Statistics
on
Information Technology
in
New Zealand

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1. Introduction

This is the third annual release of this paper. This release has:

- updated figures for hardware imports and exports;
- updated figures for trade in software and services and for the size of New Zealand information technology (IT) market;
- updated figures on the size of the Internet in New Zealand (previously published as *Sizing the Internet in New Zealand*);
- updated figures for employment in segments of the IT industry;
- an updated figure for the number of computers in homes; and
- statistics on those employed in IT which have not been updated since the last release of this paper.

This paper is also available through the Internet in a hypertext form which includes the underlying data tables as well as the graphs. The address is given on page 26.

1.1 Acknowledgements

The majority of the figures in this paper have been sourced from Statistics New Zealand. Other sources are credited specifically where they have been used. Some of the figures are taken from a survey of IT businesses conducted by Statistics New Zealand and jointly sponsored by the Ministry of Commerce, Information Technology Association of New Zealand, Tradenz and Statistics New Zealand.

1.2 Defining Information Technology

As well as the traditional data processing industries, telecommunications and broadcasting are shown in many of the figures in this paper. This reflects the fact that these industries process information using technological means, and the increasingly blurred distinctions between these sectors.

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2. Imports and Exports

IT hardware imports and exports are given under three categories: *Computer Hardware and Parts*, *Telecommunications Hardware*, and *Wireless Communications Hardware*.

The hardware import and export figures given here are measured at the border by the Customs Department as goods leave or enter the country. Calendar years are used in these figures.

The Software and Services Export section uses a different methodology - a survey of businesses - so its results are not directly comparable with the hardware figures given below.

2.1 Hardware Imports

The following chart shows a summary of New Zealand IT hardware imports for the last 6 calendar years. Three periods may be seen in the graph: a gradual decline until 1991, a gradual increase until 1993 and rapid growth through 1994 into 1995. Until 1994, the bulk of this growth was in the *Computer Hardware and Parts* category, but this category is now slowing while the others increase more quickly.

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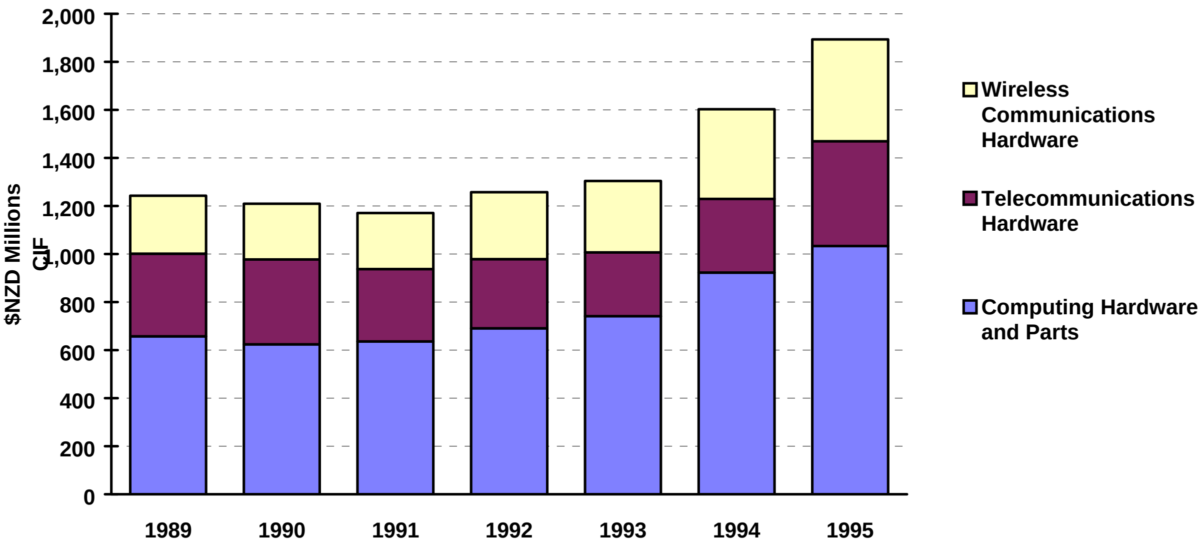

The information in the previous chart is shown below split by import source, showing that the bulk of IT imports come from Asia and America.

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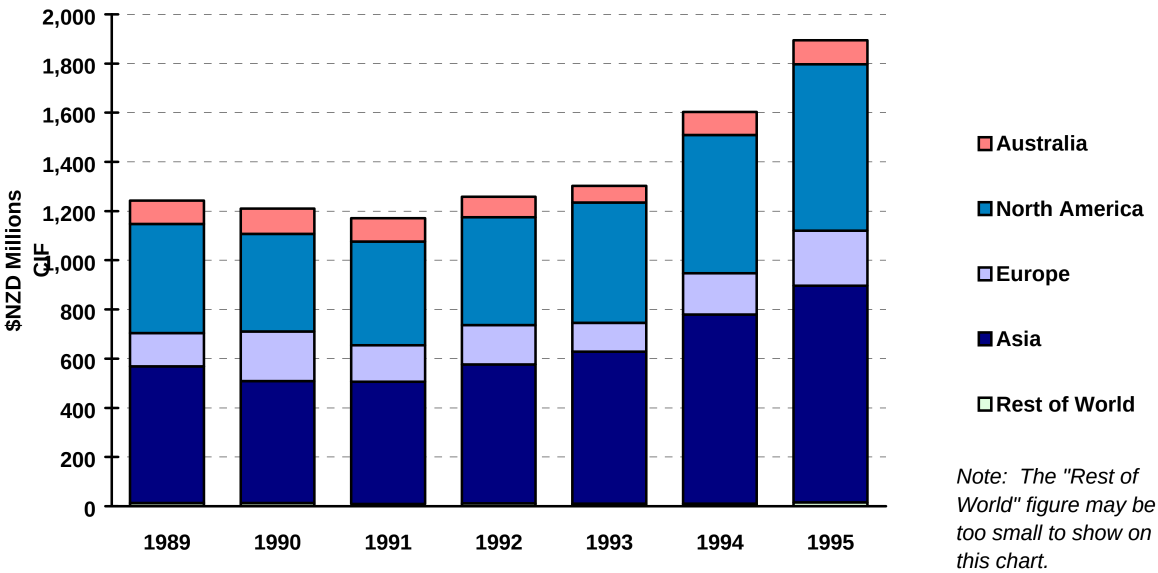

Note: The "Rest of World" figure may be too small to show on this chart.

2.2 Hardware Exports

The following chart shows a summary of New Zealand IT hardware exports for the last 7 calendar years.

