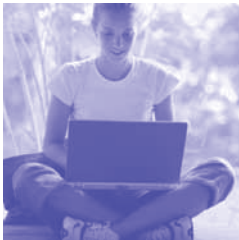
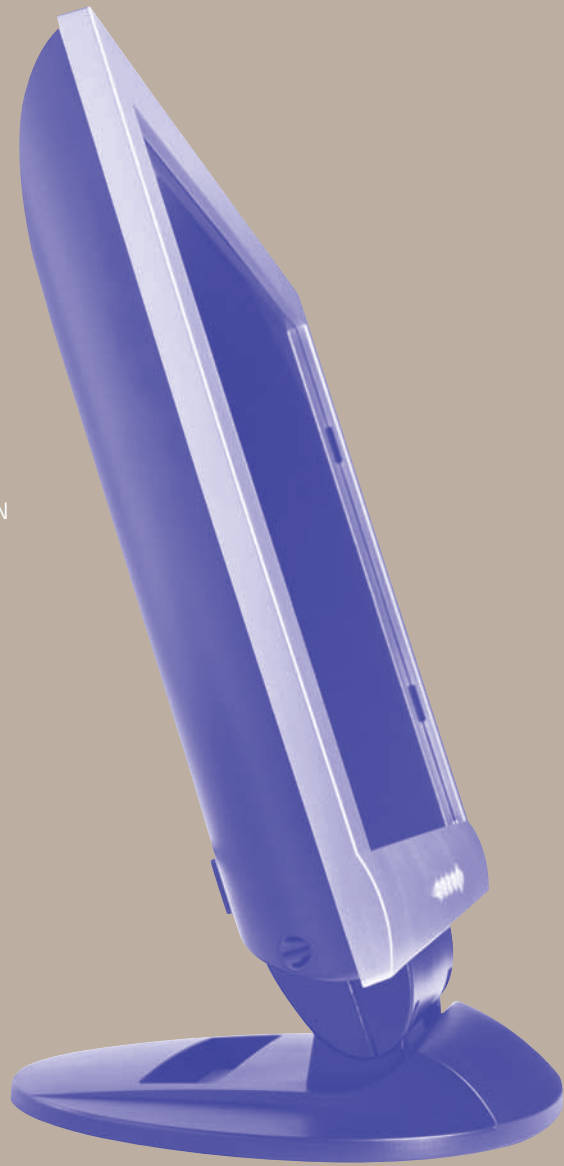
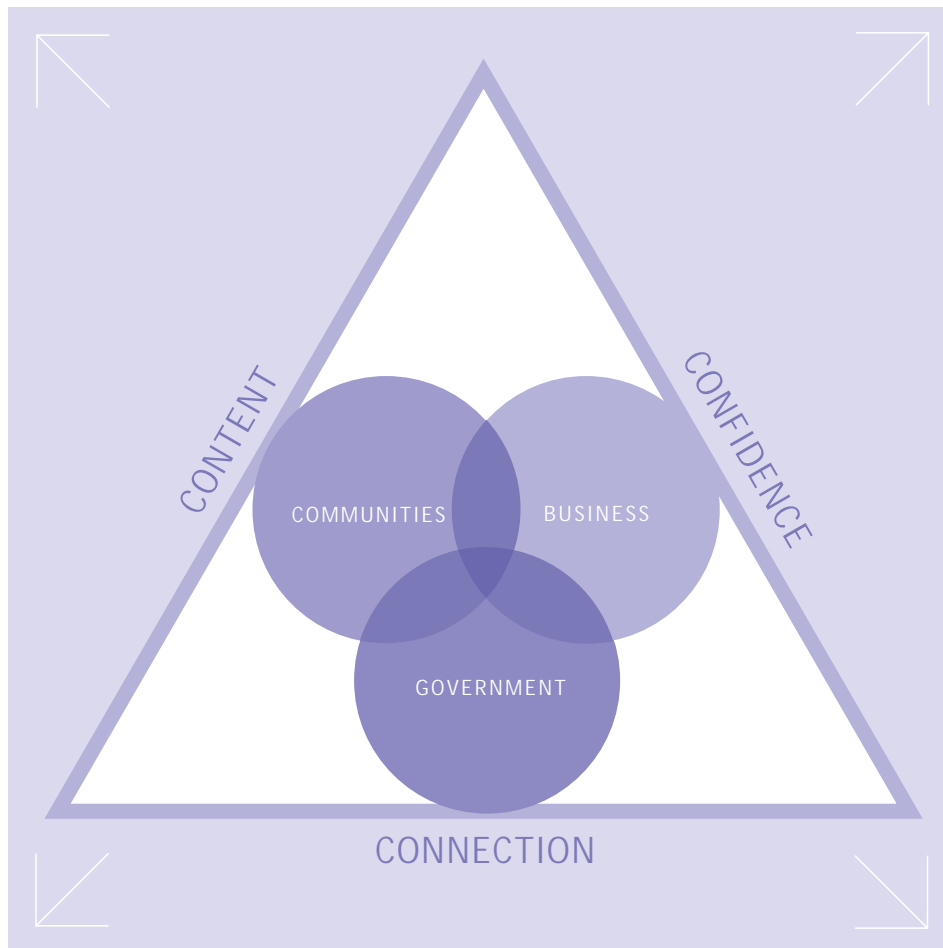


# DIGITAL STRATEGY:

A DRAFT NEW ZEALAND DIGITAL STRATEGY FOR CONSULTATION





## ACKNOWLEDGEMENTS

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## DISCLAIMER

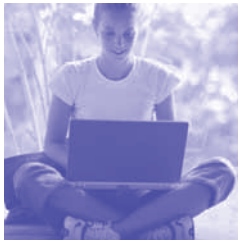
Any statements made or views expressed in the draft Digital Strategy do not reflect government policy.

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# DIGITAL STRATEGY:

A DRAFT NEW ZEALAND DIGITAL STRATEGY FOR CONSULTATION



# minister's foreword



We live in a time of rapid and unparalleled technological change.

Our government is committed to bringing the benefits of information and communications technology (ICT) to all New Zealanders – to create a society where ICT empowers everyone to create, access, utilise and share information and knowledge, enabling individuals and communities to achieve their full potential.

On many indicators, New Zealand is among the leading countries in the transition to such a society. Today, more and more New Zealanders are using ICT, such as mobile phones and the Internet, to communicate, to learn and to operate their businesses.

But many of our people and communities do not yet have the access, skills or confidence to get the maximum benefits from ICT. Considerable progress has been made in accelerating the development of the ICT sector, identified as a key focus area under the Growth and Innovation Framework. However, many businesses, especially small businesses and those in other sectors, have yet to realise the full productivity gains that digital technology can bring.

The government has been active in implementing a wide range of ICT initiatives including in e-government, health and education. But there is a need to bring this activity together within a unifying framework and update it in light of the latest technology trends, to guide our ICT-related policies and initiatives over the next five years.

The purpose of the draft Digital Strategy is therefore to provide a unifying vision for using digital technologies to shape an exciting future. As a nation, we are quick to embrace new technologies and we have the skills, education and motivation to use them to create wealth and well-being for all. Our vision is for New Zealand to be a world leader in using information and technology to realise our economic, social and cultural goals.

At the heart of this Strategy is the need to recognise the importance of the key enabling conditions – content, confidence and connection – and the needs of key user groups – individuals and their communities, business and government itself.

This draft Strategy is the result of a whole-of-government process, co-ordinated by the Ministry of Economic Development, and is now released for public feedback and discussion. Your input will be carefully considered in finalising the Strategy this year. I look forward to meeting with many of you at a series of business and community forums.

This Strategy provides an ambitious plan for the development and implementation of policies aimed at achieving the ideal of all New Zealanders benefiting from the power of ICT to harness information for social and economic gain. By working together to implement the Strategy, we can seize the opportunities for increased prosperity and greater social cohesion that the effective use of the tools of ICT can deliver.

Hon David Cunliffe  
Associate Minister for Information Technology  
Associate Minister of Communication



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# executive summary



## VISION

New Zealand will be a world leader at using information and technology to realise our economic, social and cultural goals.

All New Zealanders will benefit from the power of information and communications technology (ICT) to harness information for economic and social gain. This will result in changes in government, businesses, communities and society as a whole.

## THE PURPOSE OF THE DIGITAL STRATEGY

The government is determined that its citizens enjoy the benefits that ICT can bring. To this end, it has implemented a wide range of ICT-related initiatives, including the roll-out of e-government, promotion of e-commerce to business, ICT strategies for health, education and national heritage collections, community ICT initiatives, and legislative changes in telecommunications and e-transactions.

The Digital Strategy provides an integrated framework for existing and future initiatives to encourage the uptake and effective use of ICT for economic, social and cultural gain.

Developing ICT infrastructure is a necessary condition for reaping the benefits of ICT, but more than that is needed. *Complementary* innovations in society's systems, processes and institutions, in business management, and in individual skills and behaviour which shape what we do with the new opportunities that ICT provides are also needed.

The Strategy contains bold new actions for the future. It provides a direction for government policy for the next five years, and will ensure that ICT-related strategies and actions are co-ordinated and focused on the key opportunities and challenges.



## BUILDING THE STRATEGY

There are three high-level roles for the government: leadership by example, facilitating change and mitigating risk.

ICT *offers* new ways to deliver government services and create desired outcomes.

In addition to the work of central government, other parts such as local government, businesses, communities, community and voluntary organisations, philanthropic agencies and individuals all have their own roles to play.

## CREATING THE CONDITIONS

In order to reap the social and economic benefits of ICT, three interrelated areas for action are required:

1. **Content:** Information made available via digital networks;
2. **Confidence and capability:** The necessary skills to use ICT effectively; and
3. **Connection:** Affordable access to ICT infrastructure such as telecommunications networks, computers and mobile phones.

The government's role is to enable better access to the information contained in public collections, promote public confidence and capability in the use of ICT, and ensure that affordable ICT infrastructure is available to all.

## REALISING THE BENEFITS

The government's role in realising the benefits is to:

- facilitate **communities** and individuals to use ICT effectively;
- promote innovation in New Zealand **businesses**; and
- use ICT to transform **government**.

Policy development in all these areas must be coherent and integrated. The greatest benefits will flow when the whole system is ICT-enabled.

## THE DESIRED OUTCOMES

**Content:** Through the effective use of ICT, the social, cultural and economic value of New Zealand's stock of content will be unlocked, giving New Zealanders seamless and easy access to the information that is important to all aspects of their lives.

**Confidence and capability:** All New Zealanders will have the necessary literacy skills to maximise their opportunities using digital means.

The environment for ICT use in New Zealand must therefore be secure, reliable and well regulated. The public will be safety-aware, and will have a well founded trust in the use of ICT.

# executive summary



**Connection:** New Zealand will have an information and communications network infrastructure that provides the level of connection necessary to meet the high demands of an information-empowered society. It will meet the requirements of all users and will be readily accessible and affordable.

**Communities:** ICT will be an important tool for realising the social, cultural and economic ambitions of our communities and citizens.

**Businesses:** New Zealand businesses *in all sectors* will have the necessary knowledge, management capability and access to content and ICT infrastructure to create innovative products and processes and increase productivity. The ICT sector will contribute 10% of New Zealand's GDP by 2012.

**The government:** Information, service delivery and government processes will be integrated across agencies to ensure that the New Zealand government is responsive, citizen-centric and cost-effective. Information and services will be customised to the needs of citizens and businesses, and accessible from a single point of contact. Agencies will adopt a whole-of-government perspective when designing and implementing services.

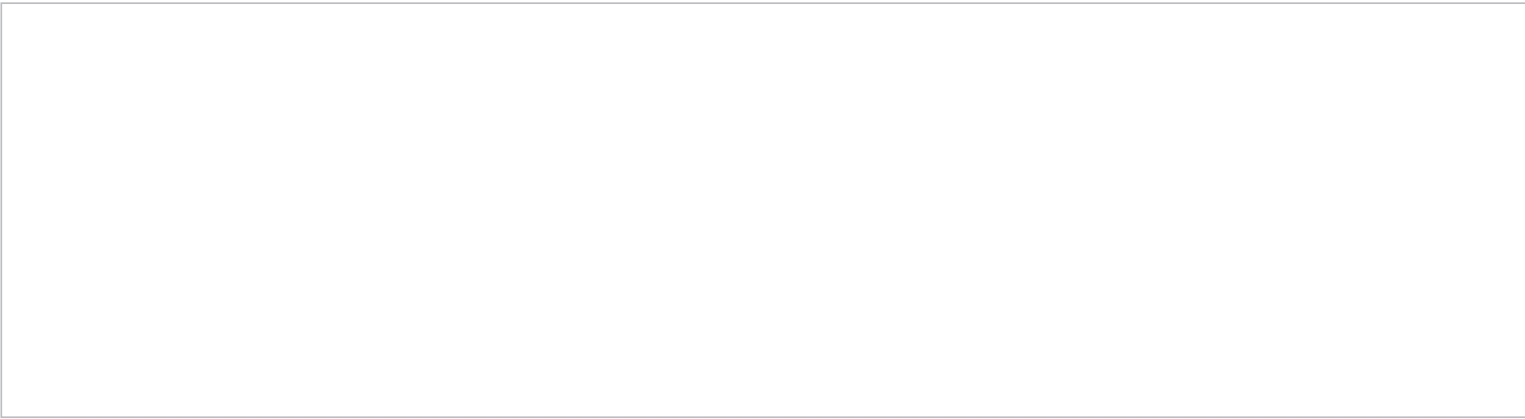
## WHERE TO NEXT

The completion of this draft Digital Strategy concludes phase 1 of the Digital Strategy. Phase 1 was an inter-departmental process, across the whole of government, to develop this draft Digital Strategy for public consultation. Two additional phases to follow are phase 2: consultation and phase 3: implementation.

The aim of the consultation phase is to receive your input on this draft Digital Strategy. Your input is sought on the general direction and the specific actions contained in this Strategy. Government agencies will be consulting with a wide cross-section of New Zealanders and all your input will be carefully considered when finalising this draft Strategy later this year.

The finalised Digital Strategy and the recommended action plans will be implemented in phase 3. This phase will continue for the next five years. Government agencies implementing new actions proposed in the finalised Strategy will need to go through the Budget process before the actions can be confirmed as government policy.





# the vision



## New Zealand will be a world leader at using information and technology to realise our economic, social and cultural goals.

All New Zealanders will benefit from the power of ICT to harness information for economic and social gain.

This will result in changes not only in selected industries, but in government, businesses, communities and society as a whole.

Services will be more easily accessible, customised and delivered through many channels in many locations, just as banking is today.<sup>1</sup>

Government services such as health and education will be more accessible and delivered more efficiently; compliance with legal obligations will be easier and cheaper.

Communities will be strengthened by being connected to fast global communications networks, giving their members access to new services, the world of knowledge and new markets for their businesses. New Zealanders will have easy access to their national heritage collections and to the national stock of research and science knowledge.

New Zealand's science and technology research communities will be globally connected and supported by a world-class advanced network infrastructure.

Our businesses and communities will possess the skills and confidence to utilise national and local information resources to create their own information products and services, to build social and cultural capital, and to communicate our stories to the world.

ICT will provide a set of tools to help those less well-off to acquire new skills. It will offer them new opportunities to participate and improve their social and economic well-being.

Such significant developments are not without risks. ICT has the potential to amplify existing inequalities, cause disruptive changes in work and social patterns, and give rise to new technology-based criminal or nuisance behaviours. The Digital Strategy takes account of these dimensions of technological change.

Much of the technology on which an information-empowered society depends is already in existence. The positive outcomes described above have already been demonstrated in working examples both in New Zealand and overseas. The Digital Strategy outlines how New Zealand can progress towards the ideal of all New Zealanders benefiting from the power of ICT to harness information for social and economic gain.

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<sup>1</sup> Banking services can be accessed through EFTPOS, ATMs, telephone banking and Internet banking.



## HEALTH AND DISABILITY SERVICES

As New Zealand's population ages in the decades to come, we will demand more of our health and disability services. The widespread use of ICT in health and disability services will provide opportunities to reduce costs and enhance the services provided.

We have already seen significant improvements in services through the use of ICT. For instance, 99% of health subsidy claims are now lodged electronically by primary care service providers, and more than 70% of laboratory test results are dispatched electronically to GPs. Some 60% of GPs use Practice Management Systems for clinical purposes.

Exciting future e-health opportunities include remote diagnosis by specialists and remote surgery using televideo over broadband to serve rural GPs. Patients and their health care providers will have access to their health data from anywhere in the world, providing better quality and continuity of care.

## EDUCATION

ICT is now widely available in our pre-schools, schools and tertiary institutions, providing opportunities for students and the wider community to learn:

- about ICT;
- with ICT (supplementing standard teaching and learning resources); and
- through ICT (supporting new ways of teaching and learning).

Online resources, such as courses and research information, enhance teaching practice and enrich the learning experience. A university student taking an Art History course can take a virtual tour of the Sistine Chapel as part of an online tutorial. In future, students will be able to learn in virtual classrooms linked by video, audio or online conferencing. Students at a school in a remote rural community in New Zealand could learn about astronomy for example, by communicating directly with astrophysicists at NASA.



# the vision

## THE SCOPE OF THE DIGITAL STRATEGY

We are in a period of rapid and continuing technological change.

Over the past ten years, New Zealanders have enthusiastically embraced the Internet, mobile phones and other ICTs. Using these technologies, we can do things today that were impossible a decade ago, such as using a mobile phone to take a photograph and sending it to another phone user, managing supply chains electronically, and selling goods and services through the Internet.

The New Zealand government is determined that its citizens enjoy the benefits that ICT can bring, such as higher productivity, integrated and customised government services, particularly in health and education, and better access to knowledge for all to stimulate innovation and creativity. The 2003 World Summit on the Information Society (WSIS) showed that many countries are actively working towards building what they term the Information Society, an ideal made possible by very high-speed communication networks and cheap, ubiquitous computing.

The full benefits of ICT will only be realised through the widest participation. This will require a broad-based approach that takes account of the cultural and social possibilities, rather than adopting a narrow economic viewpoint.

The Digital Strategy provides an integrated framework for existing and future initiatives, whether they are directed at encouraging the uptake of ICT or using ICT more effectively to deliver desired outcomes, such as higher productivity or better health and education.

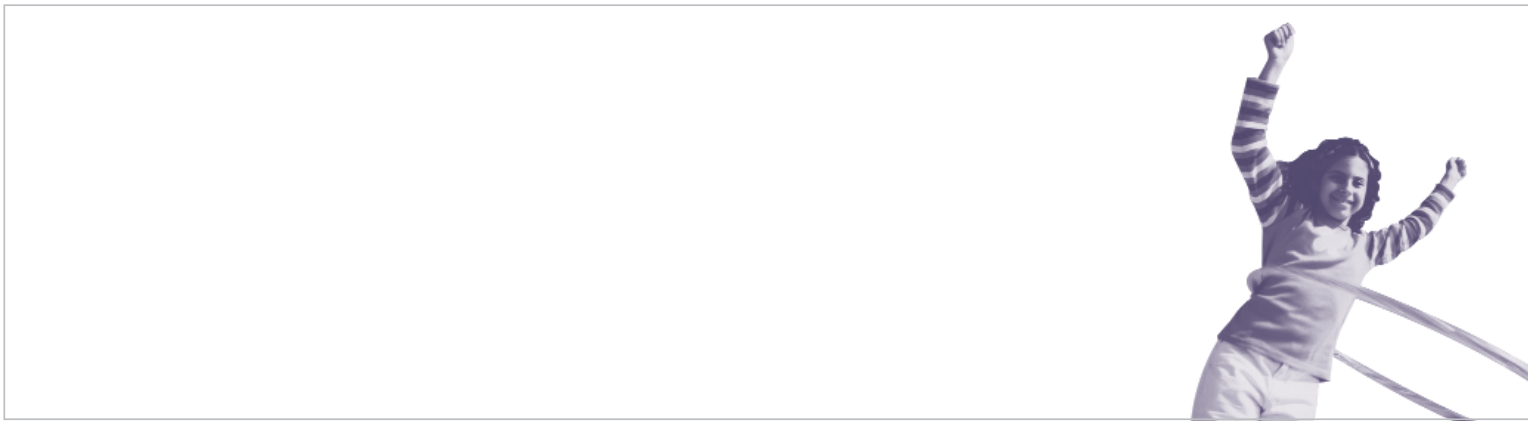
The Strategy contains new actions for the future. It is intended to provide a direction for government policy for the medium term, and will ensure that ICT-related strategies and actions are not only co-ordinated but focused on key opportunities and challenges.

To this end, the Strategy:

- provides a context for policy by describing the nature of current technological change, its impact on society, and its potential benefits;
- adopts a whole-of-government perspective, incorporating cultural, social and economic views, and shows how they can work together in the effective use of information and ICT;
- provides a framework for existing ICT strategies, within which practical initiatives can be implemented; and
- identifies the opportunities and challenges facing New Zealand, clarifies the role of the government and defines what needs to be done to enable all New Zealanders to benefit from the power of ICT to harness information.

The Digital Strategy is aligned with key government goals including:

- growing an inclusive, innovative economy for the benefit of all (with particular regard to the Growth and Innovation Framework (GIF));
- improving New Zealanders' skills; and
- strengthening national identity and upholding the principles of the Treaty of Waitangi.



## THE ORIGIN OF THE DIGITAL STRATEGY

In recognition of technological change and its effect on the economy and society, the government has developed various ICT-related strategies and initiatives over the past four years that include:

- e-Commerce Strategy (building business capability);
- e-government strategy (transforming government and its services using ICT as a driver);
- Education ICT Strategy (integrating ICT more fully into curriculum practice and education administration);
- the Wave Report (to define the e-health infrastructure required to provide integrated health care);
- Connecting Communities Strategy (addressing social inclusion and community building);
- National Library Digital Strategy (managing preservation of digital content, digitising the heritage collection to make it more accessible);
- Project PROBE (infrastructure delivering broadband to schools and their surrounding communities); and
- legislative reform, for example, telecommunications and e-transactions legislation (improving competition and innovation in telecommunications, and enabling electronic methods to be used to meet legal requirements).

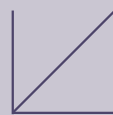
In addition, the government announced its GIF in February 2002. The GIF identifies innovation as a key means of improving New Zealand's economic performance. A strong and well developed innovation system and culture will underpin economic growth and social well-being for New Zealand.

As ICT is an enabler of innovation and productivity gains across the economy, it was selected as one of the three GIF focus sectors, along with biotechnology and the creative industries.

The first stage in this work was the report in May 2003 of the ICT Taskforce, set up to look at the growth potential of the ICT sector and the role of ICT in the New Zealand economy. The Taskforce provided a positive assessment of the sector's future and concluded that, given the right conditions, ICT products and services could contribute significantly to New Zealand's future growth.

The second stage is the development and implementation of this Digital Strategy, which focuses on the broader issue of how ICT can enable New Zealand's cultural, social and economic development.

# setting the scene: ICT and New Zealand



## 1.1 A TIME OF TRANSITION

In 1900, a telephone cable was brought ashore at Cable Bay in the north of New Zealand. The cable stretched across the planet from Porthcurno in Cornwall, joining New Zealand to Europe, and making voice-based telecommunication possible. That first cable was just the start. In the early part of the 20th century, we built an extensive land-based telecommunications network that joined New Zealand communities together.

