Statistics
on
Information Technology
in
New Zealand

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Ministry of Commerce
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1. Introduction

This is the fourth 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 the New Zealand information technology (IT) market;
- updated figures on the size of 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;
- new figures on the number of computers in New Zealand schools; and
- new figures for the number of Internet connections in schools and the number of schools that intend to connect to the Internet.

In previous issues of this paper figures relating to IT occupations have been included. As these figures were derived from census data which has not been updated yet, data on IT industry occupations has not been included in this issue of the paper. However, it is intended that a special issue, including updated data from the 1996 census, will be published later in the 1997 year.

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 28.

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.

2. Imports and Exports

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

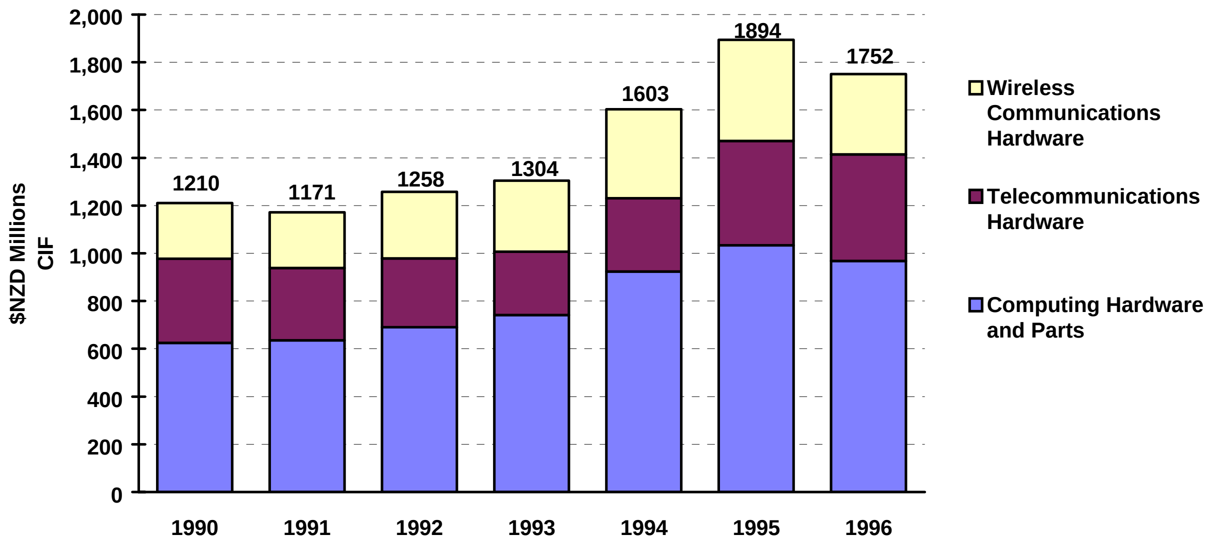
The hardware import and export figures given here are measured at the border by the Customs Department as goods leave or enter the country. Calendar years are used in these figures.