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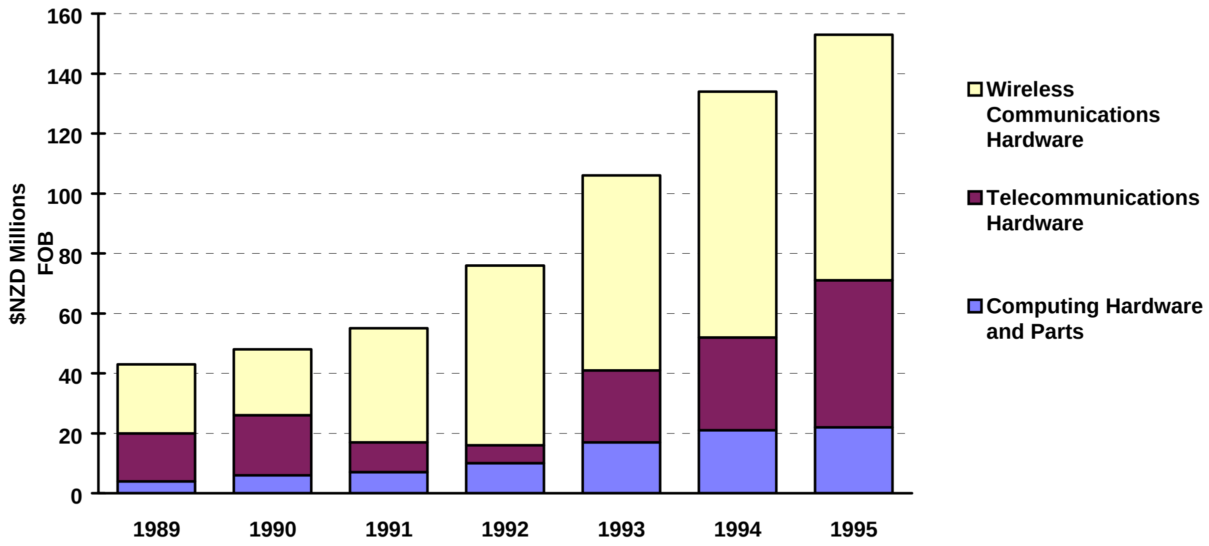

There has been a sustained increase in export value over this period, particularly in *Wireless Communications Hardware*.

Both IT hardware imports and exports have grown rapidly over the last few years, but the total value of the imports is still larger by a factor of 10.

The previous chart refers to three categories of IT related hardware exports; the next one shows the contribution of *Computer Hardware and Parts*:

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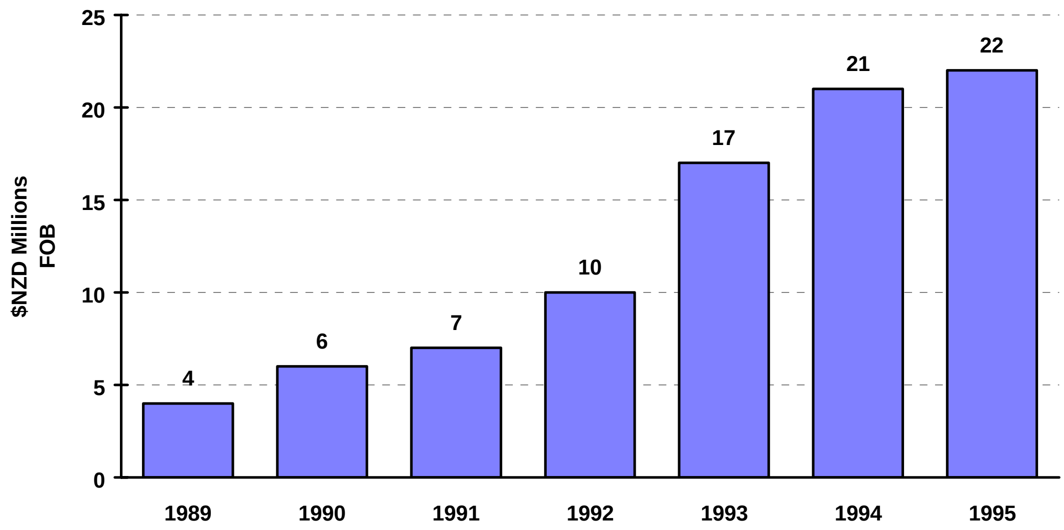

The export of *Computer Hardware and Parts* increased steadily from 1989 to 1992, then more than doubled from $10m in calendar 1992 to $21m in 1994, then eased back to the pre-1992 growth rate.

Hardware export information is shown below split by export destination:

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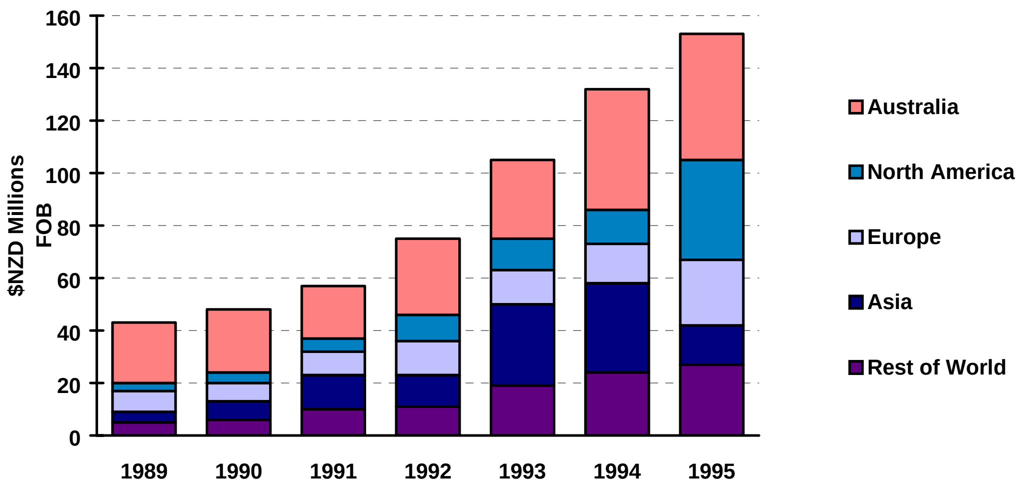

This shows a re-alignment of trading partners in 1991-1993, with exports to North America and Asia gaining ground strongly, followed in 1993-1994 by strong growth across the whole range of trading partners. In 1995 exports to

Asia declined sharply but those to North America and Europe expanded, with strong export growth overall.

2.3 Software and Services Exports

The information in this section is taken from a survey of businesses conducted in 1994 and again in 1995 by Statistics New Zealand. This survey was sponsored by the Ministry of Commerce, ITANZ, Tradenz and Statistics New Zealand. The survey will be repeated on an annual basis.

The survey asks all businesses for information as at their previous annual balance date, the cut-off being 30 September each year. The average balance date in each sample might reasonably be assumed to be March.

Software and services have not been separated due to the difficulty of accounting for software maintenance revenue.

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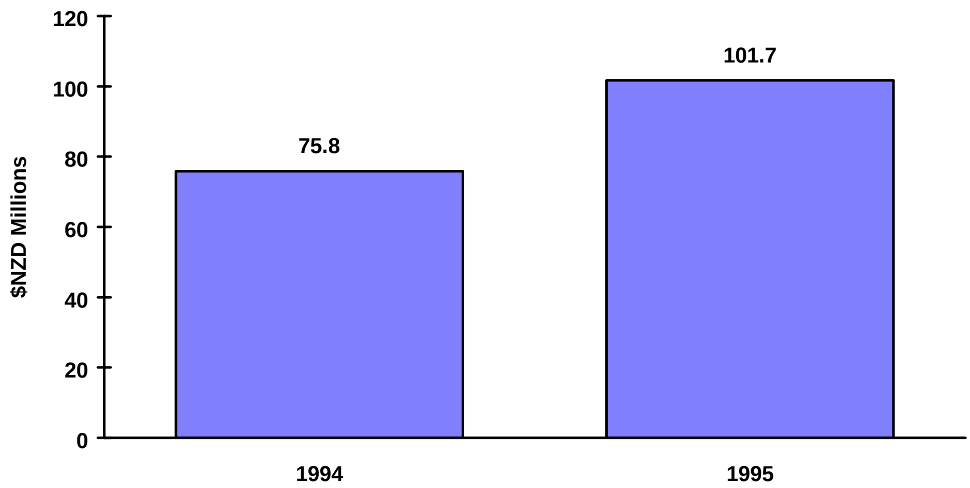

The 1994 figure has been revised very slightly from the last release of this paper due to re-classification of income by some firms.