By the 1960s, the cable-based telephone network was being supplemented by satellite networks. The first computers had been developed during the Second World War, and 20 years later some larger businesses were beginning to use early forms of electronic data interchange. Personal computers took off in the 1980s, rapidly becoming more powerful and almost ubiquitous by the end of the century. At about the same time, the first analogue mobile phone networks were created. With the adoption of Internet Protocols (IPs) in the 1990s, a low-cost platform was built that connected telecommunications and information technology as well as connecting millions of computers right around the globe.

### WHAT IS ICT?

ICT stands for information and communications technology. The term includes electronic information-processing technologies such as computers and the Internet, as well as fixed-line telecommunications, mobile phones and other wireless communications, broadband, and various specialised devices ranging from barcode scanners to global positioning systems (GPS). ICT devices can be embedded in other machines and appliances, from watches and washing machines to cars, to increase their functionality.

Although these different technologies developed independently of each other, their development has begun to converge in recent years. In different ways, that convergence has created synergies that today provide powerful yet inexpensive ways of manipulating and moving vast amounts of information.



The transformative impact of ICT derives from the ways in which these technologies can provide us with a greatly enhanced ability to create, collect, manage, process, store, move and access information, using networks to do so.

Commerce, culture and learning have always required networks to thrive. The networks enabled by ICT are different, because of their speed, global reach and almost unlimited uses, from data-processing to entertainment. While ICT networks require wires, computers, mobile devices and web sites, these things are not their essence. The value of networks resides in the ways they enable people to interact and share information with one another.

ICT networks have already enabled huge efficiency gains to be made in information-intensive activities. Using networks to access creative, educational and cultural content creates enormous social value. The ability to share information strengthens all communities, makes research and development more efficient, and enables the spread of innovations throughout the economy.

As networks grow, the value of being connected grows exponentially, while the cost to the individual either remains the same or reduces. Economists call this a *network externality*. To illustrate, a connection to the Internet in 2004, with its 600 million users and four billion Web pages, is much more valuable, yet much less expensive, than a connection to the Internet was ten years earlier. In 1994, the World Wide Web was in its infancy, with a mere six million users and fewer than 20 million Web pages.

Historically, the manipulation and movement of information were constrained by the physical characteristics of the storage medium such as stone tablets, parchment, or printed paper. At the most fundamental level, ICT has enabled information to

be freed from the constraints of its physical storage medium. For example, EFTPOS separates money from notes and coins, MP3 files separate music from compact discs or Edison cylinders, and digital photography separates photographic images from film.

#### GENERAL-PURPOSE TECHNOLOGIES

Technological change is one of the key sources of economic growth. Over the past 100 years, the rate of technological change has accelerated, driving economic growth and social change.

We are familiar with incremental technological change: cars become lighter, safer and more fuel-efficient, gramophones morph into hi-fis, and Sony Walkmans become MP3 players.

Occasionally, however, a new technology is invented that has huge and far-reaching effects on human existence. Thousands of years ago, the domestication of plants enabled us to establish permanent settlements, giving rise to modern civilisation. Later, the development of writing enabled information to be recorded and disseminated without depending on human memory. More recent examples include the various machines that started the Industrial Revolution and led to the harnessing of electricity and the invention of the electric dynamo, which eventually enabled assembly-line manufacturing to develop, and hence mass production.

# setting the scene: ICT and New Zealand



All these are examples of **general-purpose technologies**.<sup>2</sup> ICT, which enables large amounts of information to be processed rapidly and moved around with ease, is another.

Generally speaking, a new general-purpose technology allows greater economic and social complexity to develop. There are three phases to the development of a general-purpose technology:

- the introduction of the new technology;
- a transition in which the technology spreads widely and the necessary infrastructure, policies, education and complementary technologies are developed; and
- consolidation and harvest, during which the economic and social benefits from the new technology are reaped.

In the case of ICT, like the world's other developed economies, we are in the second, transition stage where the technology spreads widely.

## 1.2 OBTAINING THE FULL VALUE FROM ICT

Technological changes affect the structure and functioning of the economy and society. A transforming general-purpose technology will by its very nature cause (or require) significant changes in society's structures and institutions.

Take a familiar example from our own history: the development of refrigeration. Once freezer ship technology became available in 1882, the economic and social structures in New Zealand were shaped over time to support the production and export of frozen meat and dairy products to markets on the other side of the world.

The availability of refrigeration was not sufficient in itself for New Zealand to obtain economic benefit. Land holdings had to be consolidated into more efficient units and farming practices improved (pastures, stock-breeding and management, to fencing). Abattoirs and dairy factories were built to process meat and dairy products for market, while the government regulated the industry and took oversight of quality control. The government also invested heavily in research into improved farming practices, which in turn improved quality and productivity.

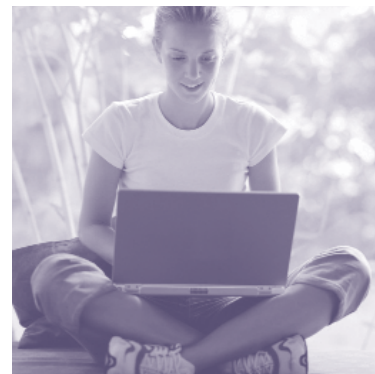
The rise and rapid adaptation of New Zealand protein farming were intertwined with the development of finance, processing, distribution and shipping to form a sophisticated mechanism connecting the farms to their markets.<sup>3</sup>

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2 See Carlaw and Lipsey, 'The conceptual basis of technology policy', Discussion Paper 02-6, Department of Economics, Simon Fraser University; Lipsey, Bekar, and Carlaw, 'The consequences of changes in GPTs' in *General Purpose Technologies and Economic Growth*, ed Elhanan Helpman, MIT Press, 1998; and Bekar, Carlaw, and Lipsey, 'Long-run growth and general purpose technologies', forthcoming, [www.econ.ubc.ca/kcarlaw/outline.pdf](http://www.econ.ubc.ca/kcarlaw/outline.pdf).

3 James Belich, *Paradise Reforged* Viking, 2001, p. 62.





## COMPLEMENTARY CHANGE IS NEEDED

ICT is a transforming technology on a much greater scale and with many more applications than mechanical freezers. But, like freezer ship technology, it is not enough by itself to drive sustained economic growth.

Developing ICT infrastructure is a necessary condition for reaping the benefits of ICT, but that's not all that is needed. What is also required is an environment that supports and drives *complementary* innovations in society's systems, processes and institutions, in business management, and in individual skills and behaviour. In many cases, systems and processes will have to be re-engineered in order to take advantage of the benefits ICT can provide. In addition, policies must be developed to mitigate new risks, such as breaches of privacy and technology-enabled crime.

The policy focus for ICT therefore requires a shift from infrastructure and supply considerations to supporting ICT-driven structural transformation.

Policy development should be considered at several different levels:

- the **individual** (recognising people's different skills and training or education needs);
- the **community** (ensuring access to ICT for all; using ICT for better delivery of services and for community building, to ensure effective communication, and to develop community and voluntary groups);
- the **firm** (changes in business processes, management capability, potential for new products and services);
- the **industry sector** (ICT may change the functioning and structure of a sector significantly, including the nature of employment); and
- the **wider economy** (such as the significant change in the telecommunications market with the shift to

integrated voice and data services, and the advent of wireless services).

Our current ICT policies reflect this very wide range of requirements, from education, health and community enablement to business assistance, regulatory reform and E-government (see Appendix 1).

## 1.3 FUTURE TRENDS IN TECHNOLOGY

The developments in ICT over the past 25 years can be characterised by six broad trends:

1. The **speed and capacity of microprocessors** increase and this, combined with the miniaturisation of components and devices, has powered both personal computing and a growing range of task-specific devices and applications, such as the iPod, DVD, EFTPOS, and GPS;
2. The **convergence** of different information and communications technologies increases, seen for instance in the merging of telecommunications, computing, broadcasting and content-producing industries such as publishing, music and film;
3. The **cost of technology and access** decreases, and combined with increased utility, this drives rapid uptake by both businesses and individuals;
4. The **degree of connectivity** increases, in terms both of the percentage of the population connected and of available points of access; with a step change in recent times from fixed-line to mobile wireless communications;
5. **Bandwidth** (that is, the speed and capacity) of networks increases; and
6. Unexpected, **disruptive technologies**, such as the Internet and mobile communications, emerge and are rapidly adopted.



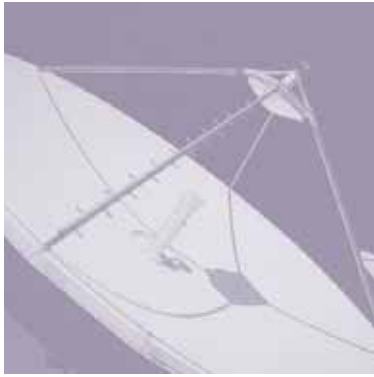
# setting the scene: ICT and New Zealand

It is likely that these trends will continue for at least another decade, with the following developments being likely:

- computing power will continue to double about every 18 months (Moore's Law);
- broadband uptake will take off as competition improves, costs come down and new applications and uses are created;
- broadband speeds will increase to satisfy the requirements of new applications, including the demands by research and education institutions for gigabit access to high-capacity databases and other e-science tools;
- the cost of fibre-optic networks will decline, and new networks to the office and the home will be built;
- wireless technologies will provide ubiquitous, fast mobile connectivity, any time, anywhere;
- there will be a proliferation of cheap, task-specific connected or electronically readable devices (such as Radio Frequency Identification Devices or RFIDs), particularly for sensing, monitoring and data collection;
- IP networks will replace switched networks, allowing any smart device to be connected to the Internet, speeding the convergence of telephony, television and data transmission;
- organisational processes and procedures will become more adaptive, to take advantage of the new capability provided by ICT; and
- by the end of the decade, new optical technologies will make possible all-optical networks and consequently a vast increase in communications bandwidth, to hundreds of gigabits per second.

Many new devices and applications will follow these developments and drive others, just as we have seen in the past five to ten years with MP3 players, digital cameras, Personal Digital Assistants and DVDs.

Technological development constitutes an opportunity that can be turned to the advantage of New Zealanders. The government's actions should therefore be directed towards creating a preferred future for New Zealand, rather than accepting an inevitable future.



## 1.4 THE CURRENT STATE OF PLAY

### STRENGTHS

By any international yardstick, New Zealand is near the forefront in adopting ICT. We have been in the top ten countries in the world for Internet access on a per capita basis since 1993. Recent surveys show that 75% of New Zealanders are regular Internet users, the highest rate in the world. We have been the highest spenders in the world on IT equipment per capita for a number of years. We combine access to advanced technology with a low cost-base – a combination that is attractive to foreign investors.

We are resourceful and keen to exploit the advantages offered by ICT. We are developing an international reputation in the area of creative digital content in film, animation and Web design.

Our national heritage institutions have developed programmes to digitise their collections. We have successfully piloted the use of ICT tools to strengthen and improve the capability of our communities, and have developed world-class programmes for cyber-safety.

Our local communities have access to a wealth of information from a variety of sources for learning, research and business purposes. Public investment in public libraries is currently over \$200 million per year.

We have established world-leading e-government services, such as online customs services, online company registration and electronic management of land transactions. Owing to the electronic management of tax, many of us no longer need to file a tax return.

Our regulatory environment is open and transparent. Our shared history and our small size enable us to respond quickly to calls for change and co-ordinate our efforts to solve our problems.

# setting the scene: ICT and New Zealand



## WEAKNESSES

However, offsetting these strengths are some weaknesses to be addressed. We lack sufficient people with management experience, leadership skills and entrepreneurial e-commerce skills. We produce insufficient graduates in some technical disciplines to meet local demand.

We have a very high proportion of small and medium-sized enterprises (SMEs), and many of our firms are not yet connected to or integrated with global business networks. Smaller New Zealand firms sometimes struggle to keep up with technological developments, especially the ways in which ICT is changing processes and demand factors in their key markets. In some quarters, there is a poor understanding of the opportunities ICT offers for social and economic gain.

There is an uneven distribution of infrastructure capability at reasonable cost, particularly in our rural communities. Whilst our general rate of ICT uptake has been rapid and comprehensive, our uptake of broadband to date has been slow and is uncharacteristically low by OECD standards.

Although our Internet usage is high, some 45% of New Zealanders have no Internet access at home, particularly the elderly and those living on low incomes or outside cities. There are pockets of ICT-illiteracy in our communities. Some 2% of mainly low-income households lack a telephone line, the most basic of ICT devices.<sup>4</sup>

## OPPORTUNITIES

New Zealand has a diverse and vibrant culture with rich voices and histories. ICT is one way in which our many different communities can grow, strengthen their linkages and communicate their stories to the rest of the world.

ICT opens up opportunities for New Zealand businesses to create new services and products. Our small firms can use ICT to link with partners in New Zealand and elsewhere, to build critical mass and supply customer needs in global markets. Clusters of SMEs can use ICT to compete with large incumbent firms.

ICT offers new avenues for New Zealanders to exploit the rapidly developing market for creative content. It provides tools to unlock our information assets, such as the cultural, scientific and technical information in our libraries, archives, museums, databases and research institutes. In research and education, an advanced network delivering gigabit speed capacity will enable immediate, real-time connection and collaboration with advanced overseas research facilities.

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<sup>4</sup> It should be noted that the widespread use of mobile telephones means that line connections may not be a reliable indicator of access to telecommunications.



Cheap remote-sensing devices will enable us to develop new applications to support our core industries, such as pasture management, food monitoring, environmental sensing, distribution network logistics and inventory tracking.

ICT enhances collaboration between government agencies. By efficiently managing information, we can deliver integrated, customised services to individuals and businesses, improve the service quality and access, and reduce compliance costs. ICT can also significantly improve the quality and delivery of health care, including remote monitoring of medical conditions.

On its completion, Project PROBE will provide all schools and associated communities with access to broadband, enabling better access to e-government services, digitised heritage collections and other resources for learning.<sup>5</sup> Broadband will also act as a catalyst for the local development of innovative applications to meet regional business and community needs.

#### THREATS

If we are to achieve the goal of returning New Zealand to the top half of the OECD ranking by per capita income, we must use ICT and information to enhance innovation and create value, to attract new investment and retain key industries, to preserve our cultural capital, and enable our communities to prosper. If not, our standard of living will decline and with it our public services, particularly health and education.

The main economic threat to New Zealand is that our productivity and competitiveness will suffer if we fall behind in adopting new technologies. For instance, tracking technologies using RFID create savings in transport and inventory control. It is likely that similar technologies, used to trace the components of a food

product from farm to consumer, will become mandatory in key markets. New Zealand businesses must keep abreast of such changes or risk being locked out of important markets.

We need to maintain the same quality of infrastructure and knowledge as our main trading partners, just to remain in the game. The rate of technological change is increasing, and our management practices may fail to keep up. Similarly, policy-makers will need to be aware of the implications of emerging ICT.

ICT also brings risks. It facilitates the unauthorised use of copyright material, while providing rights' owners with the means to impose controls over access to intellectual property to an extent that may conflict with the requirement for legitimate access to information. Patent law is being used to erect barriers to competition, increasing the cost of doing business and limiting the diffusion of new innovations. The ease with which personal data can be created, mined and misused constitutes a significant risk to privacy.

The principal social and cultural threat is the dilution of our national identity and culture. The advent of cheap international communication has made it easy for us to consume entertainment and cultural products that are produced elsewhere and marketed globally. The risk is that they may swamp or supplant our indigenous culture.

Finally, ICT wastes arising from old ICTs that are dumped in landfills generate waste that is highly toxic. Its improper disposal creates health and environmental hazards, which must be adequately managed.

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<sup>5</sup> Project PROBE is the Provincial Broadband Extension Project, to provide broadband access for schools and their communities.

# building the strategy



## 2.1 THE FRAMEWORK FOR ACTION

### INFORMATION

Creating and managing information is at the heart of human activity.

Information is the medium in which we define who we are, communicate with each other and learn about the past and the world in which we live, and how we create value and participate in local, national and global dialogue and markets.

Therefore, we should focus our attention on information-rich activities, those in which we create, collect, manage, process, store, move or access information via a networked environment.

### NEW THINKING

Technology tends to develop ahead of society's accepted way of doing things. The old practices will not necessarily work in an environment where ICT is all-pervasive. New technologies enable us to adopt a wholly new approach. Advances in technology require the development of new practices and procedures to ensure that we obtain the full benefits and minimise the risks. To do this requires new thinking.

The effective use of ICT is dependent on the extent to which decision-makers, business leaders and managers, community leaders and individuals understand the environment in which they operate and how their activities create value for their customers, clients, stakeholders or for themselves. If these things are well understood, there will be clarity about how ICT can enable new approaches and create added value.

In the future, such new practices and procedures will be part of the usual way of doing things. The current period of transition, however, demands that we – the government, businesses and individuals – make a concerted effort to develop the necessary practices and procedures (including any formal rules and regulations) and ensure they are adopted.

### THE PURPOSE OF A STRATEGY

A strategy describes our vision for the future. It defines the future state we wish to attain and provides the government with a framework for the key actions required to capture the economic, social and cultural gains possible from ICT. By working from the future we seek to create, we can identify optimal pathways and align our resources to implement key actions and attain the vision of this Digital Strategy.

### WORKING TOGETHER

Making effective use of ICT will not occur by central government action alone. For the benefits of ICT to be realised throughout our society, everyone must play their part: communities, businesses, local government, community and voluntary groups, philanthropic agencies and individuals must all assist in the process of change.

Local government is intimately involved in the welfare of local communities. Communities and businesses know their own needs best and can be innovative in meeting them. Central government can offer them a menu of tools, but the biggest gains are achieved when communities and businesses use those tools to take their own actions and promote change from the bottom up. This draft Digital Strategy has been prepared in the expectation that sectors outside government will wish to engage actively with it.



## FLEXIBILITY

In such a rapidly changing environment, a strategy such as this cannot adopt a deterministic view of a single path to the future, since it is impossible to foresee the right way to go.

It follows that government agencies must be unified behind the broad principles and direction of the Strategy, but able to retain the flexibility to alter their delivery mechanisms to meet challenges as they arise. For this reason, the Strategy will need to be reviewed at regular intervals. Communities, businesses and individuals must all be free to adapt as quickly as needs dictate.

## 2.2 THE ROLE OF THE GOVERNMENT

There are three high-level roles for the government:

- **leadership:** The government will lead by example, by building a common vision and adopting best practice in the application of ICT to its own processes, organisational forms and delivery of services;
- **taking the actions necessary to realise the benefits:** The government will ensure that the necessary changes to legislation and government processes and services are made, and will work to create an environment that supports and drives the complementary innovations required in society's practices and procedures, in organisations and management; by supporting the development of New Zealanders' digital and information literacy skills; and by supporting access to and creation of digital content; and
- **mitigating the risks:** The government will ensure that the risks of technological change, such as e-crime and nuisance behaviour, or economic and social disadvantage, are mitigated.

The government need not take on new roles, but rather should modify its current roles as technological change requires, and consider how ICT can make possible new ways to achieve its desired outcomes. As ICT is a set of information tools, and information is at the core of all government activities, ICT must be considered whenever policy is developed.

# building the strategy



## 2.3 THE WSIS PRINCIPLES

The Digital Strategy has drawn upon a useful frame of reference: the Declaration of Principles adopted by the international community at the 2003 WSIS, in which New Zealand participated.

The WSIS Declaration defined a number of key principles for realising the ideal of an Information Society. The principles have been adapted to suit New Zealand's particular needs and have informed the development of the focus areas in the Digital Strategy. They will continue to guide the government's actions to implement the Strategy.

### THE PRINCIPLES UNDERPINNING THE DIGITAL STRATEGY

#### **Collaboration and partnership:**

Central and local government, individual government agencies, the private sector, the non-profit sector and other stakeholders should work together to realise the maximum gains for New Zealand from the use of ICT.

#### **Continuity and policy responsiveness:**

The Strategy and its implementation will be as far as possible technology and competition-neutral and able to be adapted to changing conditions. Technology, users' needs and markets are highly dynamic; therefore policy settings and programmes must be responsive and adaptive.

#### **Connectivity:**

All New Zealanders should have fair and reasonable access to ICT infrastructure and services, making use of broadband, wireless and other innovative technologies. Government policy will have regard to barriers to access, such as price, location and culture.

#### **Access to information and knowledge:**

An inclusive society requires the ability of all its citizens to access and contribute information, ideas and knowledge.



**Capability-building:**

Each person should have the opportunity to acquire the necessary skills and knowledge to participate fully in an information-empowered society and the knowledge economy. Attention should be paid to building institutional capability through human resource development. The use of ICT should be promoted at all stages of education and in all forms of training, taking into account the special needs of persons with disabilities and disadvantaged groups. Life-long learning and information literacy should be promoted.

**Building confidence and security in the use of ICT:**

Strengthening the framework of trust, including information security and network security, authentication, privacy, and consumer protection, is a prerequisite for all New Zealanders to benefit from the power of ICT and an information-empowered society.

**Enabling environment:**

If innovation and creativity in the Information Society are to be encouraged, knowledge must be widely disseminated and intellectual property protected. Appropriate legislation is therefore essential, accompanied by a supportive, transparent, pro-competitive, technologically neutral and predictable policy and regulatory framework. Cultural property must also be protected.

**Cultural diversity and local content:**

The government will promote the creation, dissemination and preservation of content, whether it is educational, scientific, cultural or recreational, that reflects the experiences and languages of the cultures that make up New Zealand society.

**International and regional co-operation:**

In the application of its policies on overseas development assistance, New Zealand will work toward the application of the WSIS Information Society principles.

# building the strategy



## 2.4 THE FOCUS AREAS

The focus areas have been derived from the Digital Strategy principles outlined above. The principles highlight the conditions necessary for New Zealand to become a world leader at using information and technology, and prescribe the ways we will work together to achieve the goal.

There are two dimensions to the Strategy: *creating the conditions* and *realising the benefits*.

### CREATING THE CONDITIONS

In order to reap the social, economic and cultural benefits of ICT, we must focus on three interrelated action areas:

- **content:** That is, information made available via digital networks. 'Information' is a broad concept that encompasses national heritage collections, government information, Māori language resources, research databases, traditional cultural products such as literature and history, and new cultural products from the creative industries. The term also includes the information generated by businesses and community organisations;
- **confidence:** That is, developing the necessary skills at all ages, in all parts of society, to use and participate in ICT effectively. Such skills include functional and digital literacy and the ability to participate in an interactive electronic environment. Confidence also encompasses the dimension of trust in the use of ICT;
- **connection:** That is, affordable access to ICT infrastructure such as telecommunications networks, computers, mobile phones and other devices.

These three dimensions are mutually reinforcing. Content provides the reason, confidence provides the skills and trust, and being connected provides the means.

The government plays a key role in creating the necessary conditions by developing policies to:

- **unlock the social and economic value of content** by progressively providing digital access to existing content in public institutions, and encouraging the production of new digital content;
- **promote confidence and capability** in the effective use of ICT by individuals, communities and business, through its leadership, by raising ICT awareness, providing training, and by addressing safety, security and privacy issues; and
- **improve connection**, by ensuring the availability of affordable ICT infrastructure for all.

