realised, a minimum quality level can be enforced and we can be confident that in new developments at least further costly changes will not have to be made.

We note in our companion report that in Korea, the Korean Government has a cyber certification programme for offices and apartments, asserting that certified premises meet minimum levels of ducting and cabling for a high quality broadband installation.

We therefore recommend that a number of changes are made to the planning regulations to stipulate that ducting, fibre and kerbside electronics are included as part of the 'essential services' in all new developments. Equally we recommend that the issue of the cost charged for ducting etc in existing developments be examined with a view to ensuring the availability of competitive broadband to end-users in existing developments.

We recommend that in introducing this new measure increased co-operation between the Government, service providers and the development industry will be called for. In the short term this would involve working together to establish what exactly the requirements for new developments should be (as has already happened to some degree in the UK⁵⁷), to establish whether guidelines or regulation are the most appropriate means to achieve these ends and to establish the timeframes in which actions will be completed.

The nature of this recommendation means that it will not provide a 'quick win' - as the benefit to be derived will only accrue over time as the building stock is renewed. Despite this, this recommendation should be seen as important one and should be recognised as a sign that government is beginning to deal with the e-infrastructure deficit in a reasoned and informed manner.

5.3.8 Training and support

There has been a slow and steady progress to improve the IT literacy of the nation.

The European Computer Driving License (ECDL) is available through FAS courses, has been reasonable popular and is a prerequisite in some non-IT courses at third level.

Less formal initiatives also exist (for example the South West Equalskills programme) which provide an enjoyable and non-threatening introduction to computers for people who may never or seldom have used a PC, and to equip these people to participate in the Information Society.

The Department of Public Enterprise has provided support to communities who wish to access information technology under the CAIT (Community Access Information Technology) programme. This programme enables community groups to receive grants up to €130,000 for the development of community infrastructure, the provision of training and the creation of awareness.

The Ennis Business Champions Programme accredits local businesses who strive to increase their productivity through the successful integration of technology within the workplace.

⁵⁷ [http://www.e-envoy.gov.uk/oeo/oeo.nsf/sections/ukonline-actionplan/\\$file/rec01.htm](http://www.e-envoy.gov.uk/oeo/oeo.nsf/sections/ukonline-actionplan/$file/rec01.htm) Recommendation 1.8

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Dublin Chamber itself has run the Dublin Regional e-Business Development Programme that is designed to increase awareness of the Internet and e-Business among SMEs throughout Dublin, Dun Laoghaire Rathdown and Bray. This programme has also been implemented nationwide through the Chambers of Commerce of Ireland and it is in receipt of funding from the Department of Enterprise, Trade and Employment.

We propose that these and other schemes should be extended in the context of video broadband access. There should be State support for video broadband centres for technical assistance in Chambers of Commerce and Associations, similar to the Italian Government's support and as discussed in our companion report. The Italian Government has also committed itself to disseminating and supporting best practice in local portals at the district level and incubators for multimedia companies.

We also discuss in our companion report the positive experiences in Australia on how best to use the internet from rural and marginalised communities. National promotional programmes could be similar run with appropriate State support here.

5.3.9 Consolidation of broadband service platforms using IP technologies.

Broadband applications can be voice, data, video or multimedia in nature. Businesses and Government wish to deliver their own services in the most cost effect manner. These services address both customer facing and internal applications. The delivery of these services should be provisioned over a single infrastructure, using IP as a common delivery mechanism. Thus whether the transmission technology is ADSL or satellite, copper or optical cable, fixed or mobile, and for voice or data or video, in all cases we should move to converge the common infrastructure using IP.

This consolidation of services around IP would provide a reduction in operational expenses and capital expenditure for the services providers. For business and the consumer it also results in increased efficiencies in business applications, and the availability of new and innovative services in the home.

The elimination of multiple communications platforms within the service provider environment has been accelerating across Europe, and has been shown to deliver financial gains to both the consumer and the provider:

“Operating expenses savings, improved return on assets and the ability to quickly roll-out new services were the main reasons that Telecom Italia decided to merge its voice and data networks onto an IP backbone. The IP network uses MPLS "Class of Service" features (i.e. the ability to prioritize network traffic) to give different priorities to voice and data so that the highest quality of service can be ensured. The project will allow Telecom Italia to save two thirds of its transit operating expenses over the forthcoming years.”