The survey also finds a total hardware export figure of $176 million. This is not directly comparable to the IT hardware export figures captured at the border and given earlier in this paper because of: differences in the accounting year; the exclusion of export costs such as freight and insurance; and the restriction of the survey to IT related firms with at least 2 staff members.

The survey has two specific limitations. Firstly it does not include "embedded software" - ie software which is part of a hardware product such as a communications system or a washing machine, and secondly it does not comprehensively cover non-IT businesses or businesses of 2 full time equivalent staff or less. Both these limitations would tend to cause the survey to underestimate the actual export figures.

3. New Zealand IT Market

The information in this section is taken from a survey of IT businesses conducted in 1994 and again in 1995. For more information about the survey, see the previous section, Software and Services Exports.

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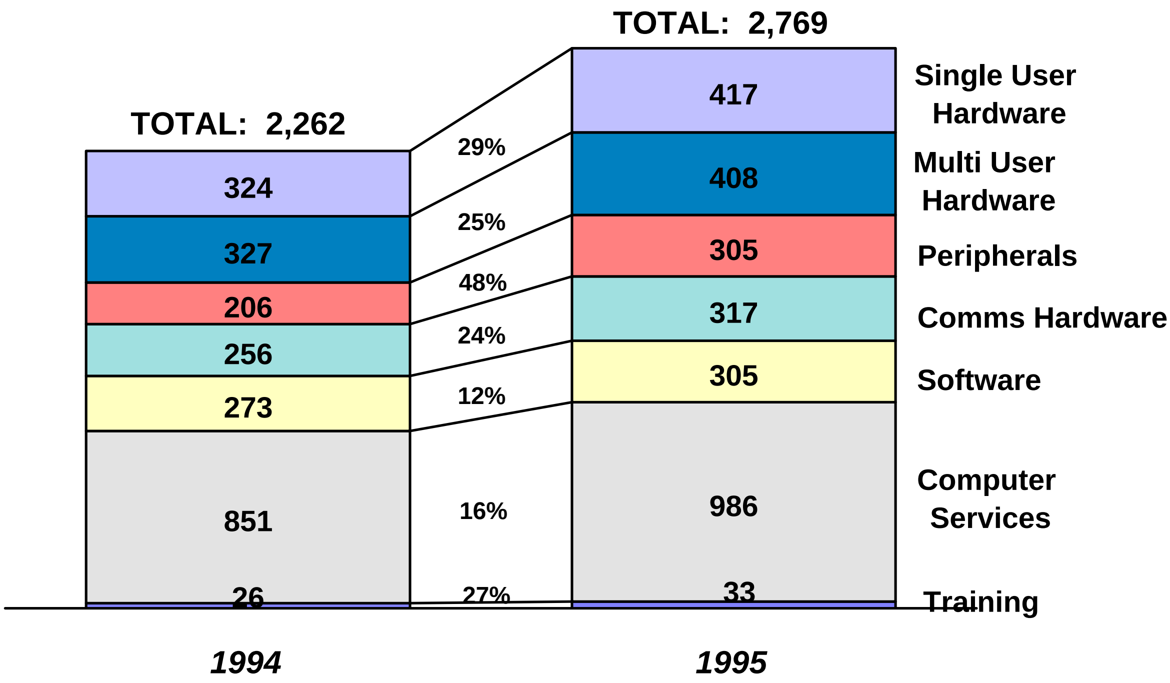

These figures represent goods and services sold to end users, and so do not double-count items which are sold by wholesalers and sold on by retailers.

The *Single User Hardware* category refers to complete computers intended for use by only one person at any one time, and is mainly desktop and laptop PCs and Macintoshes. *Multi User Hardware* is computers intended for use by many people at the same and includes file servers, midrange systems and mainframes. Parts of computer systems (other than the CPU) when sold separately appear under *Peripherals*.

The split between *Software* and *Computer Services* is unreliable because of the difficulty of accounting for software maintenance revenue.

All categories showed strong growth over the year. The total market grew at 22%, and the hardware categories grew at a combined rate of 30%. It is tempting to assume that this is due solely to the expanding home PC market; but the 25% growth in the multi-user systems category shows that some of this growth is due to businesses increasing their IT spending.

Software and services have also grown significantly, although not as rapidly as hardware. This may reflect software price reductions in the PC market, over the same period PC hardware capabilities improved but pricing remained constant.

4. Industry and Employment

The IT Industry comprises those industry sectors whose business is IT related; eg software houses. By IT occupation is meant a job whose focus is on IT, eg programmer. There are non-IT occupations within the IT industry (eg an accountant in a computer bureau) and IT occupations in non-IT industries (eg a programmer in a bank).

The table below shows, as at 1991, the distribution of IT occupations with respect to the IT industry.

No. Employed	IT Occupations	All Occupations
IT Industry	8,826	40,200
All Industry	27,717	1,400,376

The figures for this table were taken from the 1991 Census of Dwellings.

In 1991, 4% of the working population of New Zealand was in an IT occupation and/or working for an IT related firm. (As discussed below, a broad definition of the IT industry is used.)

4.1 IT Industry

Digital convergence is increasingly tying computer technology to telecommunications and broadcasting. For this reason the definition of IT industry used in this paper is broad, encompassing telecommunications and electronic media. It could be argued that some of the industry sectors below do not deal exclusively with IT even under this broad definition, however these figures are based on the standard industrial codes in use in New Zealand at the time this data was collected.

The information for the charts on the IT industry below is taken from the annual business survey operated by Statistics New Zealand. Staff numbers are full time equivalents.

There was a coverage change in 1994. This added businesses identified through data matching with IRD, and those which had originally voluntarily registered for GST but whose turnover subsequently grew to over $30,000pa. It removed businesses whose turnover had dropped below $30,000pa. The effect of the coverage change on the figures above was neutral over the total of all categories. There was a decrease in the numbers reported to be employed in consultancy and software development, which was matched by an increase in those employed in computer shops. There was no impact on the telecommunications category. The 1994 figures given here are the revised ones.

The chart shows a steady rise in employment in the IT industry since 1992, despite a significant reduction in the telecommunications sector which is its biggest single component.