### REALISING THE BENEFITS

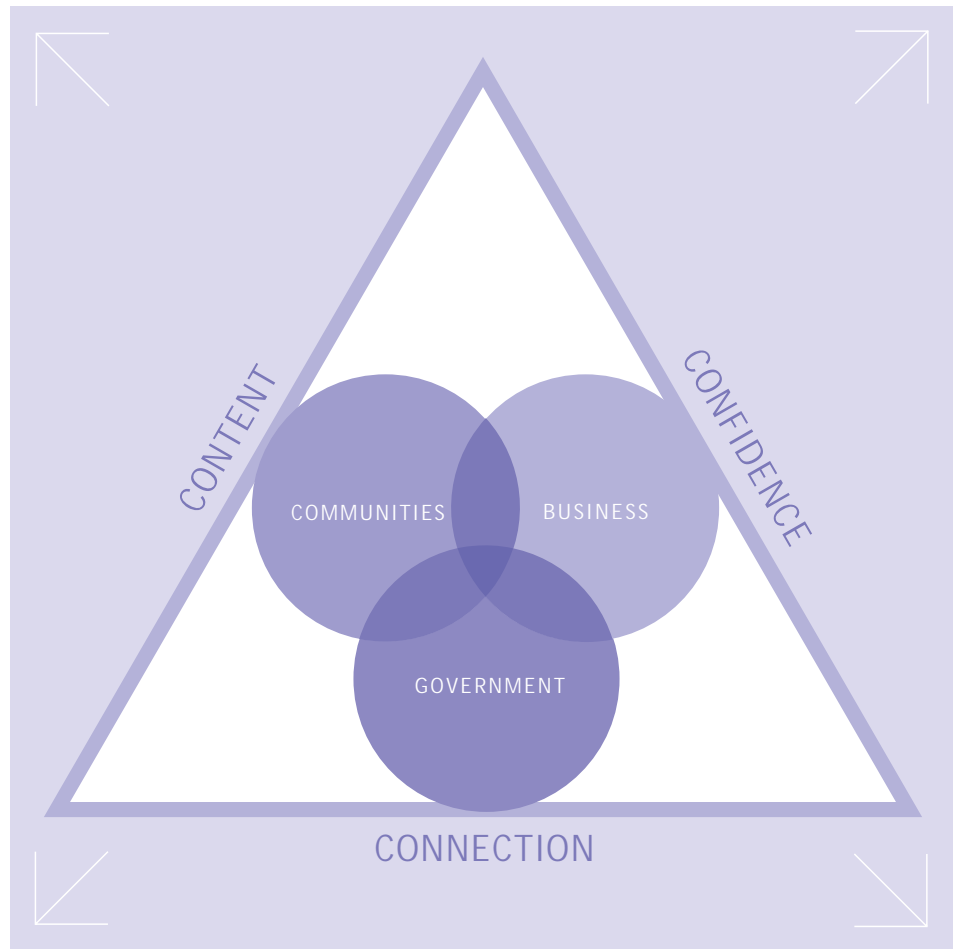
Different groups in society have very different requirements for content, confidence and being connected.

The government plays a role in realising the benefits for different user groups by developing policies that will:

- facilitate the effective use of ICT to unlock the social and economic potential of all citizens and communities, including geographic communities and communities of interest, identity or circumstance;<sup>6</sup>
- promote innovation in New Zealand firms and industry sectors and in other kinds of organisations to create value from information in a networked environment; and
- transform government by seizing the opportunities provided by technological change.

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<sup>6</sup> For examples of the different kinds of community, see the Glossary.



# creating the conditions



## 3.1 CONTENT

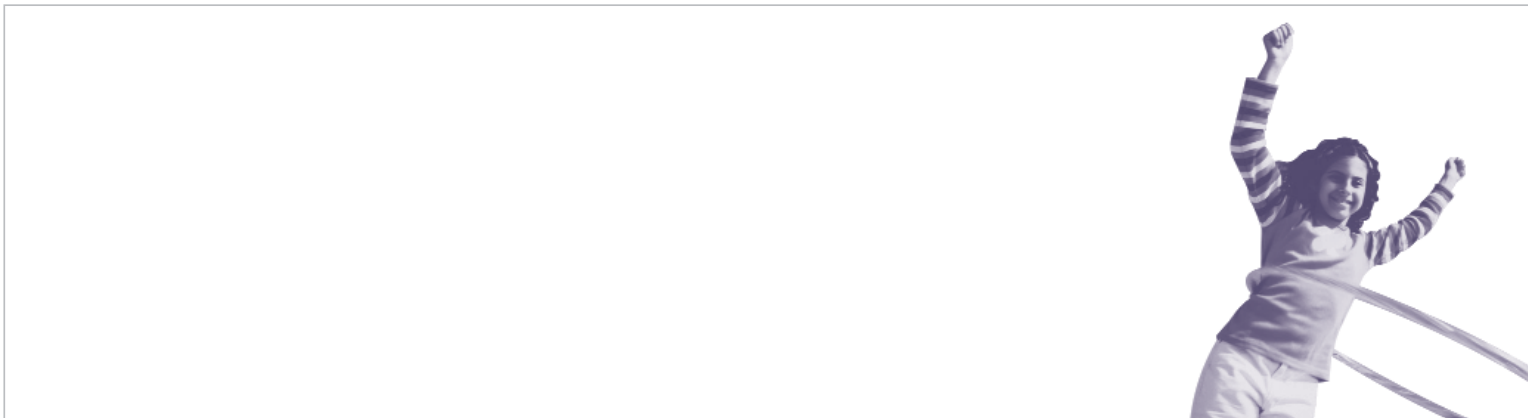
OUTCOME
Through the effective use of ICT, the social, cultural and economic value of New Zealand's stock of content will be unlocked, giving New Zealanders seamless and easy access to the information that is important to all aspects of their lives.

In an inclusive society, all members are able to access and contribute to the national stock of ideas, information and knowledge. This ideal forms the core of a democratic society and is at the heart of our policies in education, culture, national identity and the innovation system. Moreover, national competitiveness is increasingly seen as dependent on the ability to access content and add value to it, as well as possessing a unique stock of knowledge and a distinctive culture. All these dimensions of content underpin national identity and branding.

Increasingly, content is seen as the means by which value is added to commercial products and services (for instance, media production companies are now repositioning themselves as digital content companies). Even the provision of public services is understood to be reliant on content. The Ministry of Health's e-health vision is based on 'the delivery of the right information, at the right time, in the right format, to the right person'.

What is meant by the term 'content'? Anything that is capable of being digitised can be considered content, whether it is raw data (ranging from scientific research to sales figures), text, graphics, photographs, spatial models and maps, archival material, video and audio material, or television and radio broadcasts. The term can also be applied to meta-information (that is, information *about* information, such as library catalogues).

Content therefore includes national heritage collections, government information, databases of scientific and technical information, scholarly journals including e-journals, and library catalogues. It also includes educational resources, Web logs, cultural and language resources, locally produced stories and histories, family photos on a Web page, and new products from the creative industries, such as interactive games.



Until the invention of computers, information was stored in physical formats (such as paper, film or tape). Access to information depended upon gaining access to the physical object that contained it, such as a book, a photograph or a magnetic tape.

By converting information into digital form, ICT has enabled information to be freed from the constraints of physical storage. The cost of creating, owning, searching, sending and reproducing information has fallen dramatically. Storage costs are low and transmission is instant. Information can now be created, accessed and sent from many points, including businesses and the home. Wireless technologies enable information to be sent from and received anywhere on Earth.

It is now easy to manipulate information to create wholly new information-based products and services. Given the skills and equipment, individuals and community groups can easily produce and disseminate their own content.

New content industries have developed at various points along the digital content value chain, which runs from content creation and production, via encoding, storage and retrieval, distribution and networking, to usage (including reuse).<sup>7</sup> The ability to share sets of data (datasets) increases their content value. For example, links between geographic, demographic and resource datasets increase their potential as planning tools.

Members of the public can now access digital content held by central government agencies such as the National Library, Statistics New Zealand, Land Information New Zealand and the Personal Property Securities Register and by heritage organisations such as film or sound archives and museums. To get the full benefit, however, the public must be made aware

of the range of content that is available, and methods of access must be enhanced.

Technologies that make it possible to move information around faster than ever before also make it possible for suppliers of information to control access in ways not imagined before. Publishing, marketing and licensing practices can conflict with the spirit or the letter of international agreements or national legislation, making it difficult to balance the rights of intellectual property holders with the rights of those seeking access to information for educational or cultural purposes.

#### THE ROLE OF THE GOVERNMENT

The government has an established role in:

- supplying government information as part of the democratic process, including statutes and regulations, legal obligations, Official Information Act requests and details of policies and programmes;
- developing necessary policies and standards;
- preserving and presenting our national heritage through the work of the National Library, Te Papa, Archives New Zealand and other memory institutions;
- documenting New Zealand history in oral histories, war histories and the *Dictionary of New Zealand Biography*;
- enhancing our national identity, by supporting artistic expression (in literature or performing and visual arts) and creative industries such as film and publishing;

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<sup>7</sup> There is more detail on our ability to create new content industries in the section on Businesses.

# creating the conditions



- supporting New Zealand broadcasting content through NZ on Air, the TVNZ Charter, Radio New Zealand, Te Māngai Pāho and the Māori Television Service and the National Pacific Radio Trust;
- providing a range of scientific, technical and statistical data, including location-based information such as the land registration system and topographic and oceanographic data sets;
- providing access to international knowledge and research, by buying licences for overseas databases and maintaining national research collections held in Crown Research Institutes, national institutions and universities; and
- providing guidelines for the commercialisation of intellectual property.

The transition to digital formats will change the way the government will carry out these roles in the future. Despite the pace of technological change, it must manage its content-related institutions and policies so that the full value of New Zealand's content can be obtained.

## ACTIONS TO DATE

The government has already taken significant strides in adapting its management of content to a digital environment.

Specific e-government examples are:

- the government portal, which gives citizens access to all central and local government services;
- the Treaty of Waitangi web site; and
- Te Kete Ipurangi (TKI) – a bilingual (Māori and English) portal and Web community providing educational resources for teachers, school administrators and the wider education community.



The National Digital Forum is an initiative of the National Library, Archives New Zealand, Te Papa and other institutions with national heritage collections. One outcome of this collaboration will be *Matapihi* ('windows'), giving Web-based public access to images of heritage documents and objects.

The National Library's Digital Content Strategy is directed towards the provision of enhanced access to digital information (especially New Zealand content), and the collection, long-term storage and preservation of digital content. Specific initiatives include:

- the Papers Past web site, for access to all 19th century New Zealand newspapers;
- the establishment of a consortium with other New Zealand libraries to offer the EPIC service, giving New Zealanders access to electronic resources from major overseas publishers; and
- the establishment of a trusted digital repository to collect and preserve digital objects.

Archives New Zealand has developed the GLADIS system, to provide Internet access to information about the Archives holdings and the function and administration of government since 1840.

The Copyright Act 1994 has been reviewed to determine the applicability, adequacy and operation of the Act in the digital environment. Proposed amendments to the Act will provide copyright protection for electronic rights management information (ERMI), but specifically not for those functions that track usage.

Examples of other initiatives underway are:

- a new Public Records Bill being drafted by Archives New Zealand to include provisions for dealing with electronic records;
- publication (by the Ministry for Culture and Heritage) of the *Online Encyclopedia of New Zealand*; and
- creation of Living Heritage, an initiative that enables New Zealand schools to develop and publish an online bilingual resource based on a heritage treasure in their community.

# creating the conditions



## MAXIMISING THE OPPORTUNITIES

Information previously held by several institutions can now, for the first time, be considered as a whole through a National Content Strategy, with the aim of maximising the social, cultural and economic benefits of content.

Ideally this will result in New Zealanders having easy access to all the information they need for all aspects of their lives such as for business, cultural, community and educational purposes.

Local government is already responsible for the provision of public library services. Local libraries provide electronic access to information at the community level in partnership with community groups and central government agencies such as the National Library (via the EPIC service). There is an opportunity for libraries to expand their role.

Government policy already requires all departments to apply approved e-government standards for resource discovery and systems interoperability. Examples can be found in collaborative initiatives between the Ministry of Education and the National Library, such as those for interoperability between e-learning and digital library architectures.

	ACTION	TARGET	AGENCIES RESPONSIBLE
1.	<p>Create and implement a National Content Strategy</p> <p>The Strategy will assess the current state of New Zealand's stock of content and its accessibility, including access to international sources. The scope will include:</p> <p>Part A: Content Development</p> <ul style="list-style-type: none"><li>• create a high-level asset map of the national stock of digitally accessible information resources, focusing on cultural heritage, education, business, and science and technology content resources, and allowing for extension to other disciplines;</li><li>• identify gaps, investigate solutions to resolve them and recommend action;</li><li>• identify international scientific and other databases of information relevant to New Zealand and arrange access to these;</li></ul>	December 2007	National Library, New Zealand Trade and Enterprise, Ministry of Research, Science and Technology, Archives New Zealand, Ministry for Culture and Heritage, Te Papa, Ministry of Education, Ministry of Economic Development, Ministry of Health in consultation with the State Services Commission (e-government unit), Statistics New Zealand, Land Information New Zealand, Creative New Zealand, Local Government New Zealand.





	ACTION	TARGET	AGENCIES RESPONSIBLE
1.	<p>Create and implement a National Content Strategy cont.</p> <ul style="list-style-type: none"> <li>• develop policies for the preservation of e-information and e-records to ensure that all digital materials are preserved and that all agencies conform with government policies and legislation; and</li> <li>• develop further electronic resources for the delivery of the New Zealand education curriculum.</li> </ul> <p>Part B: Content Discovery and Access</p> <ul style="list-style-type: none"> <li>• develop policies and standards to access information;</li> <li>• promote equitable access to information by print-disabled and economically disadvantaged groups;</li> <li>• develop policies on national access to the research results of taxpayer-funded science and technology research; and</li> <li>• develop a Creative Commons (see Glossary), in collaboration with the Library and Information Advisory Commission, for the storage and access of published information and rights' management.</li> </ul>		
2.	<p>Develop common metadata and interoperability standards between sets of geospatial information. A multi-stakeholder taskforce will be created to drive improvement in data and interoperability standards between sets of geospatial information held by both local and national government agencies.</p> <p>Common data and interoperability standards between sets of geospatial information have the potential to improve outcomes in transport planning, land use, civil defence, statistical reporting, health and environmental resource management.</p>	December 2006	Land Information New Zealand, Local E-Government New Zealand, Ministry of Research, Science and Technology, Statistics New Zealand, Ministry of Health in consultation with the State Services Commission (e-government unit).

# creating the conditions



## ADDRESSING THE CHALLENGES

CHALLENGE	ADDRESSING THE CHALLENGE	TARGET	AGENCIES RESPONSIBLE
<b>Infomediaries</b> Essential information that used to be published and available from public libraries or Citizens' Advice Bureaux (CAB) is now provided only in digital form. While sophisticated users may be able to find the resources they require, others may require the help of an 'information intermediary', e.g. public librarian or CAB volunteer.	Fund the delivery of broadband access, equipment upgrades, technical and staff training, and additional staff for public libraries and CABs.  It is expected that funding to address this challenge will also be provided by local councils and industry.	2006	Local Government New Zealand, National Library, State Services Commission (e-government unit) in consultation with the Department of Internal Affairs.

## TAI TOKERAU WEB SITE – MĀORI CULTURE

[www.taitokerau.co.nz](http://www.taitokerau.co.nz)

This highly successful project combined commercial, cultural and research interests to enhance community and regional development in the Far North. The Tai Tokerau site was a collaborative venture between the Tai Tokerau Māori Tourism Association, the Auckland University of Technology and local communities. The site incorporates the stories, information and assets of individual communities within a broader regional and cultural framework. An identity has been developed for cultural tourism in the region, allowing for a more efficient use of resources and building on the strength and cohesion of local communities. The locally developed content contributes to the national store of knowledge, and is accessible to visitors anywhere in the world.



#### MINISTRY OF HEALTH – HEALTH INFORMATION

In evaluating the progress made in implementing electronic health (e-health) initiatives, a recent Australian study (*Commonwealth of Australia, Health Connect: Interim Research Report*, 2003) noted that the decision of the New Zealand government ‘to invest in, and promote, key items of health information infrastructure has positioned the country as a world leader in the field’. This achievement has resulted from a number of building blocks including:

- passing the Privacy Act 1993 and the Health Information Privacy Code 1994;
- early adoption of international Health Level Seven (HL7) standards (see Glossary); and
- the implementation of the National Health Index, a unique identifier for health services’ users.

### 3.2 CONFIDENCE AND CAPABILITY

The full potential of ICT can only be realised if all New Zealanders have the ability and confidence to use it and consider their experience of ICT to be beneficial. There are two dimensions to consider: our people and the ICT environment in New Zealand.

- **The human dimension:** Ensuring that New Zealanders are aware of the ways in which digital technologies can enhance their well-being, and that they have the opportunity to acquire ICT skills together with the necessary technical support to use them effectively; and
- **The ICT environment:** Ensuring that the environment for ICT use in New Zealand is trusted, secure and reliable.

#### OUTCOME

All New Zealanders will have the necessary literacy skills to maximise their opportunities using digital means.

# creating the conditions



Making the step-change from the world of physical information to the digital realm requires a corresponding change in how we think about literacy. Literacy has been defined as ‘a complex web of reading, writing, speaking, listening, problem solving, creative thinking and numeracy skills.’<sup>8</sup> We now need to expand the concept of literacy to encompass ICT and information skills.

**Digital literacy** is about having the confidence, skills, motivation and discrimination to use ICT in appropriate ways. Digital literacy can therefore be seen as a life skill, similar to literacy and numeracy.<sup>9</sup>

**Information literacy** is the ability to locate, evaluate, manipulate, manage and communicate information. As learners become increasingly information-literate, they develop skills in discrimination, interpretation and critical analysis. ICT offers opportunities for higher-order thinking and creativity in processing, constructing and conveying knowledge.

Literacy is both the goal of education and a skill that must be acquired for learning to occur. The speed and breadth of technological innovation mean that digital and information literacy skills will need continual updating and development.

Digitally and information-literate New Zealanders will be able to find readily the information that is important to their lives and businesses, including educational and cultural content. They will be able to map and manage individual and community information assets, and contribute their stories or information to the local and national stock of content. They will be better able to adapt to changes in the workplace, and in the nature of work itself.

While ICT confidence for all is a worthwhile goal in itself, it also contributes materially to people's self-sufficiency. The digitally literate use ICT to improve their well-being, whether it is to learn, find employment, or to develop their businesses and community organisations.

In the future, more of life's activities will be facilitated by digital means. Correspondingly, there is a risk that some people will be left behind. For society to be inclusive, everyone must have the opportunity to become digitally and information literate.

## THE ROLE OF THE GOVERNMENT

The government has a long-established role in education provision and industry training. It is the government's responsibility to ensure that all groups in society have the opportunity to become confident in the use of ICT.

In fulfilling the roles described above, a key task for the government is to ensure that digital and information literacy is promoted at all stages of education and in all forms of training, taking into account the needs of people with disabilities and of disadvantaged groups.

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<sup>8</sup> Ministry of Education, *Digital Horizons: Learning through ICT*, revised edition, December 2003.

<sup>9</sup> Ibid.



#### ACTIONS TO DATE

The government has developed a number of strategies and collaborative inter-agency projects aimed at providing New Zealanders with the capabilities and confidence to use ICT.

Examples include:

- Digital Horizons: Learning through ICT (2002, revised December 2003) – a strategy for schools focusing on new ways of teaching and learning through ICT;
- Interim Tertiary e-Learning Framework (2004) – direction for the development of a tertiary sector e-learning capability;
- Connecting Communities Strategy (2002) - developing and distributing tools to enable communities to plan for and efficiently use ICT and improving the co-ordination of government support to community ICT initiatives;
- Project Rorohiko – a recycling programme that allocates used computers to schools in Gisborne and Wairoa;
- digital opportunity pilots – ICT-Boosted Study Support Centres (wickED), ICT Technology Training (GenXP), Learning Communities in the Far North (FarNet), and Laptops for Teachers and Senior Students (Notebook Valley);
- assisting Pacific communities and organisations in Auckland to develop web sites and online resources, for example the Pacific Cisco Cyberwaka Development Training Programme and Academy;
- funding for groups such as the Gore Adult Learning Programme to provide community courses on basic computer skills including email and Internet use, to enhance employment prospects; and
- funding for voluntary support services such as Senior Net and the Samoa Capital Radio 0800 Computer Help Line.

# creating the conditions



## ADDRESSING THE CHALLENGES

Maximising the opportunities provided by ICT depends on a high degree of awareness, a clear path to acquiring the necessary skills, appropriate training, and adequate technical support.

A key challenge and a theme of this Strategy is the need to raise people's awareness of the economic, social and cultural benefits of ICT, as well as its attendant risks. The benefits extend to the opportunities for better performance in all dimensions of society: central and local government, in business, in social institutions (including iwi bodies) and community organisations of all kinds.

Information and digital literacy will require continued development and updating as people's confidence grows and new technologies are introduced.

The extent of the technical support required to underpin ICT training and develop ICT projects has been generally underestimated. The barriers to technical support include both its cost and its accessibility.

