# .nz

# New Zealand

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|---|---|
| GDP per capita | USD 24,498 (USD 1 = NZD 1.44) |
| Computers per 100 inhabitants | 62 |
| Fixed-line telephones per 100 inhabitants | 96 |
| Mobile phone subscribers per 100 inhabitants | 74.2 |
| Internet users per 100 inhabitants | 60.5 |
| Domain names registered under .nz | 261,283 |
| Broadband subscribers per 100 inhabitants | 11.5 |
| Internet domestic bandwidth | 10 Gbps (2006) |
| Internet international bandwidth: | 300 Gbps (2006) (~500 Gbps potential) |

## Introduction

New Zealand (Aotearoa) is a country of over four million people located to the east of Australia and at the southwestern edge of the Pacific Ocean. First settled by Polynesian seafarers around 800 years ago, New Zealand became a focus for European colonization after the signing of the Treaty of Waitangi (te Tiriti o Waitangi) by Māori chiefs and the British Crown in 1840. The Treaty establishes a unique model of biculturalism where the rights of indigenous Māori are protected alongside those of the Crown. New Zealand has been an independent state within the Commonwealth since 1947.

Post independence, New Zealand was heralded as a leader in the development of social welfare systems. During the 1980s, it was at the forefront of neo-liberal economic transformations, dramatically reducing the role of the State and the size of the public sector through a policy of privatizing State Owned Enterprises. New Zealand today is experiencing a moderate swing back to greater government intervention with the repurchase of public assets such as railway tracks and the introduction of legislation that recognizes the national interest in areas such as telecommunications and aviation. The country is also becoming more ethnically diverse, the result of changes to immigration policy dating back to 1987. New Zealand today is 79 per cent European, 15 per cent Māori, 7 per cent Pacific peoples and 7 per cent Asian. However, the relative size of the European population is falling and by 2021 the Asian population will reach 15 per cent. One in five New Zealanders—one in three in Auckland—was born overseas (Statistics New Zealand 2002b, 2003).

New Zealand is well positioned in terms of the uptake and use of ICT. It is one of the highest per capita users of the Internet. However, it lags behind the OECD average in terms of broadband adoption and telecommunications infrastructure investment. Where New Zealand has made significant progress is through the Digital Strategy released in 2005, which takes a 'whole of government' approach rather than isolating ICT within a single Ministry. This strategy brings together existing work and identifies new legislation and funding opportunities to make New Zealand 'a world leader in using information and technology to realize its economic, social, environmental and cultural goals, to the benefit of all its people' (New Zealand Government 2005, p. 4). It is overseen by a core group of 'Digital Ministers' within the Cabinet and operationalized through a Digital Strategy Steering Group, external Advisory Group and Secretariat that works across all government ministries, departments and agencies. The Digital Strategy is derived in part from the World Summit on the Information Society (WSIS) model targeting the benefit of ICT for government, business and civil society, and it is achieved through three areas—content, confidence and connection.

## Digital content initiatives

New Zealand has a wealth of digital content producers, ranging from world-renowned Weta Digital, made famous by movies such as 'Lord of the Rings' and 'King Kong', to small local companies, such as video and interactive designer Oktobor and Web developers Springload who designed the 2006 Webby Award-winning New Zealand Festival website (www.nzfestival.telecom.co.nz). New Zealand Tourism's international travel website (www.newzealand.com), built around the Shado customer management system from New Zealand-based Straker Interactive, is another Webby-winning example of innovative

digital content. NZLive.com was launched in September 2006. Managed by the Ministry of Culture and Heritage, it links existing content and events in the creative sector.

### Hector the Protector (www.netsafe.org.nz)

Hector the Protector is New Zealand's Internet safety ambassador. Developed by The Internet Safety Group with support from Microsoft New Zealand and produced by Inkspot Digital, Hector is an easy way to educate children and keep them safe online. Named after New Zealand's rare Hectors Dolphin, Hector is downloaded and floats—or swims—in the corner of the screen. If something upsetting or inappropriate appears on the screen, the child can click on Hector and the screen is blanked out with an underwater scene and a reassuring message. At this point, Hector encourages the child to seek some help from an adult. The Hector button is supported by a set of Web-based resources and a recently released short animation for children, with more episodes in development.