Ireland should support the broadband operators and carriers in this transition from being providers of transmission circuits, to being providers of value added services across a single multiservice (voice, data and video) platform based on IP. We should create an environment within Ireland that will on the one hand attract further investment into the country for the support of technologies to address broadband application development, while one the other, supporting the local service providers to consolidate their service platforms using IP technologies.

We recommend that financial incentives we have discussed earlier in section 5.3.2 should mandate IP based solutions.

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We recommend that Government initiatives to accelerate the availability of broadband services, should address the need to transition the current service providers to a converged infrastructure using IP, and hence create a long term sustainable model for investment in the deregulated market without further State investment.

We recommend that a unilateral position be considered by both business and the Government for Ireland to take a lead across Europe, as a centre of excellence for IP convergence technologies in terms of development and deployment. This position has been already taken by countries in Asia Pacific, for example Japan and China are already strongly adopting IP V6.

6 Summary of Recommendations and Observations

We list below our major recommendations and observations. Each is numbered, and includes a cross reference to the appropriate section(s) in the main text which describes the activity.

Our fundamental recommendation is the urgent development of a credible, integrated, phased, costed plan for the national e-infrastructure:

1. Urgent development of a holistic, phased plan for national e-infrastructure: 3.4, 3.5, 5

This plan should be developed by a joint Government-industry-user stakeholders group.

2. Role of Advisory Group, and relationship to Information Society Commission, and IBEC: 5, 5.2

The plan should be credible, and should deliver a widely available video quality infrastructure in the medium term:

3. Why Ireland must invest in video quality e-infrastructure, and the risks if we do not: 4.1
4. Realism and pragmatism in national e-infrastructure plan: 5.1
5. World class, 5Mbps minimum, broadband broadly available within three to five years: 5.1
6. Nevertheless, accept different broadband targets for rural and urban areas: 5.1

The plan should align with the National Spatial Strategy:

7. All National Spatial Strategy locations to have 5Mbps in short term: 3.2.1
8. Phase one MAN programme towns which are not designated in National Spatial Strategy should nevertheless continue to participate in phase one of MAN programme: 3.2.1

The plan should provide a stable basis for a co-operative environment between the private sector, especially the broadband operators, and the State:

9. Role of Government as facilitator, not operator: 5
10. Stability needed in Government e-infrastructure policy if further investment is to occur: 5.3.1
11. Avoid duplication of quality infrastructure assets, and instead share them: 3.3.2.2
12. Establish regulation of wholesale rates to international norms, so that core infrastructure can be competitively shared: 5.3.5
13. Existing broadband operators to co-operate with new MSE: 3.3.2.3, 5.3.1

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The financial cost of a video quality broadband network in the medium term needs to be recognised, accepted, and resolved. Examples of incentives to resolve the necessary level of financial commitment are:

14. Entirely remove VAT from high quality broadband communication services 5.3.3
15. Introduce time limited availability of capital allowances for broadband equipment 5.3.2
16. Temporarily lower rate of e-VAT for online goods and services 5.3.3
17. Temporarily forgo e-VAT revenue to the State and instead allow e-VAT for online good and services to be re-invested in high quality broadband infrastructure 5.3.3

In addition we believe there are substantial cost savings to be made by Government in its e-Government infrastructure via a professional IT architecture, which could significantly counterbalance the full cost of a video quality broadband network:

18. Government to aggregate its own demand across State services: 5.3.4
19. Appoint a Government Chief Information Officer, role thereof: 5.3.4
20. Define a common IT platform across all e-Government applications, and factor out common software services into a shared software e-Government backbone: 5.3.4
21. Identify opportunities to outsource e-Government business functions and software services: 5.3.4

The plan should lead to a video quality broadband e-infrastructure for Ireland, accessible and shareable by multiple competing broadband operators; and while recognising complementary and competing telecommunications technologies (such as wire based, and wireless, and satellite), is nevertheless unified around the use of IP as the common communications protocol platform:

22. Technology neutrality in the e-infrastructure plan: 5
23. Technology competition in the e-infrastructure plan: 5.3.1
24. Promote IP as the common broadband infrastructure for voice, data and video; and take a lead in Europe (matching some Asian countries) on IP V6: 5.3.9
25. Regulate for the deployment of kerbside electronics and for the unbundling of the local loop as far as these kerbside electronics, so as to overcome video quality transmission limitations on copper wire lengths: 3.3.2.1, 5.3.6
26. Change planning regulations to mandate the provision of ducting, fibre & kerbside electronics as part of the 'essential services' required in the build phase of new housing and commercial developments: 5.3.7

Recommendations for Dublin as a World Class e-City

The plan should be transparently implemented, and the e-Minister should be publicly accountable:

- 27. Monitoring implementation of national e-infrastructure plan by e-Minister: 5
- 28. Cross Government Department co-ordination of implementation by e-Minister: 5.3.1
- 29. e-Minister must publish monthly updates on status of implementation of e-agenda: 3.1

The Government should further increase its focus on e-government services:

- 30. Accelerate e-health applications so as to provide urgent social benefits and foster general public support for broadband investment: 3.3.1
- 31. More active advertising of the e-government services: 1.1.2

The Government should actively nurture use of the e-infrastructure in addition to its own e-government services:

- 32. State aid to Corporations to be dependent on provision of e-procurement services: 3.3.1
- 33. Extending training to video broadband applications; establishment of video broadband centres: 5.3.8
- 34. National promotional programmes for rural and marginalised communities: 5.3.8

The e-infrastructure plan must be visionary, and demonstrate the social and economic benefits to the Irish public and business community. The general public should be able to appreciate the direct personal benefits. The plan should focus on applications which require the use of video quality broadband, and thus help build the necessary sustainable business case for investment in video quality broadband by both the State and the broadband operators:

- 35. e-work pilots and promotion of successful case studies: 4, 4.15
- 36. Exploit video conferencing in schools to share skilled teaching resources: 4.4
- 37. Exploit video conferencing in third level institutions and Universities to share skilled teaching resources: 4.4
- 38. Archiving of high quality educational presentations by skilled and scarce professionals: 4.4
- 39. Use video conferencing to aid rural health services: 4.5
- 40. Offer remote monitoring of senior or infirm patients with chronic problems: 4.5
- 41. Use video broadband to reduce cost of remote security monitoring: 4.6
- 42. Industry collaborative demonstrations of movie on demand: 4.7

Recommendations for Dublin as a World Class e-City

43. Consolidated billing and content revenue sharing by operators: 4.14, 4.11.3
44. Film post production opportunity: 4.8
45. Broadcast internet television opportunity: 4.8
46. Opportunity for community television services and remote audience participation in television using video: community TV demonstrator: 4.10
47. Strengthen e-payment by biometrics: 4.11.3
48. Feasibility analysis of the e-euro: 4.11.3
49. Video dialogue with e-retailers and shop assistants: e-retailer demonstrator: 4.11.4
50. Strengthen help desks with video, including e-Government applications: 4.11.5
51. Exploit video for supply chain management: 4.12

7 Conclusions

We have spent many breakfast meetings since last May working together and exchanging ideas and proposals for Dublin's future as an e-City. We have spent much time offline working on our allocated work items, and then co-ordinating online. It has been an enjoyable undertaking, and the co-operative and open spirit of the working group, comprised of people who had not worked together before, has made it even more so.

We do not claim to have conducted a full and exhaustive study of all the possibilities, and nor do we claim to have a comprehensive grasp of all the issues, concerns and players.

However we do sincerely believe that our recommendations are researched and reasonably comprehensive, and are now a basis for action by policy makers.

Dublin, and Ireland, are wonderfully positioned to become the leading e-city and e-nation. As a nation, we have surprised ourselves in the past with our confidence, our ability and our determination. We are seen as a nation of achievers, successfully boxing on the world stage well above our weight! We are already well respected by our competitors, albeit our poor availability of pervasive broadband is causing those same competitors to take heart and position themselves advantageously against us.

Let us change their perception and win.