CHALLENGE	ADDRESSING THE CHALLENGE	TARGET	AGENCIES RESPONSIBLE
Raising awareness Raising awareness is the first step to motivating low-uptake groups to learn to use ICT, in combination with providing digital content relevant to their lives.	1. Build on and expand the regional partnerships which have developed as a result of programmes such as Project PROBE, Flaxroots Technology, and Connecting Communities to raise awareness of ICT technologies and applications, their uses, and safety and security issues.	August 2005	Department of Labour, Department of Internal Affairs, Ministry of Education, Local Government New Zealand, Ministry of Economic Development, New Zealand Trade and Enterprise in consultation with the Ministry of Social Development, Te Puni Kōkiri, Ministry of Pacific Island Affairs, National Library.
The diversity of groups that need to be targeted requires a co-ordinated response to this issue, both between government agencies and in partnership with business and community stakeholders.	2. In conjunction with the Learning Pathways initiatives (see challenge below), the government will fund a national awareness campaign comprising a series of digital stories across all sectors. They will show the benefits that digital technologies have brought and will link to ICT training programmes.	2006	



CHALLENGE	ADDRESSING THE CHALLENGE	TARGET	AGENCIES RESPONSIBLE
<p><b>Learning Pathways</b> A framework that provides for the co-ordinated delivery of quality training in partnership with government, community and industry stakeholders is necessary for confident and smart use of ICT.</p> <p>There is a need for clear guidance in the skill sets and qualifications required in the new IT trade skills, such as Web editing, electronic design, industrial process control and technical support.</p>	<ol style="list-style-type: none"> <li>1. Government, in partnership with community and industry stakeholders, will develop a clear framework for ICT skills' acquisitions and career development. It will identify ICT competencies and identify the providers of those competencies in order to provide an independent platform to facilitate informed decision-making about ICT training and services.</li> <li>2. Department of Labour to implement a quality assurance framework which provides training for technical planning and delivers an approved qualification.</li> </ol>	<p>2007</p> <p>August 2005</p>	<p>Department of Labour, Ministry of Social Development, Ministry of Education, Tertiary Education Commission, Careers New Zealand, National Library in consultation with New Zealand Trade and Enterprise.</p> <p>Department of Labour.</p>
<p><b>Training</b> Appropriate training means training at the right level, in the right language, with the right content and tools, at the right time and place.</p> <p>Training programmes for the disadvantaged have been offered at a generalised beginner's level, which may not be consistent with clients' needs.</p> <p>This challenge will also be addressed by actions proposed under the Learning Pathways challenge above.</p>	<ol style="list-style-type: none"> <li>1. Continue and expand ICT training programmes with proven positive outcomes such as Computing for Free, Computers in Homes, and projects implemented under the Ministry of Education's Digital Horizons Strategy.</li> <li>2. Develop life-long e-learning opportunities within the wider community, including workplaces, using the emerging Integrated e-Learning Strategy as a basis.</li> </ol>	<p>August 2005</p> <p>2007</p>	<p>Ministry of Education, Tertiary Education Commission, National Library, Department of Labour in consultation with the Ministry of Education, Tertiary Education Commission, and State Services Commission (e-government unit).</p>

# creating the conditions



CHALLENGE	ADDRESSING THE CHALLENGE	TARGET	AGENCIES RESPONSIBLE
<p><b>Technical support</b> The lack of affordable technical expertise has been consistently identified as the main barrier to increasing the confident use of ICT.</p>	<p>Establish a two-tier system of technical support.</p> <ul style="list-style-type: none"> <li>The second tier of support will be established first so that the technology needs, infrastructure and delivery needs of communities can be mapped (refer to Action 1 in the Communities maximising opportunities table).</li> </ul> <p>It will provide community-based technical support services (adapting existing models such as 'e-riders', tech angels) to assist community groups to plan and effectively use digital technologies.</p> <ul style="list-style-type: none"> <li>Secondly, a national 0800 technical help line will be established to provide first-tier technical support for communities.</li> </ul>	2007	<p>Department of Labour, Department of Internal Affairs, Ministry of Education, Local Government New Zealand in consultation with the Ministry of Social Development, Te Puni Kōkiri, Ministry of Pacific Island Affairs, National Library.</p>
		2008	





### COMPUTERS IN HOMES

Computers in Homes is an award-winning pilot project launched by the 2020 Trust aimed at empowering the communities of two Decile 1 schools, Cannons Creek and Panmure Bridge, to become active participants in the online world. For a small sum, 25 families from each school with a child of eight years or older were provided with a recycled PC loaded with a word-processing program, a modem, a phone line where necessary, and six months' free Internet access. The children were trained by a professional and had access to a technical support clinic. They were encouraged to pass on their skills to other family and community members, developing their self-esteem, confidence and technological ability in the process.

As well as enabling poor families to become 'wired', the scheme aimed to promote positive relationships between members of the community. It joined home and school in a collaboration between the 2020 Trust, the schools, the Ministry of Education, Victoria University of Wellington, Microsoft and Telecom. The results have been far-reaching, not only because the new technology has been successfully adopted by the families involved, but also because it has enabled them to participate more fully in the social and economic life of the community.

Parents now use computers for email, banking, communicating with the school and community (in their own languages), accessing news and information, writing letters, and managing the administration of their community groups. The children's literacy has improved, and their schools have reported a new confidence and enthusiasm for learning, thanks to their family's greater participation and co-operation with the school. The baseline and continuing research indicates that the Computers in Homes project maximises the potential of ICT to transform the social and economic opportunities available to the most vulnerable members of society, for the benefit of all.

One parent commented: 'Everything about the computer is new and interesting to me especially because I have never in my whole life ever learnt to use one. I have never ever used a typewriter. Now you wouldn't believe how well I can type. I can also touch type. My kids are learning to touch type as well. The interesting thing about the computer is my kids love doing their homework.'

# creating the conditions



## 3.2.1 SAFETY AND SECURITY

OUTCOME
The environment for ICT use in New Zealand will be secure, reliable and well regulated. The public will be safety-aware, and will have a well founded trust in the use of ICT.

Cyber-attacks, spam, electronic viruses and spyware are increasing. They cause economic loss and undermine the benefits that ICT confers.

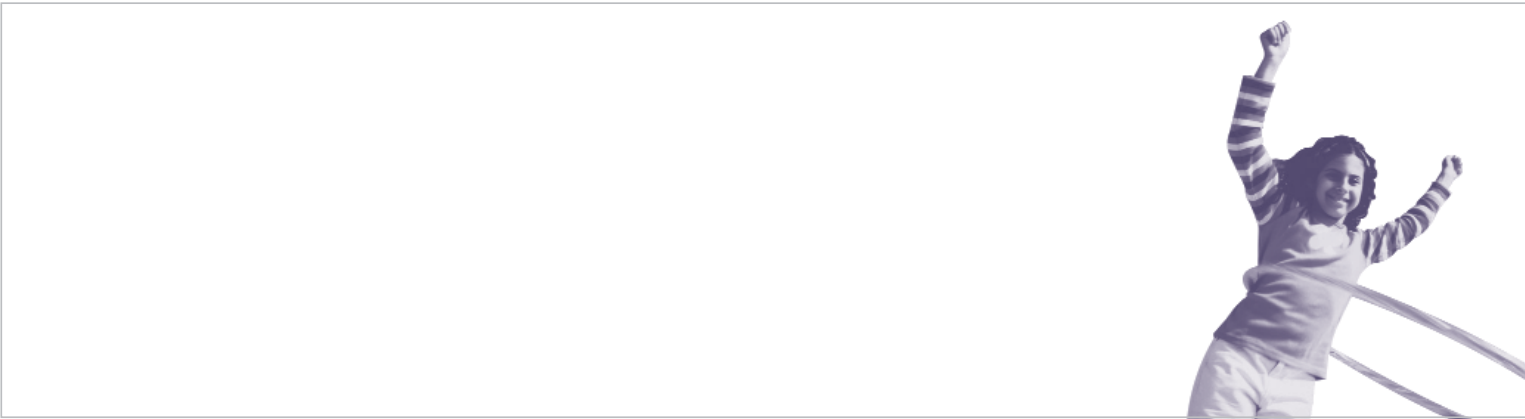
In New Zealand, 21% of businesses say that the risk of virus attack or of hackers accessing confidential information restricts their use of the Internet.<sup>10</sup> A European Union study has estimated the cost of spam to Internet users world-wide at about EUR 10 billion per year.<sup>11</sup> According to Brightmail, an anti-spam software company, unsolicited bulk mail volumes accounted for 63% of all email traffic on the Internet in March 2004, up from just 8% of traffic in mid-2001.

There are also well founded concerns about child pornography, the victimisation of children in chat-rooms, online scams, and harassment by email or text message.

All these menaces, great and small, undermine our efforts to encourage the uptake and productive use of ICT.

Both businesses and consumers require an ICT environment that is backed by adequate domestic and international legislation, together with self-regulation and education, to protect them from vandalism, fraud, theft, misleading or deceptive trade practices, spam, cyber attacks, viruses and objectionable material and behaviour.

<sup>10</sup> Ministry of Economic Development, *Firm Foundations*, p. 110.  
<sup>11</sup> Organisation for Economic Co-operation and Development, Committee for Information, Computer and Communications Policy; *Background Paper for the OECD Workshop on Spam*, December 2003.



### THE ROLE OF THE GOVERNMENT

The government will work with the ICT industry and encourage private and non-profit organisations to work together to ensure that people's online experience is safe and secure.

The government will take the lead in:

- maintaining an appropriate regulatory environment within the context of continuing technological change;
- identifying emergent issues;
- promoting the development in international fora of appropriate international standards and regulatory frameworks that address safety and security issues;
- raising awareness and promoting best practice in information security and safety with respect to the Internet and mobile devices; and
- mitigating the effects of toxic computer waste, by supporting local authorities and the recycling industry to minimise their effects on the waste stream.

### ACTIONS TO DATE

#### Intellectual property protection:

The Copyright Act 1994 has been reviewed to determine the applicability, adequacy and operation of the Act in the digital environment. Proposed amendments to the Act will provide copyright protection for ERMI, but specifically not for those functions that track usage.

In August 2000, the government agreed to a three-stage review of the Patents Act 1953 to take account of the social and technological changes since the Act was passed. The review considered that the Act was appropriate to deal with new technologies and the implications of digital technology.

#### Consumer protection and privacy:

The Ministry of Consumer Affairs published a model code to support the development of consumer confidence in electronic commerce in 2000. It was based on the *OECD Guidelines for Consumer Protection in the Context of Electronic Commerce*.

# creating the conditions



## Computer offences:

The Crimes Amendment Act 2003 enables the police to prosecute perpetrators of electronic crime more easily. The amendment covers such activities as the creation and distribution of computer viruses and obtaining unauthorised access to a computer.

## Offensive and illegal content:

Proposed amendments to the Films, Videos and Publications Act 1993 will increase penalties for offences involving objectionable material and will widen the search powers of the Censorship Compliance Unit's inspectors.

## Covert filming:

The Law Commission is considering the issues that relate to covert filming in intimate situations and the subsequent distribution of such images, and to make recommendations for law reform.

## Cyber-safety education:

The Ministry of Education, Child, Youth and Family, and the New Zealand Police were sponsors of the Internet Safety Group's *NetSafe Kit for Schools* (2003). This kit went to all schools and libraries and provides best practice guidelines for establishing a cyber-safe learning environment. In addition, the New Zealand Police and the Internet Safety Group are working together to educate the public about e-crime.

## Centre for Critical Infrastructure Protection (CCIP):

Established in 2000, the CCIP provides advice and support to owners of critical infrastructure in New Zealand, such as banks and power companies, in order to protect them from international ICT threats.

## Waste strategy:

The government's waste strategy, led by the Ministry for the Environment, called for the development of a national policy to identify the best means of extracting valuable ICT materials from the waste stream and supporting the recycling industry whilst minimising environmental risks.

## Specific e-government projects include:

- *the SEE project*: To develop and implement a secure electronic environment for the exchange of email by government departments;
- *Trust and Security*: To assess threats to government use of the Internet arising from security concerns, and the impact of these on trust in e-government; and
- *Authentication*: To develop a way for people and government agencies to prove their authenticity when transacting electronically.



## ADDRESSING THE CHALLENGES

CHALLENGE	ADDRESSING THE CHALLENGE	TARGET	AGENCIES RESPONSIBLE
<p><b>Cyber-safety and security awareness</b>  Many SMEs give low priority to digital security, for themselves or their customers, even though security breaches are costly. They need to know how to protect their systems from security breaches and eliminate unauthorised intrusions. Many home users have little security awareness, yet their home computers are used for confidential transactions with government services and commercial and banking transactions, and contain personal financial records.</p>	<p>Cyber-safety and security awareness will be compulsory modules of all ICT awareness and capability building programmes supported by the government.</p>	<p>August 2005</p>	<p>Department of Internal Affairs, New Zealand Trade and Enterprise, Department of Labour, Ministry of Education, Local Government New Zealand in consultation with the State Services Commission (e-government unit).</p>
<p><b>Spam</b>  Spam imposes hidden costs: lost time and productivity, and the consumption of network and computing resources. It can also be used for deception and fraud.</p>	<p>Pass anti-spam legislation (to be introduced to Parliament for its first reading by the end of 2004).</p>	<p>2005</p>	<p>Ministry of Economic Development.</p>

# creating the conditions



CHALLENGE	ADDRESSING THE CHALLENGE	TARGET	AGENCIES RESPONSIBLE
<p>Electronic crime Most major police investigations now have an electronic dimension.</p> <p>Electronic crime can also include the illegal trading of copyright works in digital form, cyber attacks designed to disrupt networks, the illegal distribution of covertly filmed images, the use of the Internet for the sale of objectionable material, viruses disrupting computer systems and networks, and spyware providing unauthorised access to confidential information.</p>	Develop the New Zealand Police E-Crime Strategy.	2004/ 2005 financial year	New Zealand Police.
<p>Poor data on safety Currently there are low reporting rates and inadequate New Zealand data available to accurately measure the extent of cyber-safety and security risks and their impact. Consequently, individuals, communities, businesses and the government all have difficulty developing policies to counteract these risks.</p> <p>According to the New Zealand Police, a significant amount of e-crime goes unreported, because people want to remain anonymous.</p>	Fund a New Zealand-relevant research programme and investigate the option of providing a mechanism for the confidential reporting of e-crime.	2006	Department of Internal Affairs, New Zealand Police.



CHALLENGE	ADDRESSING THE CHALLENGE	TARGET	AGENCIES RESPONSIBLE
Health risks and environmental awareness Public concern over the environmental and health risks of ICT, ranging from occupational overuse syndrome (OOS) and obesity to toxic waste (cadmium, lead, lithium, and mercury) from the disposal of computers and other devices, also needs to be addressed if we are to take advantage of the benefits conferred by ICT.	1. Health risks and environmental awareness will become compulsory modules of all ICT awareness and capability building programmes facilitated by the government.	August 2005	New Zealand Trade and Enterprise, Department of Labour, Ministry of Education, Local Government New Zealand.
	2. Government and industry, in partnership, will develop opportunities to recycle ICT components and limit the quantity of packaging that gets into the landfill waste stream.	August 2005	Ministry for the Environment, Local Government New Zealand.

#### THE INTERNET SAFETY GROUP'S NETSAFE PROGRAMME

The Internet Safety Group (ISG) is a non-profit organisation established in 1998 to educate all New Zealanders about ICT safety. Its members include law-enforcement agencies, other government agencies, businesses, educators from primary to tertiary level, and community organisations. The Ministry of Education is its primary funder and has made the ISG its 'preferred provider' of cyber-safety education for New Zealand schools.

The ISG's web site, [www.netsafe.org.nz](http://www.netsafe.org.nz), has over 100,000 hits a month with a growing number of visitors staying for over 101 page views. The ISG offers both a national help line and an email query service. In 2002, the ISG ran (in partnership with the New Zealand Police and the University of Auckland) a national symposium on cyber-safety, followed in 2003 by an international conference, 'NetSafe II: Society, Safety and the Internet'. The ISG's *NetSafe Kit for Schools* has been sent to every school and library in New Zealand. It has also published and distributed nation-wide, a brochure for parents (published with the Police Youth Education Service), an Online Safety Rule Card for children, and a pamphlet on electronic crime (published jointly with the New Zealand Police).

The NetSafe programme was awarded the International Law Enforcement Cybercrime Award in 2002 as a model of best practice for cyber-crime prevention and detection.

# creating the conditions



## 3.3 CONNECTION

New Zealand already has a well developed telecommunications infrastructure. Standard telecommunications services are widely available, and there is high usage of dial-up Internet connections and mobile phones.

### OUTCOME

New Zealand will have an information and communications network infrastructure that provides the level of connection necessary to meet the high demands of an information-empowered society. It will meet the requirements of all users and will be readily accessible and affordable.

Being connected is a prerequisite for all the other goals of the Digital Strategy: unleashing the potential of communities, creating value in business from information, and transforming government.

Being connected requires the availability of a high-quality infrastructure that connects us to global networks, enabling us to join the wired world. Such a network will give us access to knowledge resources, e-government services, leading-edge research, and new markets, making possible collaborative communication and the production of new content.

Being connected is not sufficient in itself to build an information-empowered society, as the rest of this Strategy makes plain. But without connection, nothing else can happen.

### THE SIGNIFICANCE OF BROADBAND

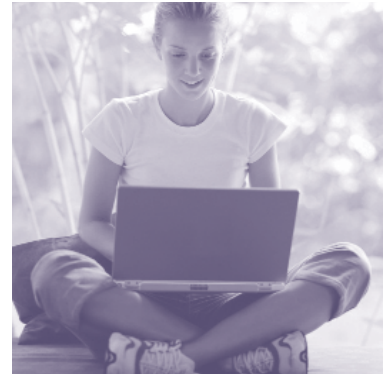
The availability and uptake of broadband are the infrastructure measures by which the development of an information-empowered society is judged. While Internet-grade broadband is widely available in New Zealand,<sup>12</sup> its uptake to date has been uncharacteristically low, with only 2.5 subscribers per 100 population, compared with the OECD average of six.<sup>13</sup> The higher bandwidth necessary for video-conferencing and voice-over-Internet have an even lower level of uptake, while the massive bandwidth requirements of advanced research are generally unavailable.

Many factors have undoubtedly contributed to the low uptake of broadband in New Zealand, such as availability, attractive dial-up rates, competitive pricing and a lack of

<sup>12</sup> Internet-grade broadband is adequate for web-browsing but lacks the real-time quality of service required for video on demand or voice-over-Internet.

<sup>13</sup> OECD, *Benchmarking Broadband Pricing in the OECD*, March 2004.





understanding of its value. Consumers typically do not appreciate the productivity benefits that broadband confers until they actually start using it.<sup>14</sup>

Providing the additional bandwidth will require significant investment, now and in the future. That investment will not occur without increased demand, stimulated by the attractive pricing of services.

Striking the same balance between investment incentives and demand incentives such as price is also significant to another dimension of connection: mobile telephony. Here, New Zealand has excellent infrastructure and uptake but high prices are inhibiting future uptake and growth.

#### BROADBAND WORTH MILLIONS TO HOSPITALS

According to an *Access Economics* report,<sup>15</sup> Australian hospitals could benefit by more than A\$190 million over ten years by using broadband technology. Broadband is able to extend the reach and contain the cost of providing many essential healthcare services, such as psychiatry, ultrasound and radiology by making it possible to provide them remotely, thereby making savings.

#### THE ROLE OF THE GOVERNMENT

In what is a relatively small market with limited competition, the ability of the regulatory environment to maintain the optimal conditions (in the absence of their being provided by a truly competitive market) is critical.

Communications technology is changing rapidly. Investing in infrastructure involves significant expense and a high degree of commercial risk. Without the spur of competition, New Zealand's small market deters such investment. As its first challenge, the government needs to enhance competition between providers to promote investment, drive innovation, and keep prices close to cost.

<sup>14</sup> The Brookings Institution has reflected on this issue: 'Many consumers may not choose to subscribe to broadband because they perceive that there are few uses of it that interest them. On the other hand, content providers may not invest in new, innovative applications because there are too few subscribers.' The Brookings Institution, Policy Brief No. 117, *Debating US Broadband Policy: An Economic Perspective*, March 2003.

<sup>15</sup> 'The Economic Impact of an Accelerated Rollout of Broadband in Hospitals', *Access Economics*, December 2003.

# creating the conditions



There are two main ways for the government to promote investment. First, it can enhance competition through the regulatory process. This includes regulating the price for certain services between service providers where it is in the long-term interest of consumers. The establishment of the independent Telecommunications Commissioner has made this process transparent and more certain. Since its establishment, the Commission has conducted work in areas such as interconnection, local-loop unbundling and wholesale pricing.

Secondly, the government through its delivery of services, can promote investment and competition in areas that might otherwise lack them. Project PROBE and the Advanced Network project are two examples. By spending tens of millions of dollars to provide government services such as education and scientific research, the government has stimulated private-sector investment in regions or sectors where the commercial risks would inhibit or delay the roll-out of infrastructure. Such initiatives have multiple benefits. Not only do they significantly improve the quality of service delivered, but the improved infrastructure also becomes available for other uses.

The government also plays other roles. It provides information to citizens, firms and communities on the benefits of ICT. It owns and manages key resources such as the radio spectrum. It can also signal its preferences to providers by setting future targets based on appropriate benchmarks.<sup>16</sup>

In all cases, commercially sound investment and the effective operation of the market should be the preferred means of supporting regional and sector development initiatives. Government regulatory intervention should be used as a last resort only.

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<sup>16</sup> Market competition and investment will be necessary to achieving many of these targets. In some cases, for example in remote regions or for disadvantaged groups, markets may not deliver services in a timely, affordable or equitable manner, and government action may be warranted to ensure the public interest is met.



### INTER-MODAL VERSUS FACILITIES-BASED COMPETITION

Inter-modal competition is competition between dissimilar technologies provided by different organisations, such as that between fixed-line and mobile phones, or (to give a less familiar example) between ADSL (copper-based technology) and wireless. Inter-modal competition exposes the entire value chain to the forces of competition, with beneficial effects. It stimulates innovation, giving consumers more choice in the range of services available at different prices.

The evidence from other OECD countries suggests that inter-modal competition can be particularly effective in spurring broadband uptake. South Korea, which has the highest uptake of broadband in the OECD, has invested heavily in cable networks that can provide broadband and television. This form of inter-modal competition is particularly suited to South Korea's high-density population.

Facilities-based competition allows competitors to use the existing infrastructure owned by an incumbent. Local-loop unbundling, bit-stream unbundling, and the sharing of radio transmission sites are three examples of facilities-based competition. Although it requires regulatory intervention, facilities-based competition may be the most efficient way to achieve competition, given New Zealand's small, thinly dispersed population and rugged terrain.

The OECD Governing Council noted in February 2004 that wireless technology provides competition for existing platforms and viable business models for extending broadband to small communities.<sup>17</sup> Wireless is likely to be the most effective means of providing broadband service in rural and remote areas of New Zealand, whilst offering competition to ADSL in other areas. In the most remote areas satellite services will also be available.

17 [www.oecd.org/document/48/0,2340,en\\_2649\\_34225\\_27374064\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/48/0,2340,en_2649_34225_27374064_1_1_1_1,00.html)

# creating the conditions



## ACTIONS TO DATE

### Telecommunications Act 2001:

In passing the Telecommunications Act 2001, the government established a regulatory régime for telecommunications that was designed to advance the long-term interests of consumers. This régime promotes competition and maximises flexibility so that new technologies can be developed and applied. The government also recognises the social objectives of connection in the Telecommunications Service Obligation (TSO) provisions.

### Project PROBE:

The government's provincial broadband extension initiative. See box at the end of this section for more detail.

### Telecommunications relay service (TRS):

The government is establishing a telecommunications relay service (TRS) to help ensure that the telephone communication needs of deaf, hearing-impaired and speech-impaired New Zealanders are met. The TRS is expected to be established by December 2004.

### Radio frequency spectrum:

The government has made suitable radio frequency spectrum available in a manner that supports a range of communications opportunities, including full commercial operations, regional or community-based broadband projects, and individual needs. The availability of such spectrum in conjunction with Project PROBE to deliver wireless broadband services is particularly important given our terrain and dispersed population.

### e-GIF:

The E-Government Interoperability Framework (e-GIF) is a collection of policies and standards for New Zealand government IT systems. It will enable integrated and uniform service delivery to government clients. It uses standards that are widely recognised, can be applied to meet business needs, and can be used by businesses. All public service agencies are required to adopt e-GIF and observe its standards when purchasing new IT systems, particularly with an external interface. The wider state sector has been encouraged to use e-GIF, and local government is also adopting it.



## BENCHMARK TARGETS FOR BROADBAND SPEED BY 2010

In order to reach the broadband targets in Figure 1 on page 50, three elements of this Strategy (content, capability and confidence, and connection) must be developed in a co-ordinated and timely fashion. It is important that content providers work closely with suppliers. Investing in infrastructure before content becomes available results in inefficiency, with resources locked up in an investment that is not being used. Providing content with no means of access is equally futile.