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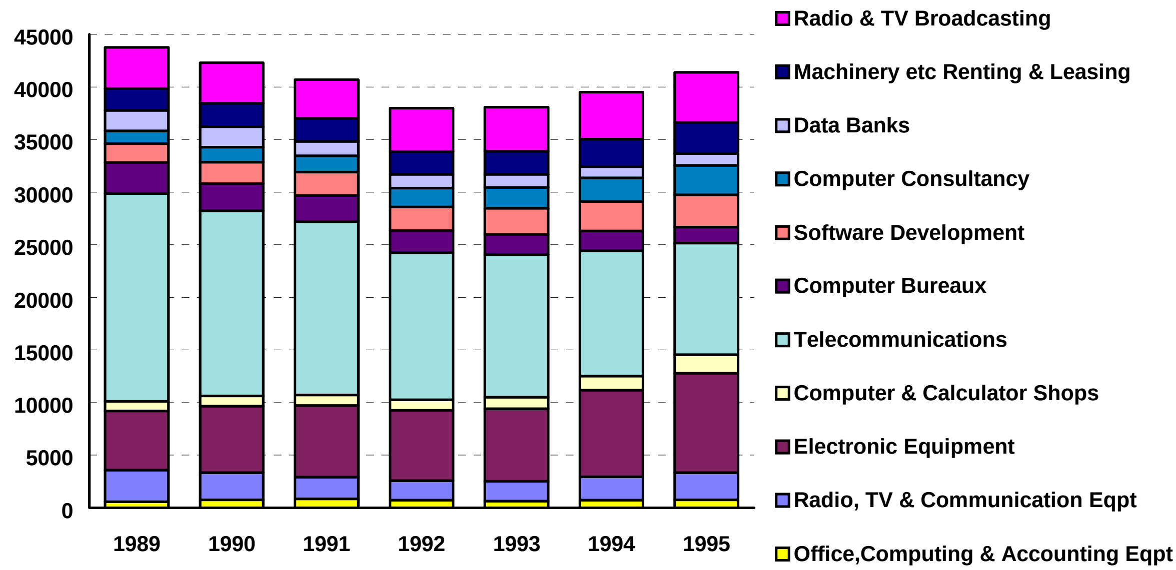

The chart below better shows this trend. It shows the same data as the chart above with the exception of the telecommunications industry. There has been a 12% increase in employment in the non-telecommunication IT industry in each of the last 2 years.

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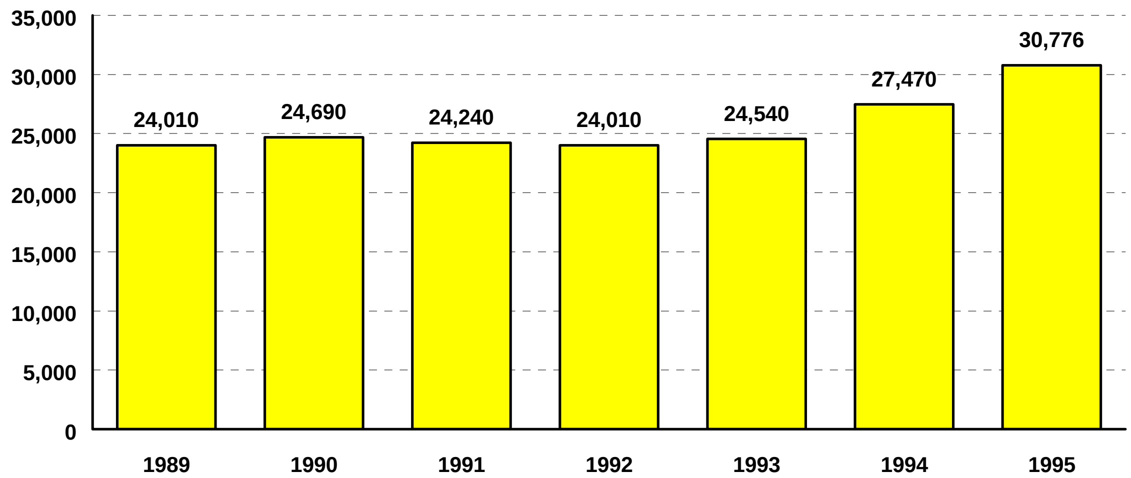


4.2 IT Occupations

The information on IT Occupations in this section, including age/sex breakdowns and ethnicity data, was taken from the 1991 census and has not been updated since the previous release of this paper.

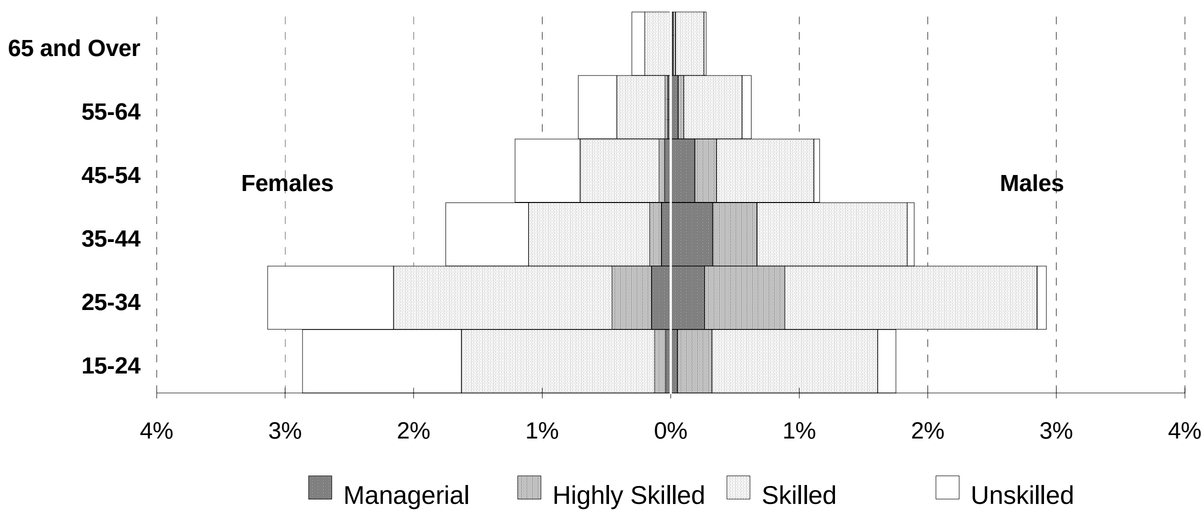
Occupations are categorised according to the occupation classification codes used by Statistics New Zealand. For the purpose of this paper, the following codes are deemed to be IT occupations:

Code	Description	Category
12271	Computing Services Manager	Managerial
21311	Systems Analyst	Highly Skilled
21312	Computer Systems Engineer	Highly Skilled
31142	Computer Systems Technician	Skilled
31211	Computer Programmer	Skilled
31212	Computer Operator	Skilled
33152	Technical Representative	Skilled
41121	Data Entry Operator	Unskilled

Category is used for stratifying the occupations by skill level.

The age sex breakdown for those in IT occupations is shown below.