8 Glossary

- ADSL** – Asymmetric Digital Subscriber Loop: a technique of transmitting internet data over ordinary copper telephone wires, which has a higher speed from the network to the consumer, than the other way around.
- ALTO** - The Association of Licensed Telecommunications Operators
- Backhaul** – the telecommunications infrastructure within a particular town or city or local area
- Backbone** – the telecommunications infrastructure for inter-city and inter-region connectivity
- Broadband** – In this report, we generally use the term broadband to imply transmission speeds above 2Mbps to provide internet related services and applications
- B2B** – Business to Business: inter-company information flows supported by the internet
- B2C** – Business to Consumer: the use of the internet to support retailing and service delivery to the public
- CAIT** - Community Access Information Technology: an Irish Government programme to encourage communities to develop basic computer competency
- CIO** – Chief Information Officer: an executive responsible for all the IT systems within an organisation, including planning for their future evolution
- ComReg** - the Commission for Communications Regulation: the Irish Commission responsible for regulation of all electronic communications mechanisms, including television and broadband
- Docomo** – a mobile telephone network developed by NTT in Japan
- DSL** – Digital Subscriber Loop: a family of technologies, including ADSL, to support transmission of internet data over ordinary telephone copper cables
- DTT** – Digital Terrestrial Television
- ECDL** – European Computer Driving License: a standard European measure of basic computer competence
- ERP** – Enterprise Resource Package: a software product which manages most aspects of a manufacturing operation
- e-VAT** – VAT charged on goods and services ordered and procured online
- FDI** – Foreign Direct Investment
- FRIACO** – Flat Rate Internet Access: a tariff scheme whereby use of the internet is not charged by duration
- IBEC** – Irish Business and Employers' Confederation
- ICT** – Information and Communications Technology
- IP** – Internet Protocol, a generic term for the family of network communication protocols used to implement the internet.
- IP V6** – Version 6 of the Internet Protocol, which very greatly increases the number of addressable connections which the internet can manage.
- ISDN** – Integrated Services Digital Network: a technology combining the transmission of voice and internet data, generally limited to slow transmission speeds of 64Kbps
- IT** – Information Technology
- Kbps** - Kilobits per second: a measure of internet data transmission speed. A single A4 page in this document consists of about 5,000 bits: thus one kilobit per second would transmit approximately one fifth of such an A4 pages per second
- Last mile** – the term used to describe the telecommunications infrastructure between a consumer premises and the nearest local telephone exchange. In practice the distances involved may be in some cases several miles.
- MAN** – Metropolitan Area Network: a high speed (5MBps or more), optical fibre based, network configured in a ring within a particular city or town.
- Mbps** – Megabits per second: a measure of internet data transmission speed. A single A4 page in this document consists of about 5,000 bits: thus one megabit per second would transmit approximately 200 such A4 pages per second
- Midband** – In this report, we generally use the term midband to imply transmission speeds of approximately 1Mbps to provide internet related services and applications
- MSE** – Managed Service Entity: the commercial organisation (yet to be appointed at the time of this report) which will operate and maintain the State's MANs
- Narrowband** – In this report, we generally use the term narrowband to imply transmission speeds below 100Kbps to provide internet related services and applications
- OEM** – Original Equipment Manufacturer: a computer manufacturer
- NDP** – National Development Plan
- NSS** – National Spatial Strategy
- NTT** – a Japanese telecommunications conglomerate
- ODTR** – Office of the Director of Telecommunications Regulator: the former Irish office responsible for regulation of the telecommunication sector. In September 2002, the ODTR was reconstituted as the Commission for Communications Regulation (ComReg).
- Ovum** – a UK based technology market research and analysis firm
- PDA** – Personal Digital Assistant: a consumer device encompassing an electronic diary, contact list, calculator, to do list, etc: the classic PDA is the Palm Pilot
- REACH** – an initiative by the Irish Government to provide e-government services
- SCM** – Supply Chain Management: the organisation of flows of components and subassemblies across multiple suppliers for a manufacturing operation
- SME** – Small or Medium sized Enterprise: a company with perhaps less than 200 staff
- SMS** – Short Message Service – sending text messages using mobile phones