The targets in Figure 1 set out the level of bandwidth that is likely to be necessary if all elements of this Strategy are progressed in sync with all stakeholders.

These targets have been discussed with a number of telecommunication companies, which confirm that they are achievable. They are confident that the technology will be capable of delivering the targets and that the provision of services will be commercially viable if the anticipated demand for services outlined in this Strategy is achieved.

Project PROBE and the Advanced Research project will provide a framework for meeting these targets. PROBE will bring medium-speed broadband (sufficient for video-conferencing) to 3000 schools and communities, reaching some 95% of New Zealand's population.

The Advanced Research project will bring gigabits of bandwidth to research bodies in major centres. The infrastructure needed for both will become available for businesses, hospitals, local government agencies and individuals, creating demand for a range of new services which, in turn, will spur further investment in infrastructure.

To achieve the benchmark targets in Figure 1, the industry will need to replace all copper lines to exchanges and cabinets with fibre, and provide major users in cities with fibre connections on demand. For residential and SME customers in towns and provincial centres, it is expected that demand for 10 Mbps (extending to 100 Mbps) can be met via the copper lines between their premises and the cabinet or by using wireless technologies.

# creating the conditions



FIGURE 1: BENCHMARK TARGETS FOR BROADBAND SPEED BY 2010

User group	Businesses in main centres, research centres (e.g. universities), other specialised users outside main centres	Medium-sized businesses in provincial towns (e.g. hospitals)	Residential and SME customers in 85% of New Zealand (urban and provincial)	Residential and SME customers in remaining 15% of New Zealand (rural)
Typical applications	<ul style="list-style-type: none"><li>• Grid computing</li><li>• Real-time virtual reality</li><li>• Synchronised astronomy</li></ul>	<ul style="list-style-type: none"><li>• Remote CAT scans</li><li>• High-definition consultation</li></ul>	<ul style="list-style-type: none"><li>• Video on demand</li><li>• Security systems</li><li>• Multiple business or entertainment processes</li></ul>	<ul style="list-style-type: none"><li>• Video on demand</li><li>• Security systems</li><li>• Multiple business or entertainment processes</li></ul>
Benchmark	40 Gbps	1 Gbps (fibre) 100 Mbps (wireless)	50 Mbps	10 Mbps
Available on demand	n x 100 Gbps <sup>18</sup>	n x 40 Gbps	100 Mbps	100 Mbps
Likely delivery technology	Fibre	Fibre or wireless	Fibre/copper and wireless	Fibre/copper and wireless

18 It is envisaged that by 2010 a single colour on a single fibre will permit up to 100 Gbps, but that as infrastructure is rolled out over time it may be more cost-effective for suppliers to provide 1, 10 or 40 Gbps services per colour or per fibre and to use multiple colours or fibres to provide additional bandwidth. Standard service offerings will be benchmarked at 10 Mbps, 100 Mbps, 1 Gbps, and 40 Gbps for fibre, depending upon location, and 10 Mbps and 100 Mbps for wireless services depending on location. Benchmarking will be done against a range of comparable OECD countries.



### MAXIMISING THE OPPORTUNITIES

As stated earlier, commercially sound investment will underpin decision-making towards the achievement of these targets. All actions will need to be taken with a view to a cost-effective solution to minimise distortions to private investment decisions and maintain the balance between competition and coverage.

To achieve the benchmark targets, service providers will need to invest in essential infrastructure to support emerging applications. The government will consider further investment in critical service areas such as education and health. Local government, businesses and community groups will also need to evaluate their future requirements.

Investment in broadband for health services will enable the provision of modes of health care delivery that now seem visionary. Using broadband for remote diagnosis over televideo and for fast access, in remote areas, to high data-volume diagnostics such as CAT scans, are two examples.

Investment in broadband in public libraries and local government provides opportunities for fast access to large stocks of content. It makes it possible to develop large content datasets and to use content delivery media such as video-conferencing.

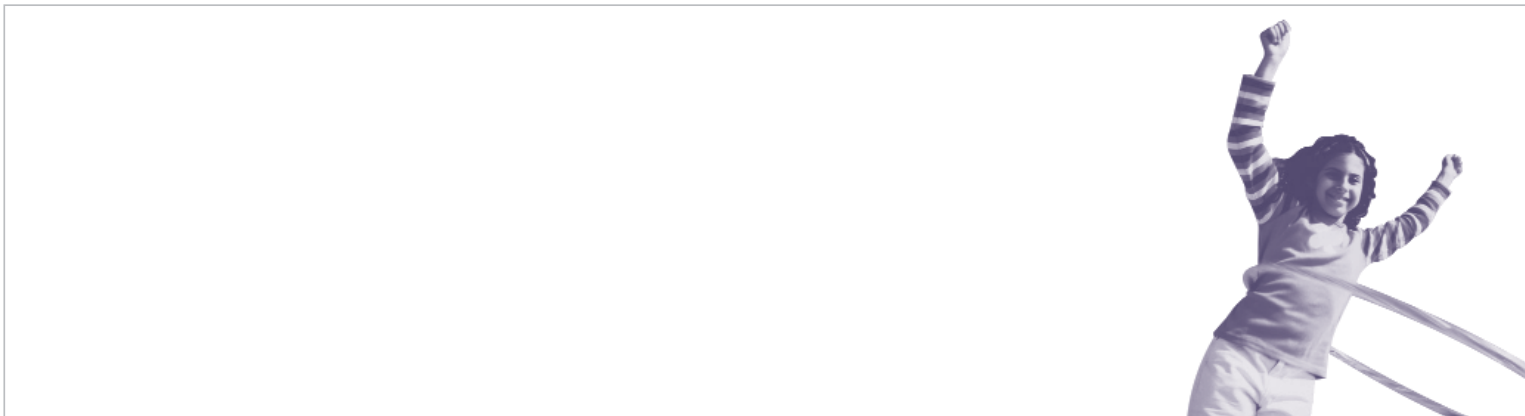
Project PROBE has already been a catalyst for accelerating ICT innovation in regional New Zealand. It has aligned community, government and industry interests around the use of broadband to accelerate regional economic development. As a consequence, the E-regions initiative is being developed by regional government interests to stimulate innovative and practical ICT solutions for regional New Zealand in four sectors: education, health, local government, and small business (see the box on page 56 for further detail).

# creating the conditions



	ACTION	TARGET	AGENCIES RESPONSIBLE
1.	<b>Project PROBE</b> Complete implementation so that all schools and communities have access to broadband by the end of 2004.	December 2004	Ministry of Education, Ministry of Economic Development.
2.	<b>Next generation Internet</b> Implement an Advanced Network linking New Zealand's research and higher education institutions to facilitate collaboration in research both within New Zealand and with international partners, and improve the quality of service available to all users.	Commence 2005	Ministry of Research, Science and Technology, Ministry of Economic Development, Ministry of Education in consultation with the National Library.
3.	<b>Regional fora/PROBE II</b> Support regional fora (such as E-regions) that have been established to identify and aggregate demand for broadband infrastructure.	2005 onwards	New Zealand Trade and Enterprise, Ministry of Economic Development.
4.	<b>Raise broadband awareness</b> All ICT awareness programmes proposed in the Confidence and Capability, Businesses and Government sections of this Strategy will raise awareness of broadband, its associated applications, and their benefits.	2005	Refer agencies responsible for the awareness programmes in the relevant sections of this Strategy.
5.	<b>Fund the delivery of broadband access for all public libraries and CABS</b> Extend the coverage of Project PROBE to ensure that all public libraries and CABS have broadband availability and through the proposed initiatives in the Communities section of the Strategy support them to become local online information centres.	2006	Local Government New Zealand, National Library, State Services Commission (e-government unit) in consultation with the Department of Internal Affairs.
6.	<b>Broadband access for all health and disability service facilities</b> By 2008, 95% of all health and disability facilities will have access to a minimum of 10 MB broadband.	2008	Ministry of Health, Ministry of Economic Development.





#### ADDRESSING THE CHALLENGES

In meeting the benchmark targets that have been set for broadband, a number of challenges must be addressed. Demand from users must be sufficient to stimulate commercially sustainable investment. Market competition must be sufficient to ensure consumers are offered good services at affordable prices.

The regulatory environment established by the Telecommunications Act 2001 largely addresses these challenges by promoting competition and maximising flexibility. The Telecommunications Commissioner has already reported on a number of investigations and signalled his intention to carry out further investigations. Via the regulatory environment and by undertaking initiatives such as Project PROBE and the Advanced Network project, the government will promote competition, act as a backstop to prevent specific problems, and support initiatives that would otherwise not be commercially viable.

The regulatory agencies need to have up-to-the-minute and accurate information available on which to base their analysis. Without it there is a danger of poor, or delayed, regulatory response to critical issues.

# creating the conditions



CHALLENGE	ADDRESSING THE CHALLENGE	TARGET	AGENCIES RESPONSIBLE
<b>Broadband pricing</b> The high price of broadband in New Zealand is considered one of the factors in the low uptake of the service.	The Telecommunications Commissioner has reported on unbundling the local loop. The Minister of Communications announced his response to the report in May 2004. The Commission and the Ministry of Economic Development have an ongoing role to monitor and report on the whole telecommunications environment.	2004	Commerce Commission, Ministry of Economic Development.
<b>High prices of fixed-to-mobile and mobile-to-mobile calls</b> The prices of mobile and fixed-to-mobile calls in New Zealand are among the highest in the OECD. <sup>19</sup>	The Commerce Commission is to investigate whether or not mobile phone call termination rates should be regulated.	2005	Commerce Commission.
<b>Commerce Commission resourcing</b> The ability to respond quickly to emerging issues is a particular advantage of the New Zealand regulatory régime.	Review the level of resources available for the Commerce Commission to monitor and regulate the sector in a timely manner.	2005	Commerce Commission, Ministry of Economic Development.
<b>Availability of information</b> The availability of accurate and timely information is critical to the ability of agencies to effectively monitor the performance of the sector and its ability to meet targets.	The government will establish relevant benchmarks and collect information on and monitor performance against these benchmarks in order to identify where intervention may be required. The availability of timely and accurate information will be considered along with the review of resources above.	2005	Commerce Commission, Ministry of Economic Development.

<sup>19</sup> Mobile termination rates are the fees that mobile phone companies charge other carriers to terminate calls on their networks, enabling mobile phone users to receive calls from different phone networks. Mobile termination charges are a significant contributor to the retail prices of fixed-to-mobile and mobile-to-mobile calls.



CHALLENGE	ADDRESSING THE CHALLENGE	TARGET	AGENCIES RESPONSIBLE
<p>Ensuring adequate investment</p> <p>Maintaining a balance between pricing of services and incentives for investment in new infrastructure and technologies is essential. Competition is the key element in maintaining incentives for investment while ensuring that prices are attractive to consumers. Regulation must be based on close monitoring and accurate analysis of good information about the telecommunications market.</p>	<p>As the new regulatory environment introduced by the Telecommunications Act 2001 becomes established, the Ministry of Economic Development will monitor its effectiveness in achieving the purpose statement of the Act: to serve the long-term benefits of consumers.</p>	2005	Ministry of Economic Development.
<p>Ensuring remote and rural access to services</p> <p>The provision of advanced services to remote regions will always be difficult to justify on commercial grounds alone, and ensuring the provision of such services is a challenge for rural communities, suppliers and central and local government.</p>	<p>Project PROBE provides a possible model for future government strategies to attract investment into remote areas by using direct grants and aggregating demand to reduce the commercial risks.</p> <p>The government will work with regions and continue to adopt whole-of-government principles in funding the provision of government services via ICT.</p>	2005 onward	Ministry of Economic Development in conjunction with local government and other central government agencies located in regions.

# creating the conditions



## PROJECT PROBE, THE ADVANCED RESEARCH NETWORK, AND E-REGIONS: ACCELERATING ICT INNOVATION IN NEW ZEALAND'S REGIONS AND SECTORS

A culture of collaboration and achievement is the driving force behind the government's Provincial Broadband Extension Project (Project PROBE), which by the end of 2004 will have provided broadband connectivity to all schools and their communities. A consortium of community, government and industry interests aligned around the use of broadband has worked to accelerate economic development in all regions of New Zealand.

PROBE is a whole-of-government project that brings significant benefits to regional communities and businesses at the same time as it provides better educational services to schools. The government funding of PROBE has come from education, regional development and economic development budgets.

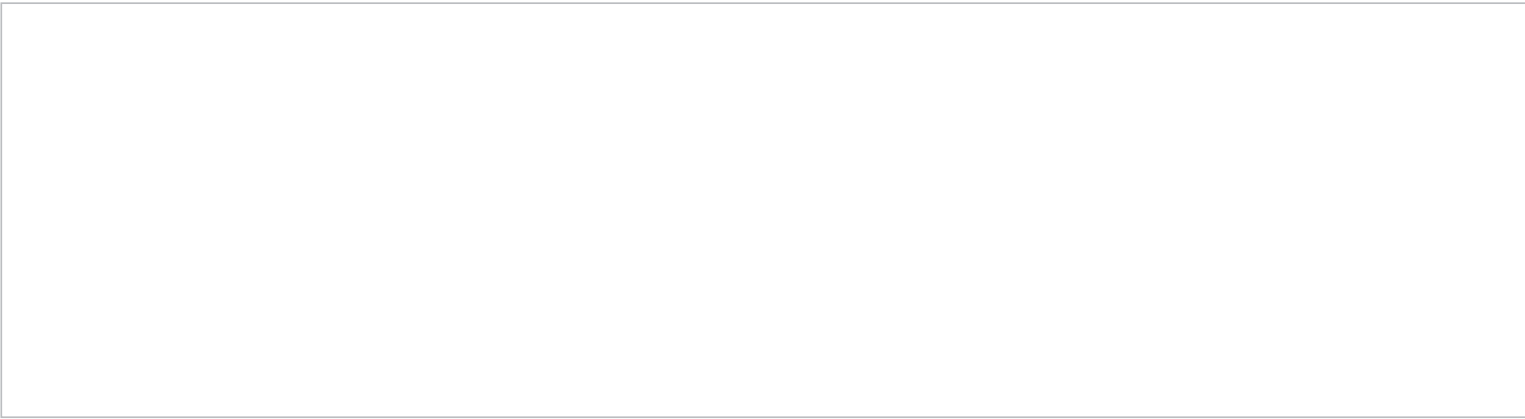
The building of a gigabit-speed Advanced Network linking New Zealand's research and higher education institutions will facilitate similar collaboration in research both within New Zealand and with international partners, and improve the quality of service available to all users. It too is a whole-of-government initiative, involving education, science and economic development agencies.

E-regions, which is in the process of being formed now, is aiming to build on the success of PROBE, and the expanding infrastructure, to stimulate innovative and practical ICT for regional New Zealand in four sectors: education, health, local government and small business.

E-regions will use its strong network of relationships to create an ideas market of innovative ICT solutions in the priority sectors, to identify the best 'radiating examples' in the regions of growth and innovation. These examples will become demonstration projects that change people's attitudes about the ways that ICT can stimulate regional development and commercial success.

E-regions is currently marshalling resources behind six demonstration projects, including:

- an integrated diabetes management programme for Northland, Hawkes Bay and Southland that connects the full range of people involved in caring for a patient (hospital, visiting health care workers, local GPs, family members and the patient him/herself) to a central server containing critical patient information. The server features emailed 'alerts' providing doctors with guidelines on the care of individual patients; and
- An e-enablement solution for 2000 regional manufacturers of high-quality packaged goods that provides software for trading in overseas markets (including online ordering, tax and regulatory compliance, and currency solutions).



# realising the benefits



## 4.1 COMMUNITIES

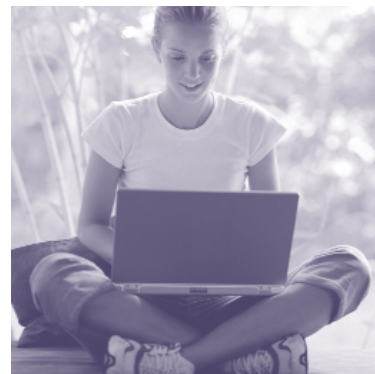
OUTCOME
ICT will be an important tool for realising the social, cultural and economic ambitions of our communities and citizens.

To create an inclusive society all New Zealanders must be able to access, use and gain benefit from ICT, and apply electronic information in ways that enhance the quality of their lives. People need motivation, skills and support to become confident ICT users. This requires infrastructure in our communities, including access points, training and coaching.

This dimension of the Digital Strategy, more than any other, depends on activity at the grassroots level. Actions that are conceived elsewhere and driven from central government will not work effectively in our independent, information-empowered communities. Local communities must be responsible for designing and implementing local initiatives if they are to be effective.

Moreover, we need to retain the local connections that affirm our sense of identity, preserving what is unique and local in the face of global brands and the flood of cultural imports from elsewhere.

The key resource for the new economy is the intellectual capital, the valuable knowledge that resides in people. It is essential that we invest in our citizens’ skills and knowledge and build cohesive communities to which people will choose to belong.



ICT can contribute to economic growth and social cohesion in at least five ways:

- **building people's sense of belonging to the community** by enhancing the social services, networks and social infrastructure that support people, geographic communities and communities of interest and improvements in individual and community capability;
- **building the productive capability** of individuals and groups within that community;<sup>20</sup>
- **improving the functioning and governance** of local institutions and community and voluntary groups;
- **encouraging innovation** in community services and enterprises; and
- **extending existing services** to isolated communities or socially excluded groups.

ICT offers unique tools for communities to identify, map and mobilise their assets, maximising the use of existing resources to meet their collective goals. The social and productive capabilities that already exist in a community are necessary for building confident, self-reliant, self-actualising communities and crucial to the development and sustainability of ICT initiatives.

#### THE ROLE OF THE GOVERNMENT

The government recognises that local initiatives that are locally owned and driven are most likely to be effective. The responsibility for improving communities' access to and use of ICT must therefore be shared by central and local government, the community and private sectors, philanthropic and voluntary agencies, and individual community members.

Central government's *particular* role is to promote and facilitate the use of information and ICT within our communities by raising community awareness of ICT, and supporting local initiatives where appropriate.

The government also has a responsibility to show leadership by using ICT to deliver core government services and by strengthening relationships with community organisations and local government to allow a comprehensive approach to be adopted. Practical advice, ideas, and the results of initiatives should all be shared so that policy in ICT, education and community development can be informed by an understanding of what works and what doesn't.

In addition, the government has a role through its regional development focus, to improve the performance of economic development initiatives in regional New Zealand. This includes working with regional stakeholders to establish the foundations and pre-conditions for the take-up of economic development opportunities (whether commercially or community driven) and facilitating the building of regional capability.

<sup>20</sup> Recent research shows that training in ICT has a greater effect on an individual's capacity to increase their earning power than training in any other subject (Daldy and Gibson, 'Have Computers Changed the New Zealand Wage Structure? Evidence from Data on Training,' *NZ Journal of Industrial Relations* (2003), 28(1): pp. 13-21).

# realising the benefits



## ACTIONS TO DATE

Many projects aimed at improving the ICT awareness, skills and access of communities have been initiated. Some are described here.

### Connecting Communities Strategy (2002):

The Connecting Communities Strategy included the establishment of three pilot communities to test community ICT-planning processes (in Otara, Tokoroa and Southland).

### Flaxroots Technology:

The Department of Internal Affairs organised four Flaxroots Technology Conferences, which showcased ICT to the community.

### The Community Taskforce Report, He Waka Koutuia (2003):

The Taskforce recommended actions to improve the community and voluntary sector use of ICT by individual organisations and for cross-sector networking.

### Niu Wave Expo (2003):

The Ministry of Pacific Island Affairs with the Department of Labour and Department of Internal Affairs organised the Niu Wave Expo, held in Christchurch. It highlighted the need for connections with the Pacific Islands to motivate the Pacific community to use ICT.

### Support for voluntary services:

Voluntary services such as Senior Net, the Samoa Capital Radio 0800 Computer Help Line, Cyberwaka, and Matagi E Fa have established training programmes suited to their target groups.





## MAXIMISING THE OPPORTUNITIES

The proposed actions have been developed according to two guiding principles:

**An enabling policy framework:** Policy development must focus on the full range of communities (geographic communities and communities of interest, identity and circumstance). It should support the identification of communities' assets and foster appropriate partnerships between government, local government, business, iwi, whānau, hapū, community and voluntary organisations, to utilise them to meet the community goals.

Partnerships between government, community groups and business are an effective way to respond to the challenges and opportunities provided by new technologies and ensure community ownership.

**Affirming community and voluntary sector ICT initiatives and building capacity:** Community initiatives arise from grassroots responses to needs or opportunities. Innovative and effective responses should be supported and adopted where there is demonstrable benefit to the community. Keeping in touch with their communities of origin is a powerful motivator for ethnic and cultural communities to invest in ICT. A number of community ICT projects, directed at particular community needs, are underway at the time of writing. Successful projects should be continued and extended into other communities.

The actions proposed below address the priorities identified at the Connecting Communities Conference 2003, as well as the seven action areas of the Connecting Communities Strategy.<sup>21</sup>

The Connecting Communities Conference identified four priorities:

- the creation and distribution of tool kits and training to support asset mapping and partnership building;
- local resources for technology planning and technical support;
- affordable access to high bandwidth networks and applications to improve ICT use within communities; and
- funding to build the ICT capability of communities.

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<sup>21</sup> Connecting Communities' seven areas of action:

- practical assistance to help communities plan their use of ICT;
- improved co-ordination of government assistance to community ICT initiatives;
- support in creating an infrastructure of non-government agencies with the capability and capacity to help deliver services to meet community ICT needs;
- assistance with providing information to communities;
- research and evaluation programme;
- training for community workers to help their communities engage with ICT; and
- development of cross-sector relationships to assist with resourcing community projects.

# realising the benefits



	ACTION	TARGET	AGENCIES RESPONSIBLE
1.	<p>Provide communities with the tools they need Communities need new tools to map their assets (e.g. skills, services, buildings, land, ICT devices) and to develop local partnerships to support the community uptake and use of ICT and enable community development generally.</p> <p>This will require the consolidation of existing central government ICT resources for community development, such as the Department of Internal Affairs' framework of ICT tools for community development.</p>	2006	Department of Labour, Local Government New Zealand in consultation with the Department of Internal Affairs, Ministry of Social Development, Ministry of Pacific Island Affairs, Te Puni Kōkiri, Ministry of Agriculture and Forestry, Ministry of Economic Development.
2.	<p>Establish a short-term (three-year) contestable fund for strategic ICT partnerships This fund will be used to progress technology planning and ICT capability building within communities. Groups, in partnership, will be able to submit cases for funding.</p> <p>To replace the contestable fund, a cross-sector Foundation will be established. It will include representatives of central and local government, industry, community and voluntary sectors. The Foundation will be responsible for the procurement and distribution of resources, providing advice, practical support and funding for community technology projects.</p>	<p>August 2005</p> <p>2008</p>	Department of Labour with a selection committee including Local Government New Zealand, Ministry of Social Development, Department of Internal Affairs, Te Puni Kōkiri, Ministry of Pacific Island Affairs, Ministry of Agriculture and Forestry.