Percentages of the Working Population by Age and Sex who are in IT Occupations at Various Levels



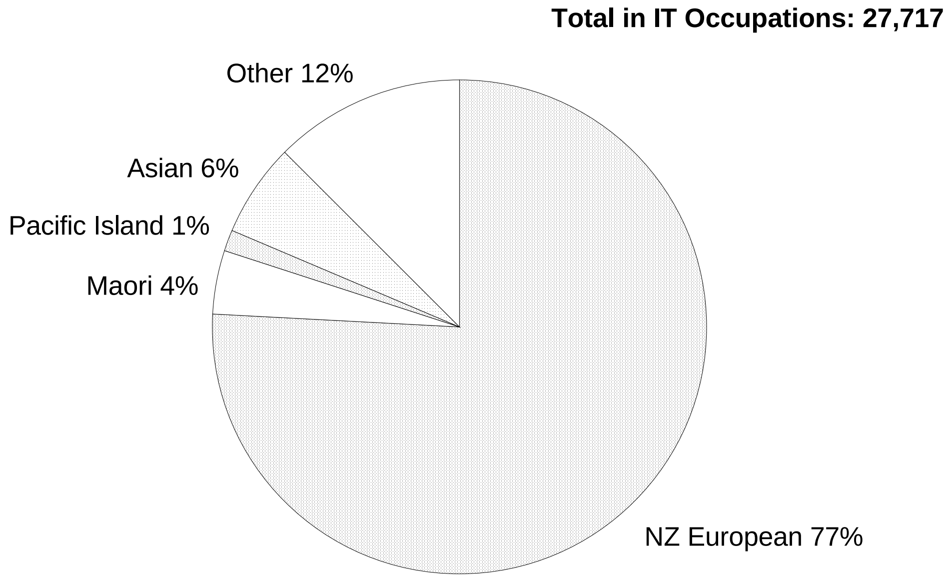
Each bar in this chart represents the numbers employed in IT occupations as a percentage of the numbers working in all occupations, for a given age/sex group. This percentage is referred to as a *participation rate* below.

Women in the 15-24 year age group have similar participation rates to men in skilled IT occupations, but this is not the case for women in older groups. In particular, managerial IT occupations (which are mostly in the older groups) are male dominated by a factor of 4 to 1. This is also true to a lesser extent for more highly skilled non-managerial occupations such as Systems Analysis.

By contrast, in data entry women outnumber men by 8 to 1 across all but the two oldest age groups. Data entry has traditionally been a female dominated occupation.

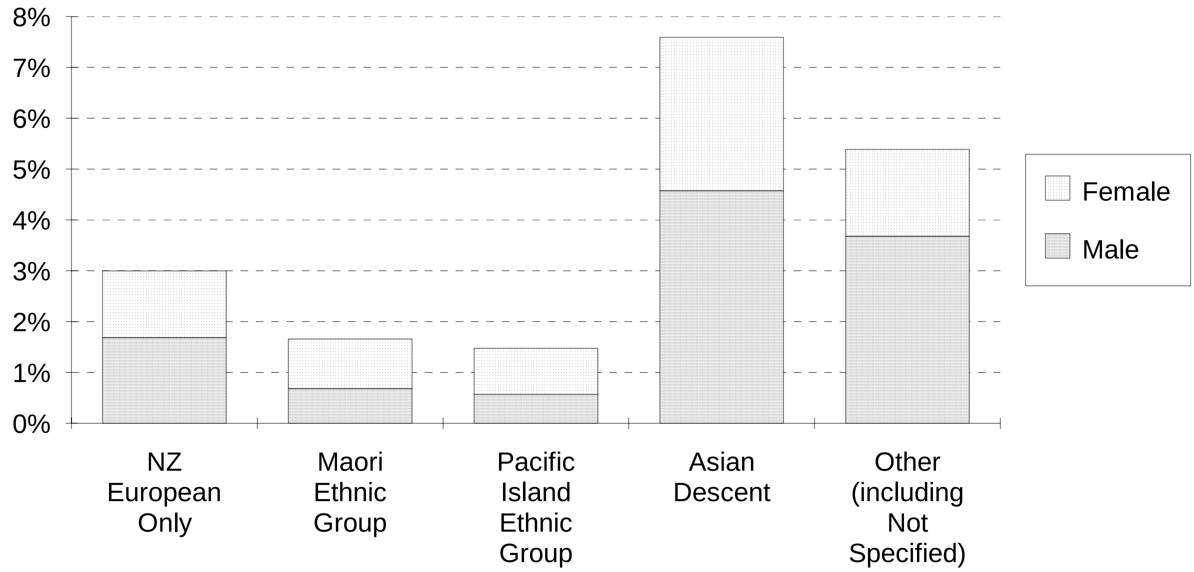
The relatively low representation of women in skilled IT occupations could be due to a historic imbalance which has recently disappeared, or to difficulties in re-entering skilled IT occupations after a career break.

Breakdown of those Employed in skilled IT Occupations by Ethnic Origin



The chart above is based on numbers employed in skilled IT occupations. No account is taken of the differing sizes of the populations involved.

Percentage of Working Population in IT Occupations Excluding Data Entry



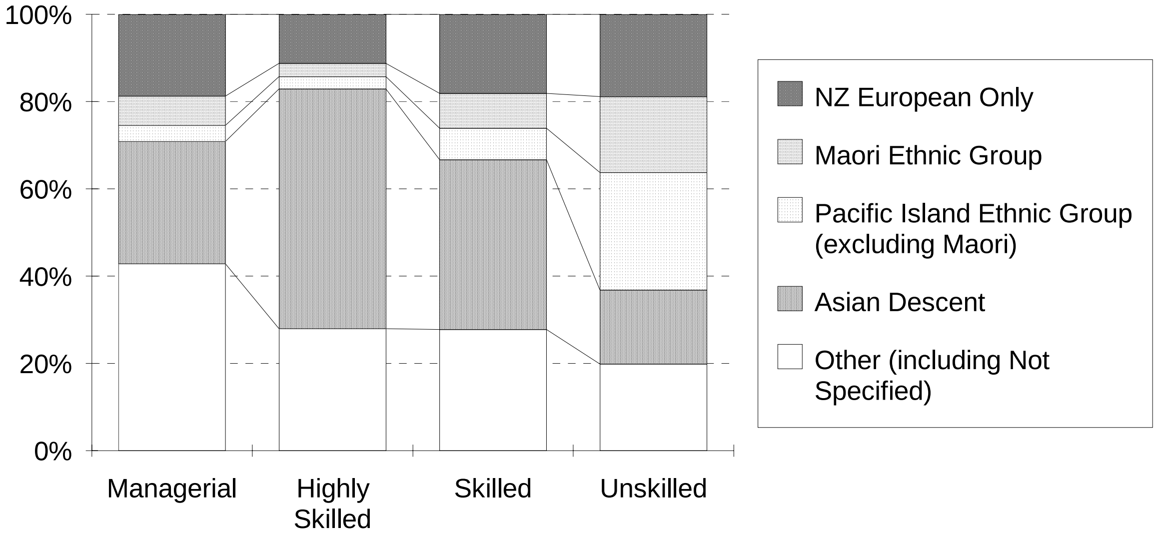
The above chart shows the numbers working in skilled IT occupations as a percentage of the working population in each ethnic group.

Those identifying as NZ European have twice the participation rate in skilled IT occupations enjoyed by Maori and Pacific Islanders. Those of Asian descent, have very high participation rates, as do those who do not fall into the above categories or did not specify - this group may include large numbers of recent immigrants.