Public digital content is being brought together through the National Digital Forum. The Digital Content Strategy, a subset of the Digital Strategy, is currently under development, led by the National Library. The Digital Content Strategy defines content in its broadest sense and aims to address economic, social and cultural challenges and opportunities. It targets two outcomes:

- New Zealanders will create, access, share, use, preserve and protect a broad range of quality content that supports the push to transform the economy and strengthen national identity and community; and
- Businesses will be digital content savvy and New Zealand will have a strong and internationally competitive digital content industry.

The Digital Content Strategy acknowledges formal content, such as that originating from research, libraries and museums, informal content such as that from community groups and blogs and commercial content created for profit. It is based around a framework that recognizes the need for content to be created and, where appropriate, commercialized; the need for appropriate models governing access and sharing of content, including creative commons; and the need for enhanced understanding of digital content and guidance on the protection and preservation of content.

The outcomes are to be achieved through a range of initiatives (at this stage, 16 are defined). These include 'Digital New Zealand', which is a programme to increase the responsiveness of the community, business and government sectors to digital content opportunities and challenges, an annual showcase of digital talent, funding and business development programmes, skill enhancement through targeted and general ICT access programmes, the development of standards and a framework for content repositories, and a national content portal.

## Online services

New Zealanders have historically been quick adopters of new technology, as demonstrated in their high usage of electronic point-of-sale transactions and electronic and Internet banking. In 2004, 96 per cent of adults had a telephone at home and 71 per cent had access to a mobile telephone (ITU 2004). Over 65 per cent of adults had Internet access, the 8th highest Internet penetration rate in the OECD and up from 37 per cent in 2000. This figure rises to 70 per cent in the 18–64 age group (Ministry of Social Development 2006). Among the New Zealand population groups, Pacific people were least likely to have Internet access (39.5 per cent), followed by Māori (45 per cent). Māori also experienced the lowest growth in Internet usage over the fours years to 2004. And despite overall high levels of Internet use, New Zealand ranks poorly in terms of the transition to broadband, with only 11.5 per cent of the population having access to a broadband connection (OECD 2005).

All mainstream media are available online and news aggregation, portal and shopping sites are popular. Demonstrating the changing demographic of New Zealand are sites such as SkyKiwi (www.skykiwi.com), a website for Chinese-speaking New Zealanders. Local auction website 'Trade Me' is consistently New Zealand's top-ranking website and has over one-third of the population as registered users and over 700,000 auctions live at any one time. It was recently sold to Australian media conglomerate Fairfax for NZD 700 million. Telecom established an online retail presence last year with the launch of Ferrit, a site that aggregates new products from over 125 retailers. Other popular websites include NZDating, the major banks, and news portals such as Stuff, XtraMSN and the *New Zealand Herald*.

Research suggests that proximity of Internet access in part determines usage and value, such that those with access at home or work report being more satisfied with the Internet as a tool and more reliant on it than those without immediate access (Williamson and Dekkers 2005). There is a strong correlation between income and access to ICT in New Zealand (as elsewhere). The urban poor, those living in rural locations, and the elderly are more likely to lack Internet access at home (Craig 2003).

According to the 2001 census, 50 per cent of those owning their own home had Internet access as opposed to only 11 per cent of those living in State or local authority rental housing (Statistics New Zealand 2002a). Only 50 per cent of single-parent families have Internet access at home, compared to 78 per cent of two-parent families (Ministry of Social Development 2006). As a result, many community ICT initiatives are focused on providing ICT access within the local community and developing ICT literacy skills (Craig and Williamson 2005).

The New Zealand e-Government Strategy states that by June 2007 ICT will be an integral part of the delivery of government information, services and processes, and that by mid-2010, government operations will have been transformed through the use of the Internet (State Services Commission 2001). The State Service Commission's 2004 review shows that many agencies now have downloadable versions of forms and a significant number are offering fully online services. This could provide significant cost savings to end-users since a survey of interactions with government agencies shows that obtaining forms was the primary activity of respondents (Curtis et al. 2004). While the security and authentication of users of online government services is currently an issue for both end-users and agencies, a project is underway to identify and implement solutions across all government agencies (New Zealand Government 2004).