	ACTION	TARGET	AGENCIES RESPONSIBLE
3.	<p><b>Develop an e-Pasifika Strategy</b> The focus will be on connectivity, confidence and content issues with the aim of encouraging and extending the use of ICT within New Zealand's Pacific communities.</p>	December 2005	Ministry of Pacific Island Affairs, Department of Internal Affairs, Department of Labour, Ministry of Education.
4.	<p><b>Promote community-based models of excellence in the use of ICT</b> Community-based models, such as those for virtual networks and Internet safety standards, will be promoted to ensure that all communities have access to models to meet their community needs.</p>	December 2005	Department of Labour, Department of Internal Affairs, Ministry of Education, Local Government New Zealand in consultation with the Ministry of Social Development, Te Puni Kōkiri, Ministry of Agriculture and Forestry, Ministry of Economic Development, Ministry of Pacific Island Affairs, National Library.
5.	<p><b>Develop a National Asset Map</b> A National Asset Map for community use would include geospatial data, statistics, research, toolkits, services and service providers using available data from central, regional and local government agencies, and the community and voluntary sectors.</p>	2010	Department of Labour, Department of Internal Affairs, Ministry of Education, Local Government New Zealand, State Services Commission (e-government unit), Statistics New Zealand, Ministry of Health in consultation with the Ministry of Social Development, Te Puni Kōkiri, Ministry of Agriculture and Forestry, Ministry of Pacific Island Affairs, National Library, Land Information New Zealand, Ministry of Research, Science and Technology, New Zealand Trade and Enterprise, Ministry of Economic Development.

# realising the benefits



## ADDRESSING THE CHALLENGES

The ‘digital divide’ that separates ICT-enabled New Zealand households from disadvantaged ones is the product of economic differences and education levels, as well as family structure, gender, ethnicity, disability, age and locality. The perceived relevance or threat of technology is also a significant factor.<sup>22</sup>

There is, nonetheless, considerable potential for ICT to redress socio-economic disadvantages. For example, by providing multiple points to access e-learning opportunities, multi-lingual communication and multi-media information bases, people isolated by location, age, disability or language can participate more fully. ICT offers opportunities to strengthen all communities, and enables resources such as networks and applications to be shared efficiently.

CHALLENGE	ADDRESSING THE CHALLENGE	TARGET	AGENCIES RESPONSIBLE
Fair and reasonable access to ICT for communities Affordable computers and telecommunications devices, sufficient bandwidth and suitable applications are essential for communities and community groups to access and use ICT effectively and creatively.	1. Promote and expand existing computer recycling projects, such as the CANZ Trust (Computer Access New Zealand). Develop more proactive relationships between CANZ and government agencies.	2006	Department of Labour, Department of Internal Affairs, Ministry of Education, Local Government New Zealand in consultation with the Ministry of Social Development, Te Puni Kōkiri, Ministry of Agriculture and Forestry, Ministry of Pacific Island Affairs, National Library.
	2. Government funding will support the establishment of e-centres in community locations, such as marae, libraries, homework centres.	2007	

<sup>22</sup> Household income, qualification levels and the number of parents and children in a family are major factors in an individual's home-based access to the Internet. Statistics New Zealand, *The Digital Divide* (2003).

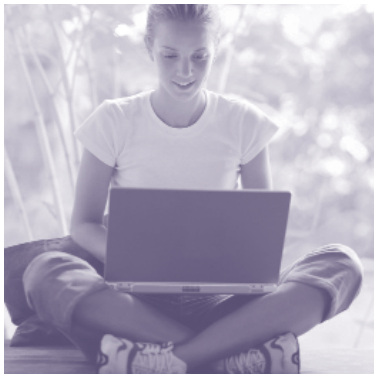


CHALLENGE	ADDRESSING THE CHALLENGE	TARGET	AGENCIES RESPONSIBLE
<p><b>Community-specific ICT training</b> Community groups and voluntary organisations have different ICT needs from those of business. A comprehensive training programme specifically for community groups and voluntary organisations should be developed.</p>	<p>Develop the community training programme in collaboration with government, the Community and Voluntary Sector Taskforce, Te Wero, and community and voluntary groups.</p> <p>The focus will be on supporting the uptake and use of the tools referred to in the actions above.</p>	2006	Department of Labour, Department of Internal Affairs, Ministry of Education, Local Government New Zealand in consultation with the Ministry of Social Development, Te Puni Kōkiri, Ministry of Agriculture and Forestry, Ministry of Pacific Island Affairs, National Library.
<p><b>Addressing well founded negative perceptions and impacts of ICT</b> There is some community resistance to ICT, based on previous negative experiences, such as inappropriate ICT training and software and hardware purchase decisions. There is also anxiety about the effect of new technologies on employment and concern that information will only be available in digital form, excluding those who are unable to access it in this way or do not wish to do so.</p>	<p>This challenge will be addressed by the ICT Awareness Programmes proposed in the Confidence and capability, Businesses and Government sections of this Strategy.</p>		

# realising the benefits



CHALLENGE	ADDRESSING THE CHALLENGE	TARGET	AGENCIES RESPONSIBLE
<p>Lack of a nationally shared ICT infrastructure for community and voluntary groups</p> <p>There is currently no single nationally shared infrastructure where community and voluntary groups can access ICT training, resources, information and applications at a reasonable cost.</p> <p>This often results in community and voluntary groups spending a lot of time researching where they can access resources, often paying high prices because of their low purchasing power compared with other organisations. This makes the whole experience of ICT for many community and voluntary groups a negative one, and often prevents them from expanding their use of ICT.</p>	<p>A national shared ICT infrastructure for community use will be developed, with provision for a shared community Web platform, standardised applications and ICT tools that can be accessed by community and voluntary groups either for free or at reasonable cost for some services.</p>	<p>2006</p>	<p>Department of Labour, Department of Internal Affairs, Ministry of Social Development, Ministry of Pacific Island Affairs, Te Puni Kōkiri, Local Government New Zealand, Ministry of Education.</p>



#### VOLUNTARY TRAINING: DEVELOPING A SAMOAN MODEL OF ICT TRAINING

This voluntary scheme, utilising Samoa Capital Radio Si'ufoga o le Laumua, was devised to address the lack of ICT awareness and improve ICT skills amongst Pacific Island communities. An 0800 number allows callers to ask questions in one of several Pacific Island languages, and help is provided on air. Listeners are canvassed to discover the questions they would like answered.

Like many voluntary schemes that meet a need, the radio help line has proved to be so successful that it is difficult to meet demand. Advice on the help line is given by an employee who has a facility with ICT and expertise in Pacific languages, but whose main job is administration.

Free workshops are also held every second Saturday, using voluntary tutors and equipment to train Pacific Island people in basic computer and Internet skills. The workshops adopt a buddy approach, using a variety of Pacific languages and images appropriate to the Pacific Island community. Written resources are being developed.

## 4.2 BUSINESSES

The potential to create significant value for businesses in all sectors, whether in the form of efficiency gains or revenue from new products and services lies in using ICT as a tool to drive process or product innovations. It is the innovative use of information that the technology enables rather than the technology itself that is critical. There are two dimensions to consider:

- promoting the uptake and efficient use of ICT by New Zealand business generally; and
- building a vibrant and competitive ICT sector.

A thriving ICT sector, with an optimal mix of local and multi-national firms, is an important part of the New Zealand economy and society, and has a major part to play in the development of other high value-added service industries. The sector supplies needed skills and applications, and ensures that new technology and knowledge are available to New Zealand firms.

# realising the benefits



## OUTCOME

New Zealand businesses *in all sectors* will have the necessary knowledge, management capability and access to content and ICT infrastructure to create innovative products and processes and increase productivity.

The ICT sector will contribute 10% of New Zealand's GDP by 2012.<sup>23</sup>

ICT was chosen as one of the GIF focus sectors because of the growth potential of the sector, and because ICT is a 'horizontal enabler' of much economic activity.

The enabling impact of ICT can be observed in many areas of economic and social activity. Some sectors of the New Zealand economy, such as banking, have been dramatically transformed by ICT, with applications such as EFTPOS, Internet and telephone banking. Research indicates a high uptake of e-commerce applications by New Zealand business, particularly in tourism, finance, insurance, accommodation, property, business services and in the education sector.<sup>24</sup>

While the effect of ICT is plain to see, measuring its contribution to productivity growth is tricky. Research by the Australian Productivity Commission, the OECD and the McKinsey Global Institute<sup>25</sup> confirms that although ICT contributes to productivity growth, there is no *simple* correlation between the adoption of ICT and productivity. Strong productivity growth in the past ten years, for example in the US and Australia, appears to have been the result of interrelated factors. These include economic reforms (including regulatory reform), access to higher skills, firm-level innovation and changes in the organisation of work.

Intensified competition in particular has been identified as a key driver of innovation. In this context, ICT plays an important role by providing managers with a tool that they can use in process and product innovation. But the productivity benefits vary from one sector to another. Those with the greatest need for information processing, such as financial services or the wholesale and retail sectors, show the highest improvements in productivity.

<sup>23</sup> The ICT Taskforce advocated this ambitious target in its 2003 report *Breaking Through the Barriers*.

<sup>24</sup> Research by University of Auckland, 'E-business in New Zealand, 2000-2002: are we ready for the digital economy?', 2003.

<sup>25</sup> Parham, Productivity Commission, 'Australia: Getting the most from ICTs', 2002, Australia.  
McKinsey Global Institute, 'Whatever happened to the new economy?', 2002, San Francisco.  
OECD, 'ICT and Economic Growth: Evidence from OECD countries, industries and firms', 2003, Paris.





Research suggests that ICT is most beneficial when applications:

- are tailored to sector-specific business processes;
- are deployed in a sequence that builds capabilities over time; and
- co-evolve with managerial and technical innovation.<sup>26</sup>

There is a consensus that ICT, in isolation from complementary innovative changes in how the business is run, is not a solution in itself. On its own, it does not drive economic transformation or productivity growth. A coherent set of economic policies is needed to create the conditions, including intensified competition that will encourage businesses to use ICT and other emerging technologies as a basis for other innovations. This is the goal of the GIF.<sup>27</sup>

#### ACTIONS TO DATE

##### Growth and Innovation Framework:

The GIF (2002) set out the Government's sustainable economic growth objectives. The Framework identified innovation as the key driver of growth, with three areas for action:

- strengthening the innovation framework;
- developing talent and skills; and
- improving global connectedness.

The GIF identified three focus sectors, ICT, biotechnology and the creative industries, with the potential to contribute to growth in other sectors of the economy.

##### E-commerce Action Team:

The E-commerce Action Team (ECAT), made up of sector leaders and e-commerce experts, was established in 2001 to promote the use of e-commerce by New Zealand businesses. It completed its work in June 2003.

<sup>26</sup> McKinsey Report, *ibid*.

<sup>27</sup> The economic factors include openness to trade, foreign investment and ideas; an efficient telecommunications market; appropriate regulatory frameworks, including international frameworks; a property rights system that strikes the appropriate balance between the promotion of innovation and the diffusion of new knowledge; a business environment that fosters and harnesses innovation; and a well educated workforce and flexible labour market.

# realising the benefits



## New Zealand Trade and Enterprise (NZTE):

NZTE assists businesses to improve capability, international competitiveness and profitability. It has a specific ICT-sector development team, responsible for facilitating collaboration by industry, government and international partners to grow the sector.

NZTE's general business development services include:

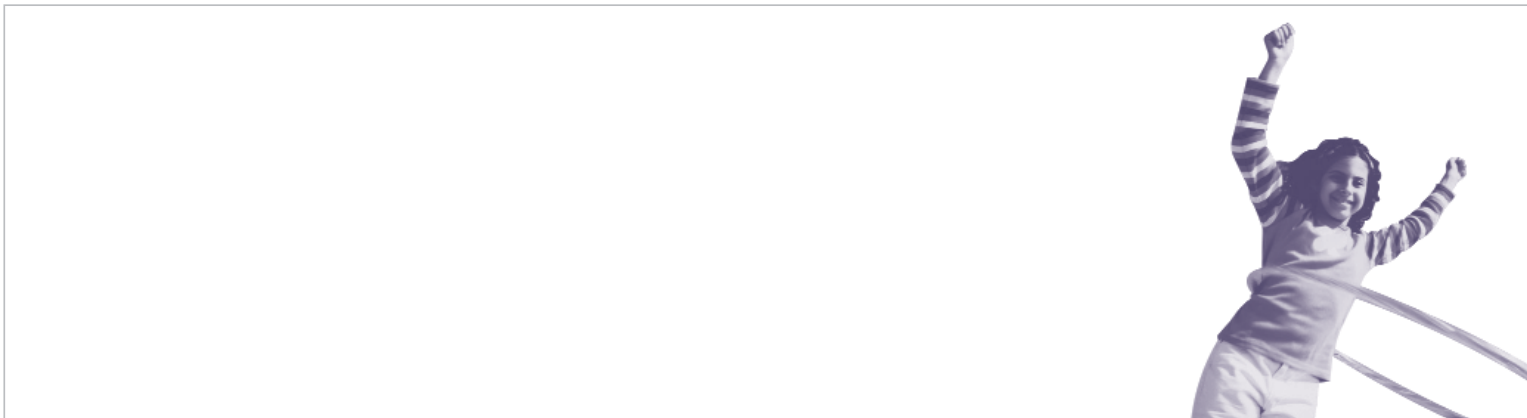
- the Business Portal: Provides access to easy-to-understand information about the key areas of difficulty raised by businesses such as tax, employing staff, OSH and ACC obligations. See [www.biz.org.nz](http://www.biz.org.nz);
- Enterprise Training: Such as seminars and workshops on business planning, marketing, finance, e-commerce; and
- E-business roadmap: Guidance for individual businesses on how they can obtain more value from ICT.

Examples of ICT sector-specific initiatives include:

- funding for the HiGrowth project;
- funding for the ICT 321 Go Global leadership programme for ICT business leaders; and
- the establishment of the Silicon Valley Beachhead programme to assist New Zealand ICT companies entering the US market.

## Other initiatives:

Other initiatives include the e-Commerce Strategy, Project PROBE, and legislative changes. See Appendix 1.



## THE ROLE OF THE GOVERNMENT

The government's key role is to ensure an open, sound and stable business environment. Policies that foster competition are the levers that will ensure that businesses take up ICT applications and services, including broadband.

The government also has an important role to play in making businesses aware of the opportunities afforded by ICT, of best practice in data security and safety in an online environment and of new technological advances.

The government has traditionally played a role in improving the management capability of New Zealand firms through business assistance programmes.

As content is a crucial resource in the knowledge economy, the government needs to ensure that our firms have appropriate access to New Zealand's stock of science and technology research.

The government must also lead by example, by adopting best practice in managing the information for which it is responsible (including interoperability, security and data standards) and developing complementary innovations in governance, management, business practices, processes and organisational forms. It also has a responsibility to seize the opportunities afforded by ICT to reduce the compliance costs for businesses.

## MAXIMISING THE OPPORTUNITIES

Maximising the opportunities for business requires actions in six areas:

- improving general management capability;
- raising business awareness of ICT, including new technology developments;
- better access to information and research;
- developing our content industries;
- exploiting market niches for the ICT sector; and
- improving government procurement processes.

Improving general management capability is the foundation for successful implementation of ICT in New Zealand's firms. The greater the understanding managers have of their products, business, industry and trading environment, especially the value chain and the information components of their business, the better they will be able to identify where ICT will fit and how it can add to the value the business creates.

ICT provides business with a plethora of opportunities ranging from cost reduction to participation in global value chains that would have been impossible in the past. Firms need to have much greater awareness of these opportunities, as well as the ways technology is changing their markets and channels, and new developments in technology.

# realising the benefits



Better access to information has the potential to accelerate research and development and the diffusion of innovation and, as in the case of regulatory compliance, reduce costs. Actions to maximise the opportunities of greater access to information are proposed in the Content section of this Strategy.

New content industries are also developing at points along the digital content value chain with the convergence of creative and technology providers and the blurring of traditional barriers between different types of media. New Zealand Trade and Enterprise reports that the digital content industry has an average growth rate of 29% per annum. Digital content opportunities are now available in such diverse areas as interactive games, e-learning, animation, special effects, Web design, visualisation technologies, audio design, and film and publishing. New Zealand already has some exemplar digital content firms such as Right Hemisphere, Sidhe Interactive, HITLab NZ and Weta Digital.<sup>28</sup>

New Zealand ICT companies are already establishing positions in market niches in health-related technologies and mobile communications. There is potential for New Zealand to promote itself as a software outsourcing destination and to attract foreign investment in research and development.<sup>29</sup> The ICT sector currently generates \$1.25 billion in foreign exchange annually, and is growing at 20% per annum.<sup>30</sup>

Lastly, government procurement is a significant component of the ICT market in New Zealand, and there is potential to improve the procurement process to ensure that New Zealand firms have a fair opportunity to compete.

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28 Right Hemisphere provides 3D software and technology platform design development for entertainment, education and sophisticated manufacturing. Weta Digital is the Oscar-winning creative team behind the special effects and animation of The Lord of the Rings trilogy. Sidhe Interactive is the first New Zealand games studio to deliver an interactive game on the PlayStation2 and XBOX platforms. HITLab NZ is exploring human interface design.

29 Two reports independently reached the same conclusion: *Strategic Capabilities Assessment – Global Software Outsourcing*, by the Gartner Group, and 'The Centre for Advanced Government ICT Application', by the Information Technology Association of New Zealand.

30 New Zealand Trade and Enterprise: *ICT Sector Strategic Plan*, March 2004.



	ACTION	TARGET	AGENCIES RESPONSIBLE
1.	<p>Promote youth enterprise</p> <p>The aim is to increase and sustain businesses run by young New Zealanders. The focus will be on:</p> <ul style="list-style-type: none"> <li>• developing a better understanding of the needs of businesses led by young people and the opportunities that exist to support them; and</li> <li>• identifying action plans which may include the establishment of a Young Entrepreneurs Network in New Zealand (similar to the Enterprise Network for Young Australians) and the creation of web sites directly targeted at supporting youth-led businesses.</li> </ul>	December 2004	Ministry of Economic Development, Ministry of Youth Development.
2.	<p>Enhancing SMEs' interactions with the government</p> <p>A project to deliver the specifications for applications that will make SMEs' transactions with the government (for example, tax payments and calculations, ACC, statistical returns) easier and cheaper to complete.</p> <p>The project will include profile-matching between government agencies (for example, when a business advises one agency of a change of address, the records of other agencies will be automatically amended).</p>	June 2005	Ministry of Economic Development, State Services Commission (e-government unit).

# realising the benefits



	ACTION	TARGET	AGENCIES RESPONSIBLE
3.	<p><b>Fit for the future management development</b> A project to improve understanding and support action in the private and public sectors to address the management capability gap in New Zealand.</p> <p>It includes research and the establishment of a contestable fund for projects that stimulate demand for management development and the supply of services to support management development.</p> <p>The project will be jointly managed by the government and the Management Development Advisory Group (a group of industry organisations led by the New Zealand Institute for Management).</p>	August 2005	Ministry of Economic Development, New Zealand Trade and Enterprise.
4.	<p><b>Develop an integrated ICT awareness and capability programme</b> ICT-awareness raising programmes will be integrated with the NZTE e-business roadmap. This programme will offer educational and capability development in a number of ICT streams, such as:</p> <ul style="list-style-type: none"> <li>• managing change: strategy, people, business processes and technology;</li> <li>• infrastructure;</li> <li>• business applications;</li> <li>• telecommunications;</li> <li>• e-business; and</li> <li>• safety and security.</li> </ul>	August 2005	New Zealand Trade and Enterprise.



	ACTION	TARGET	AGENCIES RESPONSIBLE
5.	<p>Responding to the ICT Taskforce recommendations on government procurement</p> <p>The Ministry of Economic Development, in conjunction with the ICT sector, the State Services Commission and New Zealand Trade and Enterprise, will report to Cabinet by the end of the year on improving the government procurement of ICT.</p> <p>This will include consideration of the proposed Centre for Advanced Government ICT Applications, the value of government-owned intellectual property and procurement practice in departments.</p> <p>Refer to the challenges table for detail of the government response to other ICT Taskforce recommendations.</p>	December 2004	Ministry of Economic Development, State Services Commission, New Zealand Trade and Enterprise in consultation with ICTX, Information Technology Association of New Zealand, HiGrowth and other industry bodies.
6.	<p>Develop a greater global presence for our ICT sector</p> <p>NZTE will support the ICT sector's exports by identifying market opportunities, positioning New Zealand ICT companies, supporting their offshore entry/expansion strategies, and facilitating deal flow. Key activities will include:</p> <ul style="list-style-type: none"> <li>• Outsource to NZ project – to develop an offshore outsourcing market in the UK;</li> <li>• expanding the Beachhead Programme; and</li> <li>• identifying target partners for strategic relationships such as multi-national companies, universities and research institutes.</li> </ul>	2004/2005 onwards	New Zealand Trade and Enterprise.

# realising the benefits



	ACTION	TARGET	AGENCIES RESPONSIBLE
7.	<p>Facilitate a digital content industry forum and develop a strategy to identify and leverage digital design opportunities across sectors.</p> <p>The digital content forum will identify leaders in the digital content industry and the current state of play, identify new opportunities and challenges, and recommend actions going forward.</p> <p>A strategy and sector implementation plan (to be developed by government and industry leaders) will then be developed using information from the forum.</p>	August 2005	New Zealand Trade and Enterprise in consultation with the Ministry for Culture and Heritage, Creative New Zealand, National Library, Foundation for Research, Science and Technology, Ministry of Agriculture and Forestry, Ministry of Economic Development.

## ADDRESSING THE CHALLENGES

CHALLENGE	ADDRESSING THE CHALLENGE	TARGET	AGENCIES RESPONSIBLE
<p><b>Slow or unstable data connections</b></p> <p>Research shows that 11% of businesses cite slow connections as restricting their use of the Internet.<sup>31</sup></p>	See actions and broadband targets in the Connection section of this Strategy.		
<p><b>Data integrity problems</b></p> <p>21% of businesses cite the risk of viruses or hackers accessing confidential information as restricting their use of the Internet.<sup>32</sup></p>	See actions in the Safety and security section of this strategy.		

<sup>31</sup> *Firm Foundations, A Study of New Zealand Business Practices and Performance*, Ministry of Economic Development, p. 110.

<sup>32</sup> *Firm Foundations*, Ibid.





CHALLENGE	ADDRESSING THE CHALLENGE	TARGET	AGENCIES RESPONSIBLE
Addressing the barriers to growth of the ICT sector identified in the 2003 ICT Taskforce report, <i>Breaking Through the Barriers</i> .	<ul style="list-style-type: none"> <li>• Support for the HiGrowth project over four years to 2007;</li> <li>• Tertiary initiatives – Enterprise Training for Emerging Industries, and the Entrepreneurship and Knowledge Transfer initiatives to increase the commercial knowledge of ICT graduates;</li> <li>• Increased support for the technology curriculum in secondary schools;</li> <li>• A national ICT awareness programme FutureIntech targeted at secondary school students;</li> <li>• Support for ICT 321 Go Global leadership programme for ICT business leaders;</li> <li>• Working group of industry and government representatives on government ICT procurement issues; and</li> <li>• Investigation of tax and regulatory issues aimed at improving investment opportunities in the ICT sector.</li> </ul>	This is an ongoing component of work.	New Zealand Trade and Enterprise, Ministry of Economic Development.