Women have lower participation rates than men except in Maori and Pacific Island groups. Maori and Pacific Island women have a high rate (compared with working population) of being computer operators, which is shown in the charts as a skilled IT occupation.

The following chart shows the participation rate of each ethnic group in IT occupations at each level. Effectively it answers the question "what would be the ethnic breakdown of each level of IT occupation if the working populations of each ethnic group were the same?"

IT Occupations at Various Levels as a Percentage of Total Numbers in IT Occupations for each Ethnic Group



Unskilled IT occupations (data entry) attract nearly equal participation rates from the different groups, although that for Pacific Islanders is slightly higher.

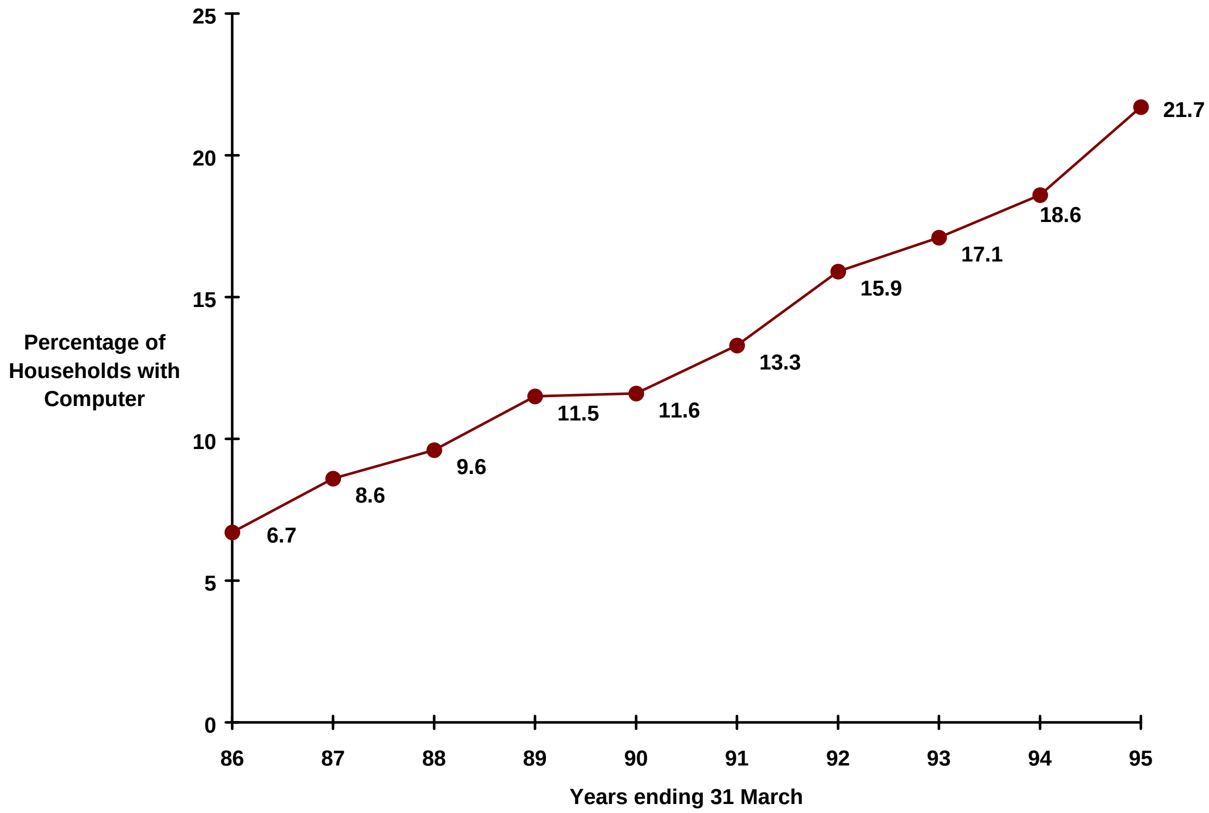
The participation rate for the Asian group is very high for highly skilled and skilled IT occupations. The "other" group is strongly represented in managerial IT occupations (computer services managers). This may represent a tendency for recent immigrants to hold managerial positions, due possibly to Immigration policy.

Maori and Pacific Island participation rates are low for skilled and managerial IT occupations, and very low for highly skilled ones.

5. Computers in Homes

These figures are taken from the annual Household Survey conducted by Statistics New Zealand. This survey assesses each household in a sample once at some point over a 12 month period ending in September of the year of the survey. It is therefore reasonable to attach the figures to a March year end.

The following chart shows the percentage of homes with a computer (mains operated with keyboard):



The chart shows a steady increase to the March 1995 level of 21.7%.

6. Computers on the Internet

The data presented in this document concern the number of hosts (computers) attached to the Internet in New Zealand, and the size of the New Zealand domain which is a measure of the number of organisations connected.

6.1 Structure of the New Zealand Internet

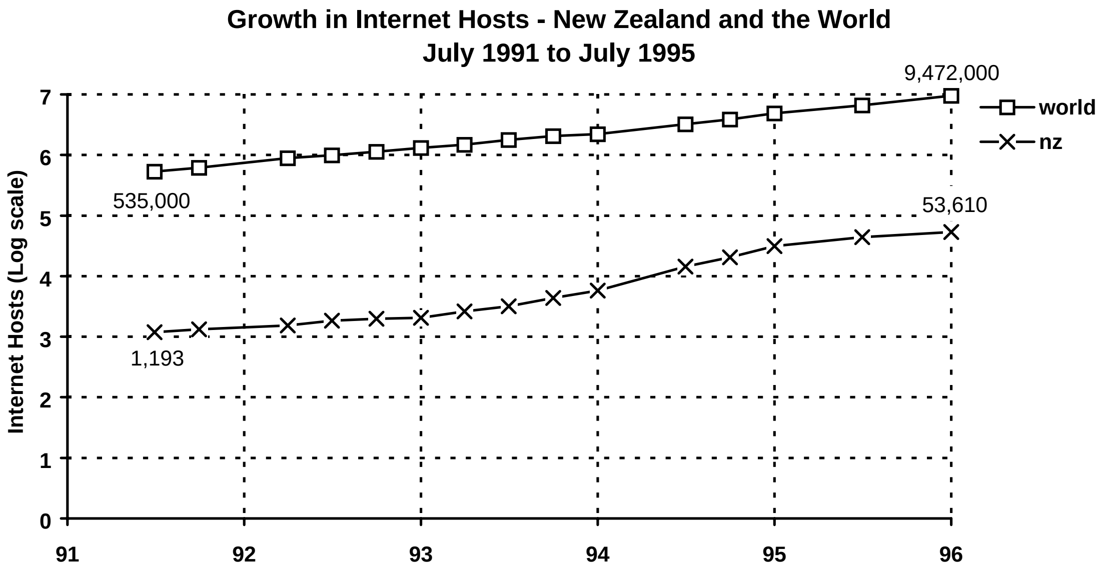
The Internet in New Zealand has essentially a two-tier structure. The first tier is wholesalers, ie those operate offshore links and bring overseas Internet traffic to New Zealand. The second comprises retailers, known as Internet Service Providers (ISPs). Internet users are customers of ISPs, who are in turn customers of the wholesalers. Between these two tiers is the New Zealand Internet Exchange, or NZIX, which offers a neutral point for ISPs to exchange data so that they do not have to send inter-ISP data offshore.