Two government agencies that stand out in terms of their current level of online service delivery are the New Zealand Customs Service (www.customs.govt.nz) and the Inland Revenue Department (www.ird.govt.nz).

### The Inland Revenue Department online (www.ird.govt.nz)

The Inland Revenue Department (IRD), a leader in government use of the Internet, has an extensive range of online service and payment options for individual and company tax payers. The IRD site allows visitors to complete most standard taxation forms electronically, to register for key services, such as Goods and Services Tax, and to communicate via a secure e-mail system. There is integration with New Zealand Post's online 'change of address system' and payment interfaces that provide secure payment from the online banking system of all major banks.

## ICT industries

ICT is one of the three focus areas for the government's Growth and Innovation Framework (GIF). The key objective is to increase the sector's contribution to GDP from 4.3 per cent to 10 per cent by 2012. This will occur by developing programmes that target globally competitive businesses, sustaining (and growing) a skilled ICT workforce, building a culture of entrepreneurship and targeting government regulatory changes to support the industry.

New Zealand is a market of overseas vendors and local ICT companies the majority of which appear focused primarily on the domestic market. It is estimated that the industry is made up of around 2,000 businesses employing two or more people. It generated NZD 14.3 billion in sales of ICT-related goods and services in the 2005 financial year, of which NZD 1.1 billion was exported (Griffin and Muller 2005; Statistics New Zealand 2006). Of the total sales, 55 per cent was for ICT services, 34 per cent for telecommunications and programme distribution services, and 5 per cent for software. Major employers in the sector include Microsoft, IBM, Vodafone and local companies Datacom, Gen-I and Eagle. Christchurch-based companies Tait Electronics, Jade and UK-owned Allied Telesis, as well as Auckland-based (but US-owned) Navman, are internationally recognized examples of New Zealand's innovative ICT industry.

According to the Ministry of Economic Development (2004), small and medium-sized enterprises (SMEs) account for 97 per cent of New Zealand's businesses and 38 per cent of total economic output. This demographic is reflected in the ICT sector where 84 per cent of businesses were classified as SMEs. However, the 'large enterprises' that made up only 6 per cent of the ICT sector accounted for 79 per cent of total sales.

## Enabling policies and programmes

The value of ICT for community development was first recognized at a policy level through the Connecting Communities Strategy (Community Employment Group 2002) and latterly in the Digital Strategy. Defining a 'connected community' as one that uses ICT as an enabler to reach its goals and needs effectively and efficiently, Connecting Communities aimed to improve access to and effective use of ICT amongst communities. More recently, the Draft Digital Strategy (New Zealand Government 2004) was published, followed a year later by the full strategy (New Zealand Government 2005). This 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' (p. 2) and sets out to create the conditions necessary for this through three interrelated areas (p. 3):

1. Content: Information made available via digital networks
2. Confidence and capability: The necessary skills to use ICT effectively
3. Connection: Affordable access to ICT infrastructure

The Digital Strategy is significant in that it signals a realization that a whole government approach to ICT is required and that, even in a 'developed' country such as New Zealand, ubiquity and sustainability of ICT, or innovation through ICT, cannot be assumed. The model used in the strategy is internationally significant because it emerged through the 1st World Summit on the Information Society (WSIS 2004) and adopts the WSIS tri-sectoral model of government, business and civil society (or community). The Digital Strategy sets out a platform for ICT up to 2010 that, in order to be made operational, must then be aligned with the government's current key policy platforms of economic transformation, families and national identity. It also links closely with the government's Growth and Innovation Framework and the Sustainable Development plan.

The strategy commits up to NZD 400 million of funding to a wide range of digital initiatives delivered by government, business and the NGO sector. While some of these are existing work programmes, there is approximately NZD 60 million of new funding aligned with the Growth and Innovation Framework, which includes two competitive funds: the Broadband Challenge (NZD 24 million) focused on broadband infrastructure partnerships in key urban centres, and the Community Partnership Fund (NZD 21 million) which provides matched funding for grassroots ICT initiatives. The strategy encompasses projects such as PROBE (provincial broadband extension), a regional broadband initiative that has been extended to address broadband availability in remote and underserved communities, and a number of projects within the Ministry of Education. The latter includes the innovative Digital Opportunities project, which funds partnerships between schools, ICT organizations, and the Ministry of Education in order to 'improve learning through the innovative use of leading edge technologies' (Ministry of Education 2006, p. 1).