# realising the benefits



## PLANET SKIN

For Planet Skin, a beauty salon in Paraparaumu, using the database package 'Hair Ware 2000' has been a key element in the growth of the business. The application enables the manager to analyse business information more efficiently and effectively, from bookings to cash management, stock control and staff administration, saving almost seven hours a day in administration time, and allowing more time for marketing the business.

The software also provides ways to improve the quality of marketing. Customer information, such as services purchased and time since previous visit, can be used to direct market to specific customers or customer groups.

Planet Skin's successful implementation of the application shows the potential for a small business to use ICT successfully, even in a low-tech industry.

## FONTERRA

One of the reasons for the creation of New Zealand's largest company was to build an organisational structure and process that allowed the free flow of appropriate and timely market information from customers to New Zealand's 13,000 milk suppliers. There had been significant barriers to the flow of information about the kind of products demanded by end consumers in international markets. As a consequence, it was harder to meet market demands for high value-added products, with a consequent loss of potential profits.

Fonterra has begun a process – known as 'JEDI' – focused initially on improving information flows within its processing, marketing and distribution operations. This project will create a single repository of all operational data accessible via a host of applications to all arms of the business (farmer/shareholder through to the marketing network). JEDI will simplify business processes, remove the problems of system and data duplication, and support Fonterra's vision of a new, fully integrated supply chain. There will be savings in staff costs and productivity gains from access to better information to plan and optimise production.

The project highlights issues relevant to ICT implementation in large organisations made up of a large number of separate businesses with diverse information needs, particularly the importance of making complementary investments in human capital, systems and processes that support the investment.



#### 4.3 THE GOVERNMENT

The opportunities for using ICT to transform the government and create an information-empowered society are of two quite different kinds:

- **general**, in terms of how a networked public sector will use information and technology to improve the ways it delivers services to citizens; and
- **sector-specific**, such as the possibilities ICT offers for transforming the health and education sectors.

This section therefore deals with the general case first before considering the far-reaching opportunities for using ICT for the delivery of health and education.

##### OUTCOME

Information, service delivery and government processes will be integrated across agencies to ensure that the New Zealand government is responsive, citizen-centric and cost-effective. Information and services will be customised to the needs of citizens and businesses, and accessible from a single point of contact. Agencies will adopt a whole-of-government perspective when designing and implementing services.

New Zealand's transformed government will be able to deliver:

- **better services** that are more convenient and reliable, with lower compliance costs and higher quality and value. For example, sharing common client data between agencies will:
  - enable individuals to be automatically reminded of obligations (such as renewing a driver's licence); and
  - avoid the need for businesses to provide the same information to more than one government agency, reducing compliance costs;
- **cost effectiveness and efficiency** – cheaper, better information for citizens and businesses, and better value for taxpayers; and
- **improved participation** that makes it easier for those who want to contribute to policy changes (for example, agencies will outline a proposed policy change on their websites and receive feedback on that change).

# realising the benefits



The government will also lead; it will act as an exemplar to citizens and businesses by its innovative approach to the supply of services, such as:

- in the authentication of online services to ensure that all government information and services go to the right person, while protecting their privacy; and
- the effective use of information in the health sector, so that patients are better informed and health resources are distributed to areas of greatest need at the right time.

## ACTIONS TO DATE

So far, good progress has been made, with the 2002 United Nations report *Benchmarking E-Government: A Global Perspective* ranking New Zealand third among 169 countries on a global e-government leadership index. Examples of recent actions for government are:

The New Zealand e-government strategy (revised June 2003):

This strategy has three core outcomes and associated benefits:

- **Convenience and Satisfaction**  
*Services provided any time, any how, anywhere*
  - People will have a choice of channels to government information and services that are convenient, easy to use and deliver what is wanted.
- **Integration and Efficiency**  
*Services that are integrated, customer-centric and efficient*
  - Information and services will be integrated, packaged and presented to minimise cost and improve results for people, businesses and providers.
- **Participation**  
*Participation in government*
  - People will be better informed and better able to participate in government.

Major development initiatives of this strategy include:

- service delivery architecture: Develop, test and implement a service delivery architecture for all of government;
- shared workspace: Pilot secure electronic workspaces for projects and policy development across government agencies and move to a full production environment if the pilots are successful; and
- authentication: Develop and implement an all-of-government framework for online authentication to ensure government services delivered over the Internet are going to the right person and their privacy is protected.



#### The strategic plan for e-local government (April 2003):

The e-local government strategy aims to support the development of e-government initiatives in councils in four main areas:

- access to local government information and services;
- innovation: Creating new opportunities for councils and citizens through e-initiatives such as regional portals and community access to ICT and information;
- participation: Working through the issues that will support greater democracy including the submissions and electoral processes; and
- leadership: Particularly on education in local e-government and awards as well as setting standards and facilitating local to central government co-operation.

#### MAXIMISING THE OPPORTUNITIES

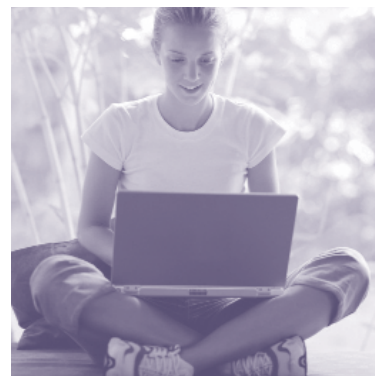
ICT is only one part of achieving the outcome of a transformed government. Success will depend on making continued improvements to the design, operation and culture of the public sector.

Of particular importance is ensuring that government agencies collaborate so that their ICT decisions reflect the broader requirements of a networked government through the development of enterprise architectures, shared ICT infrastructure, common data and security standards, and government-wide standards for interoperability.

# realising the benefits



	ACTION	TARGET	AGENCIES RESPONSIBLE
1.	<p>Develop common standards across government</p> <p>Develop, as a foundation component of the e-government programme, a common architecture across government agencies, including ICT infrastructure and common ICT standards.</p> <p>Major initiatives currently underway are the Online Authentication Project, the e-government Interoperability Framework and the ICT feasibility study.</p>	Ongoing component of the current e-government strategy with a target date of 2010	State Services Commission (e-government unit) in consultation with the Ministry of Economic Development.
2.	<p>Benchmark the current e-government strategy</p> <p>Benchmark the e-government strategy against e-government programmes of other OECD countries to identify areas of improvement. The focus will be on:</p> <ul style="list-style-type: none"> <li>• its design and areas of coverage;</li> <li>• the effectiveness of its implementation at government-wide and individual agency levels; and</li> <li>• aligning sectoral approaches to e-government (for example, in health and education) and the overarching e-government strategy.</li> </ul>	2006	State Services Commission (e-government unit) in consultation with the Ministry of Economic Development.



## ADDRESSING THE CHALLENGES

CHALLENGE	ADDRESSING THE CHALLENGE	TARGET	AGENCIES RESPONSIBLE
<p><b>Public trust and participation</b> The government needs to address public concerns about an ICT-enabled government. There are concerns that government services will only be able to be accessed online and that some government services, particularly in regional areas, will be removed.</p>	<p>Develop a 'Transforming Government' awareness programme This programme will inform the public about how ICT will be used to transform government and promote specific benefits for citizens, communities and businesses.</p>	August 2005	State Services Commission (e-government unit).
<p><b>Collaboration</b> Barriers to collaboration between government agencies and between central and local government can be found in New Zealand's legislation, public governance arrangements and system of public management.</p>	<p>Report on inter-agency and local government collaboration A detailed study will be conducted into key issues of inter-agency collaboration and local government engagement. The scope will include:</p> <ul style="list-style-type: none"> <li>• legislation and agency interpretations;</li> <li>• the capacity of the public management system to support inter-agency collaboration;</li> <li>• current governance arrangements and incentives for greater inter-agency collaboration; and</li> <li>• identifying barriers and actions to improve local government's capacity to participate in the e-government work programme.</li> </ul>	August 2005	State Services Commission (e-government unit).

# realising the benefits



## TRANSFORMATION IN THE HEALTH AND EDUCATION SECTORS

Because health and education are information-intensive and their delivery is widely dispersed, they represent the most far-reaching opportunities to transform government and build an information-empowered society. The transformation of health and education has the potential to deliver significant productivity benefits that will flow from the sectors themselves to the wider economy.

Transformation in the health sector is particularly important in view of our ageing population, which will place more demand on health services in the future, with costs increasing in proportion to usage.

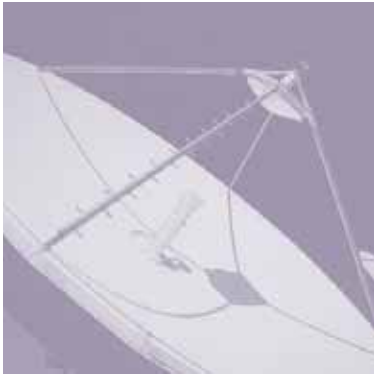
ICT is now widely available in pre-schools, schools and tertiary institutions, providing opportunities for supporting new ways of teaching and learning. Taking advantage of these opportunities is important if New Zealand is to develop a skilled workforce and to attract and retain a solid core of the exceptionally talented – necessary ingredients for us to make the jump to a successful high-growth economy.

Using ICT will not only enable the more efficient delivery of services and sharing of information and resources, but also open up the possibility of offering wholly new services to citizens, conferring benefits that would have been unimaginable a decade ago. The government, as the major provider in the health and education sectors, will lead in the use of ICT to transform them.

## TRANSFORMING THE HEALTH SECTOR

OUTCOME
E-health will assist in the effective management of health information. It will enable clinicians to better treat patients and improve health outcomes by providing access to health information, improving the quality of information and the timeliness by which that information is provided.





By embracing ICT, health providers will be able to:

- implement telehealth initiatives such as specialist diagnosis in rural medical practices, clinics and hospitals;
- exchange high-volume information leading to more timely diagnosis and treatment interventions;
- transfer large files such as diagnostic images to specialists to further improve diagnosis and treatment;
- reduce the burden of travel on specialists by enabling clinics to be held at distant locations using video-conferencing technology;
- access decision-support guidelines at the point of care, so that general practitioners can provide evidence-based care;
- provide education at a distance via video-conferencing to rural health care providers, reducing the need for travel and maintaining the body of knowledge in New Zealand on latest research findings; and
- carry out administrative activities more efficiently, allowing funds to be reallocated to service delivery.

ICT will enable health data to be better managed. By having access to better quality and more comprehensive data, we will be better able to predict our health needs and prioritise services regionally and nationally, and devise targeted prevention programmes. With accurate national data we can benchmark ourselves against international norms, and provide accurate national data to international agencies such as the World Health Organization.

#### MAXIMISING THE OPPORTUNITIES

In collaboration with the sector, the Ministry of Health has a significant programme of work underway to put in place infrastructural components on which e-health services can be built. Applications such as electronic laboratory reports and hospital discharges already use the new infrastructure. District Health Boards are exploring telehealth initiatives that will improve the quality of services they provide, particularly to rural areas. And the Ministry of Health is working with Project PROBE to enable affordable broadband to become available to sector organisations.

This existing programme of work and future work opportunities will be delivered through one strategic plan for the health sector.

# realising the benefits



	ACTION	TARGET	AGENCIES RESPONSIBLE
1.	<p>Develop a sector-based Information Systems Strategic Plan (ISSP) This will include the development and clarification of the:</p> <ul style="list-style-type: none"> <li>• direction of national health information collections and meta-data management;</li> <li>• sector network governance;</li> <li>• national application development paths; and</li> <li>• knowledge management opportunities.</li> </ul> <p>The Plan will incorporate existing policy developments around sector information technology investment, security and privacy frameworks, and collaborative structures. In this context, ongoing demand for broadband services will be generated from the ongoing sector implementation of:</p> <ul style="list-style-type: none"> <li>• electronic ordering systems for laboratory diagnostics and pharmaceuticals;</li> <li>• integration and further development of clinical and administrative systems to support the implementation of the New Zealand Primary Health Care Strategy, focusing on chronic disease management and mental health services;</li> <li>• health information management standards for data exchange;</li> <li>• exchange of high-bandwidth graphics data formats including topography scans; and</li> <li>• informatics-related analysis systems to enable better management of sector funding.</li> </ul>	December 2004	Ministry of Health.



## TRANSFORMING THE EDUCATION SECTOR

### OUTCOME

Raising achievement in an innovative education sector, fully connected and supported by the smart use of ICT.

ICT has the potential to transform the sector: how students are taught, where they are taught, and what they are taught – and also to transform the administration of the sector.

Through the use of the Internet and the provision of materials created electronically, educators will be able to access professional advice, online learning materials, tools and professional development, and collaborate in communities of professional practice.

Learners will have the opportunity to experience a much wider range of learning situations and resources. They will be able to participate in ‘virtual classrooms’ and communicate with people beyond their immediate environment, increasing their connection to the world. For example, a lesson on global warming in a school in Southland could be taught in conjunction with a class in Finland.

### MAXIMISING THE OPPORTUNITIES

The education sector is already undergoing change as a result of initiatives arising from the ICT strategies for schools (e.g. Digital Horizons), the tertiary education and information strategies (e.g. the Interim Tertiary e-Learning Framework), and Project PROBE.

# realising the benefits



	ACTION	TARGET	AGENCIES RESPONSIBLE
1.	<p>Develop an Education Sector Architecture Framework (ESAF)</p> <p>The focus will be on:</p> <ul style="list-style-type: none"> <li>• open, standards-based interoperability so that people and organisations can exchange and use data; and</li> <li>• information, knowledge and associated learning services, wherever they are, regardless of the hardware or software they use.</li> </ul>	2005	Ministry of Education, Tertiary Education Commission, Education Review Office, National Library, New Zealand Qualifications Authority in consultation with the Teachers' Council and Careers Service.
2.	<p>Develop an integrated e-learning strategy</p> <p>Development of an e-learning strategy that encompasses pre-school to tertiary education. The scope will include:</p> <ul style="list-style-type: none"> <li>• one vision and set of principles for learning in New Zealand; and</li> <li>• the mapping of inter-dependencies and synergies between capability development initiatives within pre-school, school and tertiary institutions.</li> </ul> <p>This strategy will build on the Interim Tertiary e-Learning Framework (see Appendix).</p>	2006	Ministry of Education.



#### LANDONLINE

Initiated by Land Information New Zealand (LINZ), Landonline is an information technology project that has converted millions of title records, title instruments, plans, parcels and geodetic survey marks into electronic format. LINZ staff and customers (land professionals such as surveyors, conveyancers and search agents) are changing the way they work, moving from a traditional paper-based system to an electronic environment.

The project exemplifies much of the e-government vision, using new technologies to provide more convenient access to government information and services, whilst improving the quality of services. It moves the government's management of land information into the 21st century. See [www.landonline.govt.nz](http://www.landonline.govt.nz)

#### THE PERSONAL PROPERTY SECURITIES REGISTER (PPSR)

Implemented on 1 May 2002, the PPSR is a form of electronic notice board recording specific details of security interests held in respect of personal property. Anyone can search for and view information held in the PPSR. It is accessible via the Internet 24 hours a day, seven days a week. The PPSR replaced the following paper registers of security interests:

- the Chattels Registers at the High Court;
- the Motor Vehicle Securities Register;
- the register of industrial and provident society charges at the Companies Office; and
- the register of company charges at the Companies Office.

See [www.ppsr.govt.nz](http://www.ppsr.govt.nz)

# realising the benefits



## COMPANIES OFFICE

At [www.companies.govt.nz](http://www.companies.govt.nz), companies can be incorporated in minutes, at any registry in New Zealand. Features include:

- quality certificates of incorporation are generated and emailed within a few minutes;
- no paper documentation is required;
- model consent forms for directors and shareholders are supplied;
- fees are charged to the customer's account with the Companies Office; and
- online incorporation documents can be viewed by conducting a Current Name Search.

## IR-FILE

A service of Inland Revenue, ir-File is a system that enables employers to send their employer monthly schedules electronically to Inland Revenue via the Internet. The schedules can be created by completing an on-screen form similar to the printed form or directly from existing data in compatible payroll software programs. Employers whose annual PAYE deductions are over \$100,000 must file their employer monthly schedules using ir-File. Any other employer may file electronically if they wish.

See <https://ir-file.ird.govt.nz>

## STUDENT MANAGEMENT SYSTEMS ACCREDITATION FRAMEWORK

In collaboration with schools, commercial vendors and the wider sector, the Ministry of Education has established an accreditation framework for vendors of School Management Systems. The accreditation system aims to improve the integrity, stability and accessibility of student management systems, thereby assisting schools in their management processes and decision-making. Systems have a range of functions, e.g. recording student information, student achievement, attendance details, financial management, timetabling and library management. The accreditation framework will also provide a lead towards more consistency in the way that data is transferred between the various systems and the Ministry. By mid-2004, the first round of system and vendor accreditation will have been completed and the strategy and sector training for phase two will begin rolling out.





# where to next

The completion of this draft Digital Strategy concludes phase 1 of the Digital Strategy. Phase 1 was an inter-departmental process to develop this draft Digital Strategy, across the whole of government, in order for its release for public consultation. Two additional phases will follow:

- the consultation phase; and
- the implementation phase.

## 5.1 CONSULTATION PHASE

### AIM:

The aim of this phase is to receive your input on this draft Digital Strategy. Your input is important to us because achieving the vision of this Strategy will affect all New Zealanders. It will affect you when you access health and education services. It will affect your community's access to information and ability to provide new services. It will affect your local businesses' productivity and their ability to develop new products and services and new market opportunities. Finally, it will affect your government's ability to provide more efficient and more accessible services.

Your input is sought on the general direction and the specific actions contained in this document. In particular, we want your feedback on:

- which actions you feel are most important to address the outcomes in the six focus areas of this Strategy; and/or
- if you think there are other actions that are missing that need to be considered alongside the ones we have listed.

Your input will assist us to prioritise the key actions in this document, which will be reflected in the finalised Strategy. The finalised Digital Strategy will be published later in the year after your input has been carefully considered.

### ACTION:

Government agencies will be consulting and receiving input on the draft Strategy from a wide cross-section of New Zealanders. This will include:

- industry, including the ICT industry itself;
- community and voluntary groups;
- the research community;
- the cultural and information sector, for example libraries;
- Māori; and
- sector-specific professionals in health and education.

Government agencies will conduct a number of industry and community fora, hold meetings with specific interest groups, write to groups and key individuals and make the draft Strategy and related documents available online.

Three documents will be available during the consultation phase:

- the draft Digital Strategy;
- a summary document highlighting the key points of the draft Strategy; and
- the submission form to gather your input (this is attached at the back of this document and contains questions on each chapter of the draft Strategy).

Copies of these documents will be available at industry and community fora and meetings. The documents will also be accessible online from agency web sites.





#### KEY DATES

- 18 June 2004: Consultation on the draft Digital Strategy begins.
- 16 August 2004: All feedback submission forms must be submitted by 5pm on this date.
- October 2004: Release of the finalised Digital Strategy.

## 5.2 IMPLEMENTATION PHASE

### AIM:

The aim of this phase is to implement the finalised Digital Strategy by a range of government agencies. Particular focus will be on the key actions of the finalised Strategy that will be prioritised with you during the consultation phase.

The implementation phase will continue for the next five years.

### ACTION:

Agencies implementing new actions proposed in this Strategy will need to go through the normal Budget process before the actions can be confirmed as government policy and receive funding.

Each new action will require further detailed policy development, costings and performance indicators for the Budget process. This will require agencies to continue to work, in partnership, with industry, communities, the cultural and information sectors, Māori and health and education professionals to develop the detailed implementation plans required.

During the implementation phase, the Digital Strategy and approved actions will be regularly reviewed and updated if necessary. It is important that the Strategy and action plans can be adjusted to maximise emerging opportunities and address new challenges.

#### KEY DATES

- October 2004: Detailed implementation of the Digital Strategy and action plans begins. New actions will require further policy development, costings and performance indicators to be developed for Budget 2005/2006.
- Budget 2006/2007 to 2009/2010: Continued implementation of the Digital Strategy and action plans.



# appendix 1:

## government ICT-related strategies

Over the past four years the government has devised and implemented a number of strategies and initiatives to address ICT-related issues. They include legislative reform, the delivery of government services, business capability building, education, initiatives and programmes addressing social inclusion, and infrastructure development.

### E-GOVERNMENT STRATEGY

A strategy to implement e-government in the New Zealand public sector with the goal that by 2010, the operation of government will have been transformed by its use of the Internet.

### DIGITAL HORIZONS 2003

Digital Horizons is the revised strategy for schools on Learning through Information and Communication Technologies, which developed a school ICT infrastructure, capability and programmes. This strategy focuses on helping schools to extend their use of ICT to support new ways of teaching and learning.

### TERTIARY EDUCATION STRATEGY 2002/07

The Tertiary Education Strategy 2002/07 (TES) lays out a series of proposed changes to New Zealand's tertiary education system to better support our national development goals and to respond to the challenges of globalisation, accelerating technological change and the knowledge society. E-learning is mandated by the first strategy 'to strengthen system capability and quality'.

### INTERIM TERTIARY E-LEARNING FRAMEWORK 2004

This provides high-level direction for the development of tertiary sector e-learning capabilities. An action plan is currently being developed to co-ordinate national initiatives centrally in partnership with the tertiary education sector and in collaboration with government agencies and other stakeholders including learners, iwi, community groups and businesses.

It is anticipated that this interim framework will eventually be superseded by an integrated pan-sector e-learning strategy which will encompass schools and the early childhood sector as well as the tertiary sector.

### E-COMMERCE STRATEGY

The strategy aims to increase the uptake and use of e-commerce by New Zealand businesses with the vision that New Zealand will be world class in embracing e-commerce for competitive advantage.

### CONNECTING COMMUNITIES STRATEGY

The Strategy aims to increase the ability of communities to access, participate and efficiently use ICTs, particularly to enhance social inclusion and assist in community-building. A national conference was held last year to identify the high-level priorities for community ICT development. The conference report is available from [www.connectingcommunities.govt.nz](http://www.connectingcommunities.govt.nz)

### FLAXROOTS TECHNOLOGY

Flaxroots Technology is a resource portal for the community and voluntary sector that encourages community development through the uptake of ICT. In 2000 and 2002, Flaxroots Technology conferences were organised for people interested in using the Internet and other new technologies to build stronger communities.

Source: [www.flaxroots.net.nz/index.html](http://www.flaxroots.net.nz/index.html)



#### NATIONAL LIBRARY'S DIGITAL STRATEGY

A strategy to manage the preservation of digital content and digitise the heritage collection to make it more accessible.

#### ICT TASKFORCE

The ICT Taskforce was established in 2003 by the government because ICT was identified for special attention because of its high growth potential as a sector and for its significant horizontal enabling effects across the economy. The Taskforce, made up of successful private sector entrepreneurs, provided a report with a number of recommendations designed to achieve a growth target of 100 ICT companies with \$100 million in annual sales by 2012, thereby contributing 10% of New Zealand's GDP. The key finding of the Taskforce is that New Zealand ICT companies tend to hit a barrier and plateau at a point between \$10 million and \$15 million in annual sales. The Taskforce believes that this barrier could be overcome with sufficient mentoring, education and support for executives.