6.2 Number of Computers on the Internet

The data for this section is derived from the results of a survey undertaken by Network Wizards, and is available on that company's web server at <www.nw.com>.

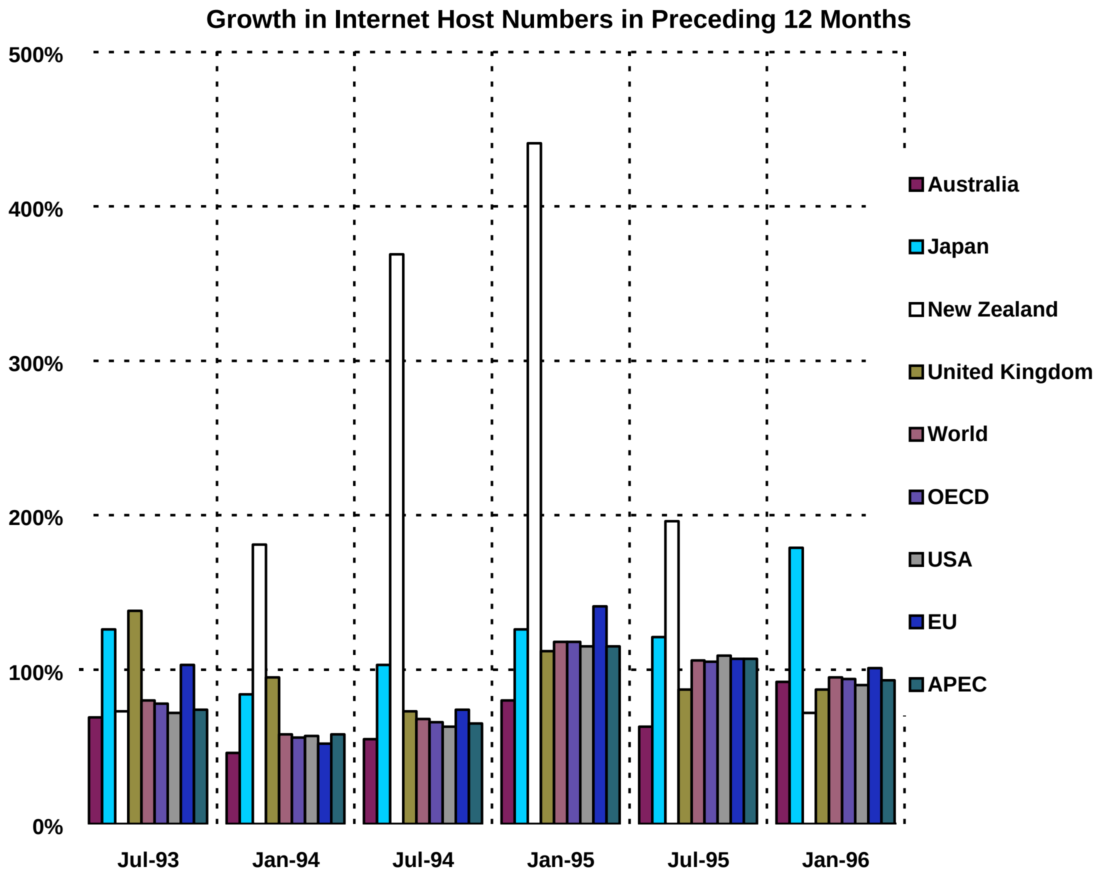
The number of computers ("hosts") on the Internet is often regarded as a measure of the number of people with access to the Internet. To be counted as host, a computer must have its own Internet address, and be permanently and directly connected to the Internet. Home or small business computers which connect by dialling up to a service provider are not counted. Consequently it is reasonable to assume that there are more users than hosts, possibly by a factor of two or more. To stress this point: the information in this paper refers to the number of computers permanently wired into the Internet in New Zealand, it does not purport to describe directly the number of individuals using the Internet.

The graph below shows the growth of the New Zealand Internet and the total Internet over the last four years.



The straight lines on a logarithmic graph tell the same story as the exponential curve usually seen on graphs of Internet growth.

Interestingly New Zealand's Internet grew much faster than the world's during 1994. This is shown more clearly by the following graph of Internet host count growth.



New Zealand's extreme Internet growth through 1994 appears to have levelled off to normal levels - where "normal", in the context of the Internet, means annual rates of 80-100%.

7. Organisations on the Internet

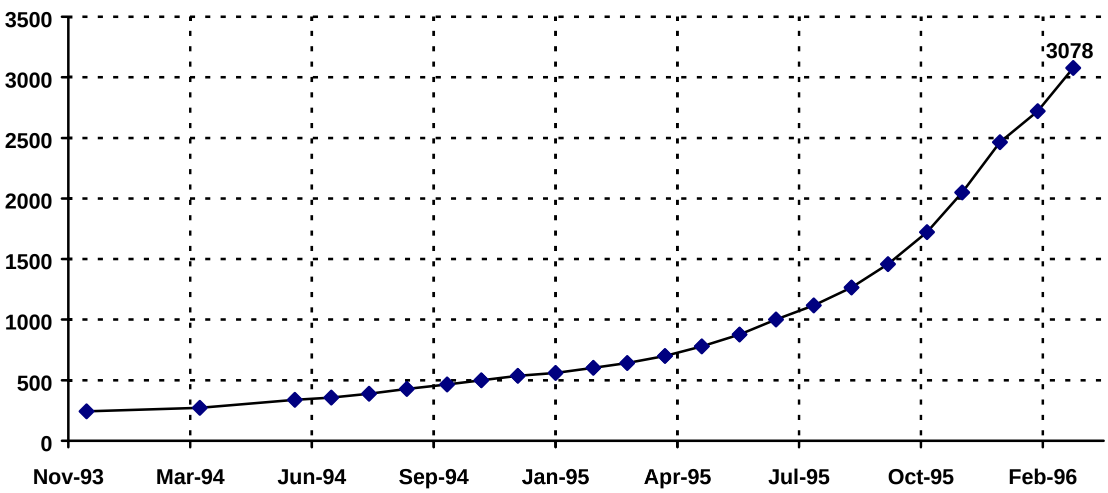
The data in this section is derived from figures supplied by Mark Davies of Victoria University of Wellington.

When an organisation connects to the Internet, it typically registers a “domain name”. This section of the document attempts to estimate the numbers of organisations connected by counting domain names.

Each third level New Zealand domain, eg <name.co.nz>, that has been registered is assumed to belong to a separate organisation (this is in accordance with the policy of the domain name registry in New Zealand). Sub-domains are not counted, thus <moc.govt.nz> is counted but <comms.moc.govt.nz> is not. In general each third level domain is given to a different organisation, be it a company, school, government department etc, so domains are a good measure of the number of organisations connected.

The first graph shows the total number of network connected organisations as a time series over the last two years.

New Zealand Internet Domains



This graph displays the kind of exponential growth usually associated with the Internet. There is an accelerating annual growth in domains of 180-250%.