Within a local government context, there is increasing but slow recognition of the role of ICT. Some city and district councils have been notable in their recognition of ICT within a service delivery and community development framework – for example, Porirua, Waitakere for the development of a joint community and council 'Digital city strategy' (Williamson and Edwards 2005), and Wellington, which recently launched an ICT policy that supports community ICT and eDemocracy initiatives in the city (Wellington City Council 2006).

## Legal and regulatory environment

New Zealand is often considered to be lightly regulated in contrast to many other developed countries. However, this has been changing over the last three Labour-led governments and increasingly there is a focus on developing legislation that protects the national interest over allowing market forces to solely determine outcomes.

The government has made a number of legislative changes to address the increasing importance of ICT within business and society. These include the Electronic Transactions Act 2003, which is based on the United Nations Commission on International Trade Law's 'Model Law on Electronic Commerce' and which clarifies the legal position of electronic commerce, and the Unsolicited Electronic Messages Act 2007, which deals with spam. Amendments have been made to existing statutes, such as the Crimes Act 1961, extending definitions to encompass crimes involving computers and communication interception offences. Changes have also been proposed to the Copyright Act 1994 to encompass new digital technologies.

The most significant examples of increased regulation have been in telecommunications, particularly in relation to mobile and broadband Internet. The Telecommunications Act Amendment Bill seeks to regulate the day-to-day management of Telecom New Zealand's physical network to encourage other ISPs to deploy their own broadband equipment. At present, New Zealand permits only bitstream unbundling, which is seen as largely ineffectual in encouraging competition since Telecom still owns and sets the cost and performance levels for the majority of Internet customers (via its ADSL service). The new legislation will fully unbundle the local loop, allowing access to network cabinets and exchanges, and create the provision for naked-DSL, meaning that retail customers will no longer need a Telecom telephone line to receive ADSL. There is also provision in the legislation for the regulatory division of Telecom's wholesale and retail services, following the model adopted by British Telecom in the UK. These changes are significant because New Zealand lags behind other OECD countries in terms of broadband uptake (22nd) and investment in telecommunications infrastructure (also 22nd) (OECD 2005).

Other regulatory activities relate to the operation of the Telecommunications Commissioner to regulate competition in the industry and the government's plan not to automatically renew radio spectrum allocations around 2010, given the emergence of new technologies such as WiMAX and the rapidly changing digital landscape.

## Open source

Although organizations such as the New Zealand Open Source Society (www.nzoss.org.nz) and Openz (www.openz.org) continue to promote the use of open source in New Zealand, the local open source community remains relatively small and

appears to be more focused on promoting global open source tools and standards than on innovating locally. Open source is clearly established in the New Zealand market, as demonstrated by the purchase of local open source pioneer, Asterisk, by commercial heavyweight Gen-I (now itself part of Telecom). Its use is sanctioned at government level where government agencies are encouraged to include open source alternatives in their evaluation, where they exist (State Services Commission 2003). One example of open source adoption is the Ministry of Education's contract with Novell to provide 2600 schools with Linux-based servers and PCs. Examples of locally created open source software include the NZ Open Source Virtual Learning Environment (VLE) Project (eduforge.org/projects/nzvle/) and the Greenstone digital library collections software produced by the New Zealand Digital Library Project at the University of Waikato (www.greenstone.org).

## Research and development

New Zealand universities are undertaking considerable research in the area of ICT. Projects of interest include the Human Interface Technology Laboratory New Zealand (HIT Lab NZ), a human–computer interface research centre at the University of Canterbury and a partner of University of Washington-based HIT Lab US (www.hitlab.org.nz), and MediaLab, an academic and commercial partnership focused on innovative uses of ICT (www.medialab.co.nz).