#### PROJECT PROBE

A provincial broadband extension project, that aims to ensure that all schools and their surrounding communities have access to broadband by the end of 2004.

#### LEGISLATIVE REFORM

The following legislation has been passed:

- **Electronic Transactions Act 2002:** To enable statutory requirements to be met for information to be in writing, signed, retained or produced using electronic methods;
  - **Telecommunications Act 2001:** To improve competition in the supply of telecommunications services;
  - **Crimes Amendment Act 2003 (No. 6):** To criminalise unauthorised access to a computer and unauthorised use of or damage to information held on computer systems;
  - **intellectual property:** A continuing programme of legislative work, notably recent work on digital technology and the Copyright Act 1994; and
  - **National Library of New Zealand Te Puna Mātauranga o Aotearoa Act 2003:** To extend the requirements for legal deposit in the National Library, for electronic publications. Legal deposit is mandated to preserve and provide access to the National Library's collections.
- In addition, the following are directly relevant to building e-New Zealand:
- **the Growth and Innovation Framework:** Intended to increase New Zealand's sustainable economic growth through innovation by strengthening the foundations, enhancing our innovation framework, developing our skills and talents, increasing our global connectedness, and focusing innovation initiatives in those areas that will have maximum impact;
  - **the Tertiary Education Strategy:** E-learning strategies are part of the Tertiary Education Strategy and have been developed from the Tertiary E-learning Advisory Group report *Highways and Pathways, Exploring New Zealand's E-learning Opportunities*, released in March 2002;
  - **e-local government strategy:** The strategy aims to support the development of e-government initiatives in councils in four main areas: access to local government information and services, innovation in delivery, improved participation, and leadership particularly on education in local e-government and awards as well as setting standards and facilitating local to central government co-operation.

# appendix 2: glossary



**ADSL** Asymmetric Digital Subscriber Line. A technology for delivering a high bit rate link to customers over ordinary copper wire. Data rates can reach 8 Mbps from the exchange to the customer and 640 bps in the other direction.

**Authentication** Determines a user's identity, as well as determining what a user is authorised to access such as secure electronic information held in financial databases. The most common form of authentication is user name and password, although this also provides the lowest level of security.

Source: [www.google.co.nz/search?q=define:Authentication](http://www.google.co.nz/search?q=define:Authentication)

Date of access: 31 March 2004.

**Bandwidth** The data transfer capacity of a telecommunications channel, usually expressed in terms of the number of bits per second that can be transmitted (a bit being one unit of information). Narrow bandwidth would correspond to a dial-up modem with 2400 to 56,000 bits per second while broadband can extend to more than 10,000 times this rate.

**Broadband** High-speed data transmission capability. The OECD defines broadband as in excess of 256,000 bits per second in both directions. The term is commonly used to refer to Internet access via cable modems, DSL (JetStream, for example) and increasingly, wireless technologies (WiFi).

**CAB** The Citizens' Advice Bureaux provide New Zealanders with information to address problems and questions they may have.

**Community** There are a number of ways of defining communities and together they make up the interconnected systems of society. Some approaches include:

- geographic communities, such as suburbs or towns that are often referred to as 'the local communities';
- communities of interest, identity, or circumstance such as the business and its various industry sectors and the research communities;
- the non-profit and voluntary sectors, which are also known as the community sector;
- ethnic and cultural communities;
- communities of interest such as those for hobbies, sports or politics; and
- communities of circumstance, such as youth, parenthood, senior citizens or the disabled.



**Connectivity** The ability to use an electronic network to send and receive information between any locations, devices or business services.

**Creative Commons** Founded by Lawrence Lessig in 2001, the Creative Commons is a not-for-profit organisation devoted to expanding the range of creative work available for others to legally build upon and share.

The Creative Commons allows copyright holders to grant some of their rights to the public while retaining others, through a variety of licensing and contract schemes, which may include dedication to the public domain or open content licensing terms. The intention is to avoid the problems that current copyright laws create for the sharing of information. The project provides several free licences that copyright holders can use when they release their works on the Web.

Source: [http://en.wikipedia.org/wiki/Creative\\_Commons](http://en.wikipedia.org/wiki/Creative_Commons)  
Date of access: 26 March 2004.

**Data** A set of one or more items of information inside an information technology system that is stored, processed or transferred.

Source: Deeson, Eric, *Collins Dictionary of Information Technology*, William Collins, 1991.

**Digital divide** The term 'digital divide' was coined in the 1990s to describe the perceived growing gap between those who have access to and the skills to use ICT and those who, for socio-economic and/or geographical reasons, have limited or no access. There was a particular concern that ICT would exacerbate existing inequalities. A number of areas of specific concern were identified both here and abroad, namely that people could be disadvantaged by their geographic location, age, gender, culture and/or economic status.

**Digital literacy** The ability to use digital technology, communication tools or networks to locate, evaluate and use and create information. See also *information literacy*.

Source: Interim Tertiary e-Learning Framework 2004, Ministry of Education.

**Disruptive technology** This term was coined by Clayton M. Christensen to describe a new, low-cost, often simpler technology that displaces an existing sustaining technology. Disruptive technologies are usually initially inferior to the technology that they displace, but their low cost creates a market that induces technological and economic network effects that provide the incentive to enhance them to match and surpass the previous technology. They create new industries, but eventually change the world. Examples include the internal combustion engine, transistors and the Internet.

Source: [http://en.wikipedia.org/wiki/Disruptive\\_technology](http://en.wikipedia.org/wiki/Disruptive_technology)  
Date of access: 26 March 2004.

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**E-crime** Electronic crime covers offences where a computer or other ICT is used as a tool to commit an offence, is the target of an offence or is used as a storage device in an offence.

Source: [www.police.govt.nz/service/ecrime/brochure.php#whatIsEcrime](http://www.police.govt.nz/service/ecrime/brochure.php#whatIsEcrime)

Date of access: 22 March 2004.

**e-GIF** The E-Government Interoperability Framework is a significant tool to enable agencies to work together electronically in a spirit of collaboration. It allows agencies to focus on the business of integrating their services for people without having to decide on competing technology standards. In the e-government context, interoperability relates specifically to the electronic systems that support business processes between agencies and between government and people and business. It does not mean that a central agency will dictate common systems and processes. Interoperability can be achieved by the application of a framework of policies, standards and guidelines, that leave decisions about specific hardware and software solutions open for individual agencies or clusters of agencies to resolve.

Source: [www.e-government.govt.nz/docs/e-gif-v-2/chapter4.html](http://www.e-government.govt.nz/docs/e-gif-v-2/chapter4.html)

Date of access: 31 March 2004.

**E-health** Involves the electronic enablement of the health and disability support services in order to:

- empower individuals and their families to manage their own health and participation better;
- improve the co-ordination and integration of care delivery to individuals; and
- allow population health initiatives such as mapping notifiable diseases to occur in a timely fashion.

Source: Advice to the incoming Minister of Health, Ministry of Health.

Date of access: 31 March 2004.

**E-learning** Learning that is facilitated by the use of digital tools and content. Typically, it involves some form of interactivity, which may include online interaction between the learner and their teacher or peers.

Source: Interim Tertiary e-Learning Framework 2004, Ministry of Education.

**E-science** Defined as science that is performed through distributed global collaborations that are enabled by the Internet. E-science uses very large data collections, computing resources and high-performance technologies.

Source: <http://e-science.ox.ac.uk/public/general/definitions.xml>

Date of access: 31 March 2004.



**Electronic Rights Management Information (ERMI)** A set of systems for identifying content, protecting copyright and tracking the usage of electronic information.

Source: Interim Tertiary e-Learning Framework 2004, Ministry of Education.

**GDP** Gross domestic product is a measure of the size of the economy of a particular territory. It is defined as the total value of all goods and services produced within that territory during a specified period (most commonly, per year).

Source: [http://en.wikipedia.org/wiki/Gross\\_domestic\\_product](http://en.wikipedia.org/wiki/Gross_domestic_product)

Date of access: 24 March 2004.

**GIF** The Growth and Innovation Framework was released in February 2002 to set out the government's sustainable economic growth objectives. The framework laid out what the government and the private sector must do to achieve higher sustainable economic growth.

Source: [www.med.govt.nz/irdev/econ\\_dev/growth-innovation/index.html](http://www.med.govt.nz/irdev/econ_dev/growth-innovation/index.html)

Date of access: 25 March 2004.

**Health Level Seven or HL7** was founded in 1987 to develop international standards for the electronic interchange of clinical, financial and administrative information among independent health care oriented computer systems, such as hospital information systems, clinical laboratory systems, enterprise systems and pharmacy systems. HL7 is an application protocol for electronic data exchange in health care.

The HL7 protocol is a collection of standard formats that specify the implementation of interfaces between computer applications from different vendors. This communication protocol allows health care institutions to exchange key sets of data among different application systems. Furthermore, the HL7 protocols are not rigid. Flexibility is built into the protocol to allow compatibility for specialised datasets that have facility-specific needs.

Source: <http://165.158.1.110/english/hsp/hspih70.htm#def>

Date of access: 13 May 2004.

**ICT sector** In New Zealand, the ICT sector is an agglomeration of the communications sector, including telecommunications providers, and the information technology sector, which ranges from small software development firms to multi-national hardware and software producers.

Source: Growth and Innovation Framework, Ministry of Economic Development.

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**ICT Taskforce** The ICT Taskforce was established in response to the government's Growth and Innovation Framework. It has four related goals, which are to enhance the existing innovation framework, develop skills and talent, increase global connectedness and focus effort for maximum gain.

The Taskforce comprised a tightly focused group of New Zealand ICT business leaders with relevant commercial experience. It reported into the growth potential of New Zealand ICT and identified the collective private sector and government contributions needed to achieve this potential.

Source: *Breaking Through the Barriers*, ICT Taskforce.  
Published June 2003.

**Infomediary** An information intermediary is usually a public librarian or Citizens' Advice Bureaux volunteer who provides face-to-face access to and assistance with government information. Infomediaries help alleviate equity concerns that may arise in connection with e-government where inadequate levels of information literacy, lack of access to technology, matters of trust and confidence or personal preferences make face-to-face delivery preferable.

**Information** This term has many meanings depending on the context. For example, it is often related to such concepts as meaning, knowledge, communication, truth, representation, and mental stimulus. See also *Information Society*.

Source: <http://en.wikipedia.org/wiki/Information>  
Date of access: 26 March 2004.

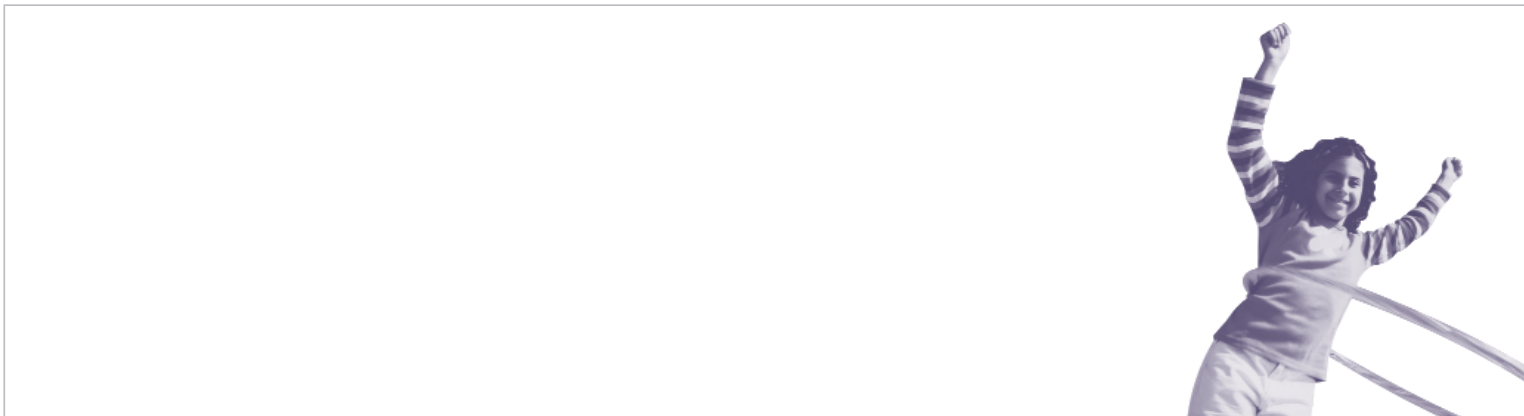
**Information literacy** The life-long ability to locate, evaluate, use and create information. See also *digital literacy*.

Source: Interim Tertiary e-Learning Framework 2004, Ministry of Education.

**Information Society** A term for a society in which the creation, distribution and manipulation of information has become the most significant economic and cultural activity. An Information Society may be contrasted with societies in which the economic underpinning is primarily industrial or agrarian. The machine tools of the Information Society are computers and telecommunications, rather than lathes or ploughs.

Source: [http://whatis.techtarget.com/definition/0,,sid9\\_gci213588,00.html](http://whatis.techtarget.com/definition/0,,sid9_gci213588,00.html)  
Date of access: 25 March 2004.





**Innovation** The creation, development and implementation of a new product, process or service, with the aim of improving efficiency, effectiveness or competitive advantage. Innovation may apply to products, services, manufacturing processes, managerial processes or the design of an organisation. It is most often viewed at a product or process level, where product innovation satisfies a customer's needs and process innovation improves efficiency and effectiveness. Innovation is linked to creativity and the creation of new ideas, and involves taking those new ideas and turning them into reality through invention, research and new product development.

Source: [www.economist.com/encyclopedia/Dictionary.cfm?id=ID484B429C-85B2-11D5-8498-00508B2CCA66](http://www.economist.com/encyclopedia/Dictionary.cfm?id=ID484B429C-85B2-11D5-8498-00508B2CCA66)

Date of access: 25 March 2004.

**Intellectual property** Very broadly means the legal rights that result from intellectual activity in the industrial, scientific, literary and artistic fields. Countries have laws to protect intellectual property, for two main reasons: to give statutory expression to the moral and economic rights of creators in their creations and the rights of the public in access to those creations; and to promote, as a deliberate act of government policy, creativity and the dissemination and application of its results, and encourage the fair trading that contributes to economic and social development.

Intellectual property is traditionally divided into two branches: industrial property and copyright. Industrial property includes inventions (patents), trademarks, industrial designs and geographic indications of source and copyright includes literary and artistic works.

Source: [www.wipo.int/about-ip/en/iprm/pdf/ch1.pdf](http://www.wipo.int/about-ip/en/iprm/pdf/ch1.pdf)

Date of access: 25 March 2004.

**Inter-modal competition** Refers to competition between dissimilar technologies, such as ADSL and wireless technologies. Intra-modal competition refers to competition between similar technologies.

**Interoperability** The ability of two or more systems or components to exchange information and to use the information that has been exchanged.

Source: [www.sei.cmu.edu/str/indexes/glossary/interoperability.html](http://www.sei.cmu.edu/str/indexes/glossary/interoperability.html)

Date of access: 25 March 2004.

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**IP** The Internet Protocol is a network-layer protocol that contains addressing information and some control information that enables packets of data to be routed between hosts on the Internet.

Source: [www.cisco.com/univercd/cc/td/doc/cisintwk/ito\\_doc/ip.htm#xtocid2](http://www.cisco.com/univercd/cc/td/doc/cisintwk/ito_doc/ip.htm#xtocid2)

Date of access: 31 March 2004.

**ITU** The International Telecommunications Union is headquartered in Geneva, Switzerland and is an international organisation within the United Nations where governments and the private sector co-ordinate global telecom networks and services.

Source: [www.itu.int/aboutitu/overview/purposes.html](http://www.itu.int/aboutitu/overview/purposes.html)

Date of access: 26 March 2004.

**Kiwi Share** A contractual agreement between the Crown and Telecom that enables the government to meet its social objectives in telecommunications. The Kiwi Share was established when Telecom was privatised in 1990. Kiwi Share requires Telecom to maintain a local free calling option for ordinary residential telephone services; charge no more than the standard residential rental for ordinary residential telephone services; and continue to make ordinary residential telephone services as widely available as at 1 November 1989. It was renegotiated in 2001 to become the Telecommunications Service Obligation (TSO).

Source: [www.med.govt.nz/pbt/telecom/minister20011218b.html#P25\\_18](http://www.med.govt.nz/pbt/telecom/minister20011218b.html#P25_18)

Date of access: 24 March 2004.

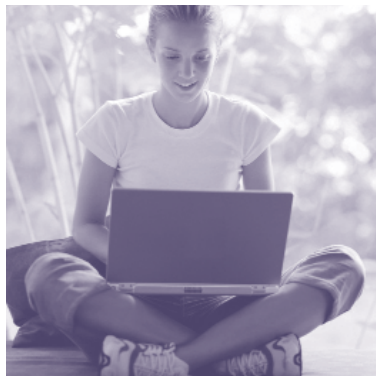
**Knowledge** Is built up from interaction with the world, and is organised and stored in each individual's mind. It is also stored on an organisational level within the minds of employees and in paper and electronic records. Two forms of knowledge can be distinguished: tacit, or implicit knowledge, which is held in a person's mind and is instinctively known without being formulated into words; and explicit knowledge, which has been communicated to others and is held in written documents and procedures. Organisations are increasingly recognising the value of knowledge, and many employees are now recognised as knowledge workers.

Source: [www.economist.com/encyclopedia/Dictionary.cfm?id=ID8D7478EF-8E5B-11D5-8499-00508B2CCA66](http://www.economist.com/encyclopedia/Dictionary.cfm?id=ID8D7478EF-8E5B-11D5-8499-00508B2CCA66)

Date of access: 24 March 2004.

**Knowledge society** A society that creates, shares and uses knowledge for the prosperity and well-being of its people.

Source: Interim Tertiary e-Learning Framework 2004, Ministry of Education.



**Local loop unbundling** Broadband is considered important for economic growth and productivity. Most OECD governments have based their policies for expanding broadband infrastructures and services on the development of competition based on a framework that ensures fair and non-discriminatory conditions of access to network resources and unrestricted competition for provision of services.

Many countries have expanded their established regulatory telecommunication frameworks to ensure that new entrants and Internet service providers can compete with incumbents in offering broadband access and services. In recent years, a number of OECD countries have required the incumbent facility-based operators to offer local loop unbundling (LLU) to new access seekers. Unbundling, as a policy, is built on the recognition that incumbent carriers have a dominant position in the provision of local communication access by virtue of their control over the local loop.

Source: [www.oecd.org/document/22/0,2340,en\\_2649\\_34225\\_25596246\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/22/0,2340,en_2649_34225_25596246_1_1_1_1,00.html)  
Date of access: 24 March 2004.

**Mbps** Millions of bits per second or megabits per second, a measure of bandwidth or the total information flow over a given time, over a telecommunications medium. Depending on the medium and the transmission method, bandwidth is also sometimes measured in the Kbps (thousands of bits or kilobits per second) range or the Gbps (billions of bits or gigabits per second) range.

Source: [http://whatis.techtarget.com/definition/0,,sid9\\_gci212534,00.html](http://whatis.techtarget.com/definition/0,,sid9_gci212534,00.html)  
Date of access: 31 March 2004.

**Microprocessor** A complex microcircuit (integrated circuit) or set of such chips, that carries out the functions of the processor of an information technology system; that is, it contains a control unit (and clock), an arithmetic and logic unit, and the necessary registers and links to main store and to peripherals.

Source: Deeson, Eric, *Collins Dictionary of information technology*, 1991.

**Moore's Law** In 1965, Gordon Moore predicted that ongoing technological development would result in exponential growth in the number of transistors per integrated circuit and that this trend would continue indefinitely. Over nearly 40 years there has been roughly a doubling of the density of transistors every couple of years, as predicted by Moore's Law.

Source: [www.intel.com/research/silicon/mooreslaw.htm](http://www.intel.com/research/silicon/mooreslaw.htm)  
Date of access: 25 March 2004.

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**Next Generation Internet** is a term used by governments, corporations and educators to describe the future network and the work underway to develop it. The future Internet will be so pervasive, reliable and transparent that it will be taken for granted. It will be a seamless part of life much like electricity or plumbing. However, getting to this will involve exploring technologies and network capacities that are in advance of offerings from commercial providers in terms of bandwidths, communications protocols and services.

Source: [www.ngi.ibm.com/](http://www.ngi.ibm.com/)

Date of access: 26 March 2004.

**OECD** The Organisation for Economic Co-operation and Development comprises 30 member countries sharing a commitment to democratic government and the market economy. Its work covers economic and social issues, from macroeconomics to trade, education, development and science and innovation.

Source: [www.oecd.org/about/0,2337,en\\_2649\\_201185\\_1\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/about/0,2337,en_2649_201185_1_1_1_1_1,00.html)

Date of access: 23 March 2004.

**Print-disabled** In terms of section 69 (4) of the Copyright Act 1994, a person has a print disability if he or she is blind, or suffers a handicap with respect to visual perception. For the purposes of the Digital Strategy, the term is taken to cover the use of ICT devices.

Source: Copyright Act 1994, Section 69 (4).

**Radio frequency** A location or band on the radio frequency spectrum, such as 800, 900 or 1800 Mhz.

Source: International Telecommunications Union *World Telecommunication Development Report 2003: Access Indicators for the Information Society*.

**RFID** Radio frequency identification first appeared in tracking and access applications during the 1980s. These wireless systems allow for non-contact reading and are effective in manufacturing and other hostile environments where barcode labels may not survive. RFID has established itself in a wide range of markets including livestock identification and automated vehicle identification systems because of its ability to track moving objects.

Source: [www.aimglobal.org/technologies/rfid/](http://www.aimglobal.org/technologies/rfid/)

Date of access: 31 March 2004.



**SMEs** Small and medium-sized enterprises. There is no official definition of an SME in New Zealand but it is usually taken to be a firm of up to 50 full-time equivalent employees (FTEs). SMEs in other countries tend to be much larger than those found in New Zealand (up to several hundred FTEs). New Zealand SMEs are typically individually owned and managed, with few if any specialist managerial staff, and are not part of a larger business enterprise. Firms with fewer than 50 employees constitute 99% of New Zealand enterprises, and account for approximately 49% of total output.

Source: *OECD Small and Medium Enterprise Outlook*, 2002, Paris.

**Spam** Unsolicited bulk email that is largely commercial in nature.

Source: [www.police.govt.nz/safety/internet.scams.php](http://www.police.govt.nz/safety/internet.scams.php)

Date of access: 22 March 2004.

**TSO** Telecommunications Service Obligation. See *Kiwi Share*.

**WSIS** The World Summit on the Information Society was endorsed by the United Nations General Assembly. Resolution 56/183 (21 December 2001) endorsed holding WSIS in two phases. The first phase took place in Geneva in December 2003 and the second phase will take place in Tunis in November 2005.

The objective of the first phase was to develop and foster a clear statement of political will and take concrete steps to establish the foundations for an Information Society for all, reflecting all the different interests at stake.

The second phase involves a process of monitoring and evaluation of the progress of feasible actions outlined in Geneva and a concrete set of deliverables that must be achieved by the time the Summit meets again in Tunis in November 2005.

Source: [www.itu.int/wsis/basic/about.html](http://www.itu.int/wsis/basic/about.html)

Date of access: 26 March 2004.