7.1 Types of Organisation

Organisations are allocated domain names according to organisation type. The penultimate part of a name, such as the “co” in <name.co.nz> is used to categorise domains. This part of the name is often called a second level domain. In New Zealand the following second level domains are used:

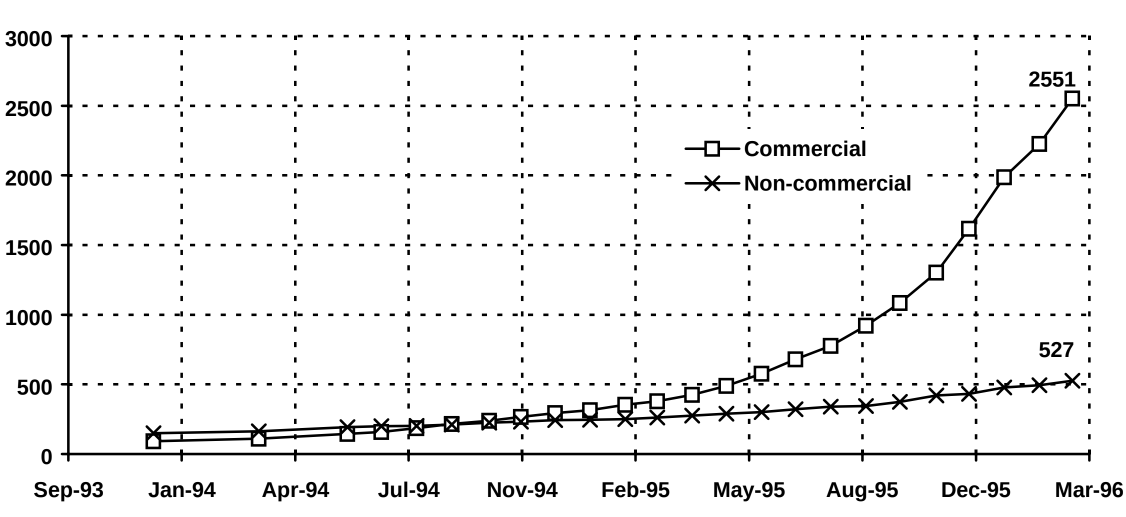
ac.nz	Tertiary educational institutions
co.nz	Companies
gen.nz	Individuals and organisations which do not fit the other categories
net.nz	Internet Service Providers
iwi.nz	Iwi organisations
org.nz	Non-profit organisations and incorporated societies
mil.nz	Military organisations
govt.nz	Central government agencies and local and regional councils
school.nz	Schools

This table represents the policy for allocating names now, and does not cover a number of historical anomalies. In particular ISPs have been registered in ac.nz, gen.nz and co.nz as well as net.nz.

While there is provision for individuals to have domain names of their own in the gen.nz domain, most do not. Therefore numbers of domains registered is not a good indicator of individuals using the Internet.

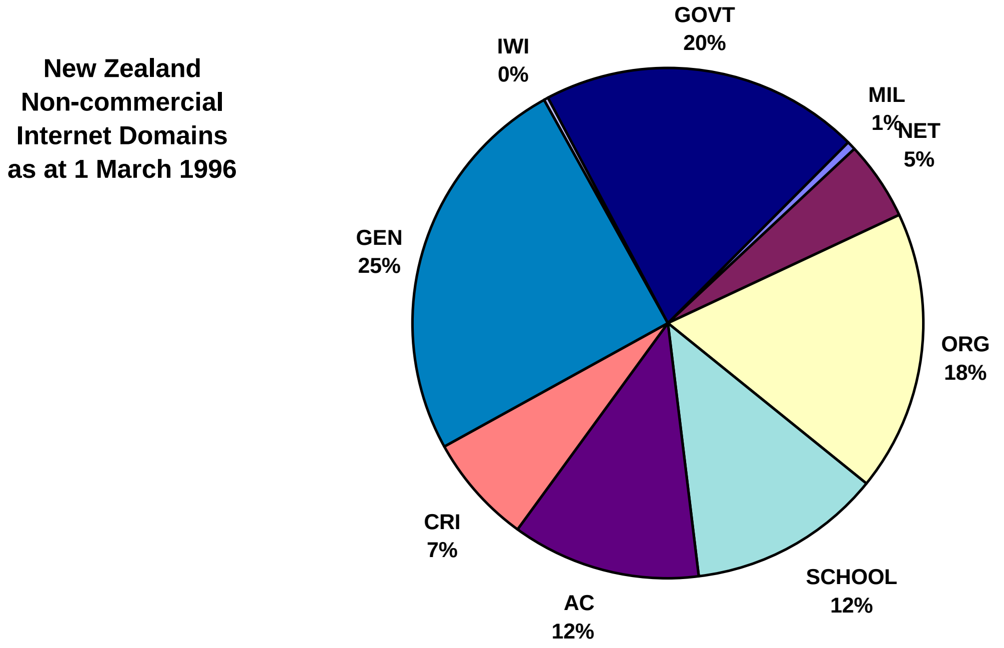
The following graph shows the split of commercial (co.nz) to non-commercial organisations (all others).

New Zealand Internet Domains



The growth rate in commercial domain registrations is itself rising steadily, and was 18% monthly compounding at the beginning of November 1995. The steep climb in the number of commercial domains tends to mask the fact that other domains are experiencing growth of 6-12% monthly.

The following graph shows how the non commercial organisations are split.

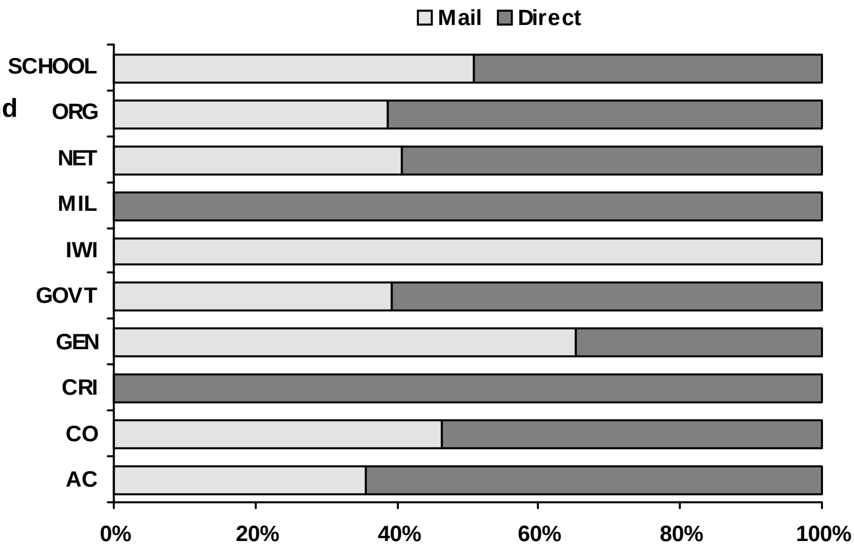


7.2 Direct Connection versus Mail-Only Connection

There are two ways in which an organisation can connect to the Internet: a direct connection allowing full access, or a mail only connection typically used to allow users of corporate mail system to send and receive Internet mail messages without offering them full Internet access. Both kinds of connection are growing rapidly.

The following graph shows the ratio of directly connected organisations to mail connected organisations split by organisation type.

Split Between Directly connected and Mail-only connected organisations as at 1 March 1996



8. Enquiries

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