There is limited but increasing research on ICT4D and community usage of technologies. Waikato University has been funded for some time by the Foundation for Research Science and Technology to undertake research into the economic, strategic and structural impact of ICT in relation to disadvantaged groups. Researchers at Victoria University and Massey University in Wellington have undertaken research into the use of ICT in the community and the voluntary sector. Government-funded research has identified barriers to the uptake and effective use of ICT in the community and the voluntary sector. These include lack of funding and over reliance on volunteers. The research shows that support for ICT is often ad hoc, training is rarely planned and structured, or it is privately funded, if funding is at all available. While there is general recognition that planning is valuable, there appeared to be a dearth of skills in this area and therefore few organizations were effectively planning for the use of ICT (Craig and Williamson 2005). The Families Commission has recently commissioned research to look at how ICT (in particular, the Internet) affects family life, identifying issues such as the ongoing digital divide, cyber safety, the potential to harness children's interest in gaming and the tangible benefits of the Internet and mobile communications to family communication (Weatherall and Ramsay 2006).

## Security issues

A strategic approach to security and confidence in ICT is being developed by the Ministry of Economic Development to 'ensure that there is a clear overall vision to underpin and guide planning and to harmonize actions by government and other participants' (Ministry of Economic Development 2006, p. 7). This draft framework encompasses government, business and civil society and ranges from protecting critical technology infrastructure to data protection, online crimes, spam, Internet safety and education. It follows from an e-Government-centric assessment of Internet-based threats undertaken by the State Services Commission (e-Government Unit 2004) and is intended to raise awareness of security issues in the design and use of ICT. It recognizes that a broad-based culture of security and safety is a prerequisite for building and maintaining confidence in ICT (confidence being one of the three areas within the Digital Strategy).

The Internet Safety Group's most recent survey of home computer users reported that 16 per cent had no (or were not aware of) anti-virus software installed on their computers. This rises to 35 per cent for security software, such as a firewall. Only 52 per cent were proactively ensuring that their operating system was up to date. Of those that did have anti-virus software installed, 76 per cent were updating it regularly (Internet Safety Group 2005b). It appears that small and medium-sized business are more security-conscious than the general public, with 95 per cent having anti-virus software installed and 84 per cent using a firewall. Almost three quarters of businesses reported an ICT-related security incident in the last year. Thirty-six percent identified inappropriate content on a business computer but only 7 per cent had disciplined an employee and 72 per cent did not know where to report computer-related security breaches (Internet Safety Group 2005a).

## Key ICT4D institutions

The Ministry of Education continues to fund community computing programmes, although changes to the funding categories mean that these have been reduced. The Ministry also continues to support projects such as Computers in Homes (www.computersinhomes.org.nz), which is run by the 20/20 Communications Trust (www.2020.org.nz) and provides computers to low-income households with school-age children.

The Digital Strategy's Community Partnerships Fund (CPF) is a contestable fund of NZD 21 million managed by the Department of Internal Affairs. The first funding round recently allocated NZD 6.5 million across 53 projects to support grassroots ICT initiatives that build capacity in or provide resources to communities. Examples of funded projects include an online clearing house for research undertaken on the community and voluntary sector, capturing of community content, community-based digital broadcasting and the establishment of an e-Rider programme (www.eRiders.net) in New Zealand. The fund is designed so that the emphasis is on projects that are scalable and that can become sustainable after the initial government funding ends. Unfortunately, awareness of this contestable fund in the community and voluntary sector appears to be relatively low, with a recent survey reporting only 27 per cent of NGOs aware of it and, of that group, 84 per cent not understanding the eligibility criteria and scope of the fund (NZFVWO 2006).

Also part of the Digital Strategy, the Broadband Challenge fund has recently allocated approximately NZD 2.5 million in funding to partnerships to develop broadband projects that provide access in rural or otherwise underserved communities.

Local non-government programmes also exist, such as Clubhouse 274 (www.clubhouse274.org.nz) which is part of the international Computer Clubhouse model providing a computer-oriented after-school learning environment for young people from underserved communities in South Auckland. Numerous local councils have funded computer facilities and training within their libraries and notable examples include Christchurch, Porirua, Manukau and Waitakere.

## Educational programmes

The Digital Strategy contains considerable reference to ICT initiatives in the compulsory and tertiary education sectors, with an investment of at least NZD 69 million between 2006 and 2010 (New Zealand Government 2005). The Ministry of Education's strategic framework for ICT identifies 65 proposed or existing projects which range from directly supporting student learning to resource development and digital content creation, open-standards network infrastructure deployment and professional development to upskill teachers. (Ministry of Education 2005).

Numerous community ICT training schemes exist in New Zealand. Many of these are by tertiary education providers and are funded through the Ministry of Education's community education budget. Microsoft's Unlimited Potential training was introduced in New Zealand in 2005 and is jointly funded by Microsoft and the Department of Internal Affairs. In New Zealand, the project's UPLIFT programme targets building ICT skills in existing community organizations with a focus on training community workers to train others in their own communities. The programme is operated by Whitireia Community Polytechnic.

The library sector, which in New Zealand is operated by local councils, has been a significant promoter of online access and training. Numerous libraries now provide computer and Internet access and some provide one-on-one or group training. This is likely to be significantly enhanced as a result of the Digital Content Strategy. One of the strategic goals outlined in the Public Libraries Strategic Framework (2006–16) is to enable access such that 'local communities and individuals have access to the digital world and the skills to participate in an informed way free from unnecessary restrictions or charges' (LGNZ et al. 2006, p. 57).

## Technology infrastructure

There is a need to overcome New Zealanders' resistance to broadband and, as discussed earlier, current legislative changes address this from a regulatory perspective. New Zealand has

### Waitakere City's Community Area Network

Developed as a partnership between Waitakere City Council, a local community trust and a private company, the Waitakere City Community Area Network project is one of the five remote and underserved community broadband projects to receive funding from the first round of the government's Broadband Challenge Fund. The project focuses on providing wireless broadband to small communities on the western edge of Auckland that are beyond the reach of ADSL and often have poor mobile coverage. These small-scale, community-based networks use open-access wireless standards to provide a relatively low-cost broadband solution for communities that would otherwise miss out. The network uses a meshing technology to optimize performance and is connected directly to fibre via a long-distance radio link. The project has been designed in a modular way so that it can easily scale up or down depending on demand and be packaged so that it can be used in other isolated communities.

100 per cent broadband coverage through ADSL, wireless and satellite services. ADSL is the primary technology for broadband delivery, servicing 90 per cent of broadband users. Wireless is increasingly seen as a viable alternative with companies such as Call Plus and Woosh investing in WiMAX technologies. There is also activity around public access Wi-Fi, particularly in the main urban centres, and examples include CafeNet in Wellington (www.cafenet.co.nz).

The ADSL network is controlled by former State-owned monopoly Telecom New Zealand, which resells the service to different ISPs, the largest of which, Xtra, it owns. It has been argued that this has led to poor consumer choice and a level of service below that in other comparable countries. Ironically, it has also led to New Zealand broadband pricing being relatively low (albeit for a lower quality service). A recent study ranks New Zealand poorly at 22nd out of 26 OECD countries in terms of broadband service quality and price. The research observes that New Zealand consumers receive, on average, poorer quality broadband and are significantly more likely to be affected by low data usage caps (Williamson 2006).

Government activity in terms of infrastructure primarily relates to funding through the Broadband Challenge (urban fibre) and PROBE Extension (remote and under-served communities) components of the Digital Strategy. In addition, TelstraClear has been awarded a government contract to build and manage the Research and Education Advanced Network, New Zealand (REANNZ), which will provide high speed connections between universities, crown research institutions, related companies and overseas institutions at a cost of NZD 43 million.

In the commercial sector, mobile Internet continues to grow with the availability of 3G services from both Telecom Mobile and Vodafone, and the planning of limited new networks by Econet and TelstraClear. The latter recently also announced a project to deliver wireless telecommunications and Internet service in the north island city of Tauranga.

## Conclusion

New Zealand is at an interesting point with regard to digital maturity. Internet usage is high but there remains a demonstrable failure to engage with broadband. Government has embarked on regulating the monopoly telecommunications network with a view to increasing opportunities for competition in the market and increasing broadband uptake. Recognition of ICT is increasing within local and central government and also at a community level. However, disparities still remain in terms of access and skills and these are largely a reflection of broader socio-economic and educational disparities.

The innovative Digital Strategy takes a whole of government approach to ICT, delivering funding for alternative network infrastructure extending broadband coverage and for community-focused ICT initiatives. Altogether, the strategy encompasses over NZD 400 million in funding that also includes significant investment in the education sector and the development of a Digital Content initiative. The only cloud on the horizon would appear to be the need to overcome a lack of awareness of the Digital Strategy in the community and voluntary sector.

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