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

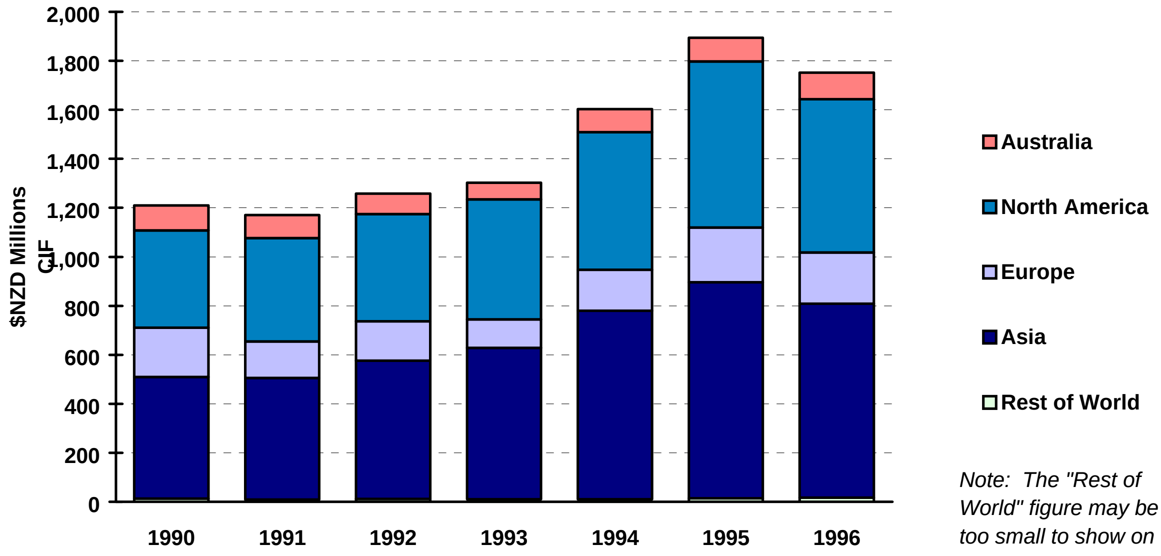
The following chart shows a summary of New Zealand IT hardware imports for the last seven calendar years. It is clear from the chart that following a gradual decline to 1991, there was continuing growth in IT imports until 1995. However, in 1996 there has been a decline in overall imports of 7% to $1.7 billion, due to a fall in imports in both the *Computer Hardware and Parts* and *Wireless Communications Hardware* categories. Only in the *Telecommunications Hardware* category was there any growth in 1996 and this was of the order of 2%.

IT related Hardware Imports by Type



The information in the previous chart is shown below split by import source, showing that the bulk of IT hardware imports continue to come from Asia and America, despite a decline in imports from both areas in 1996. IT hardware imports from Asia fell by 10% from their 1995 level and imports from America were down 8%. Imports from Europe also declined by 7%, while imports from Australia and the rest of the world increased.

IT related Hardware Imports by Source

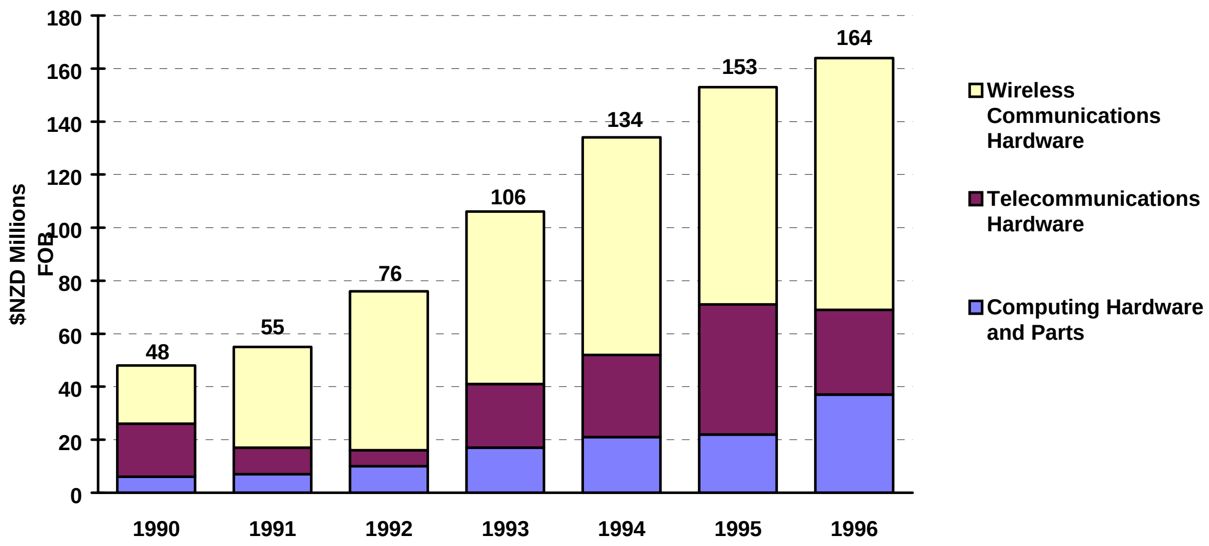


Note: The "Rest of World" figure may be too small to show on this chart.

2.2 Hardware Exports

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

IT related Hardware Exports by Type

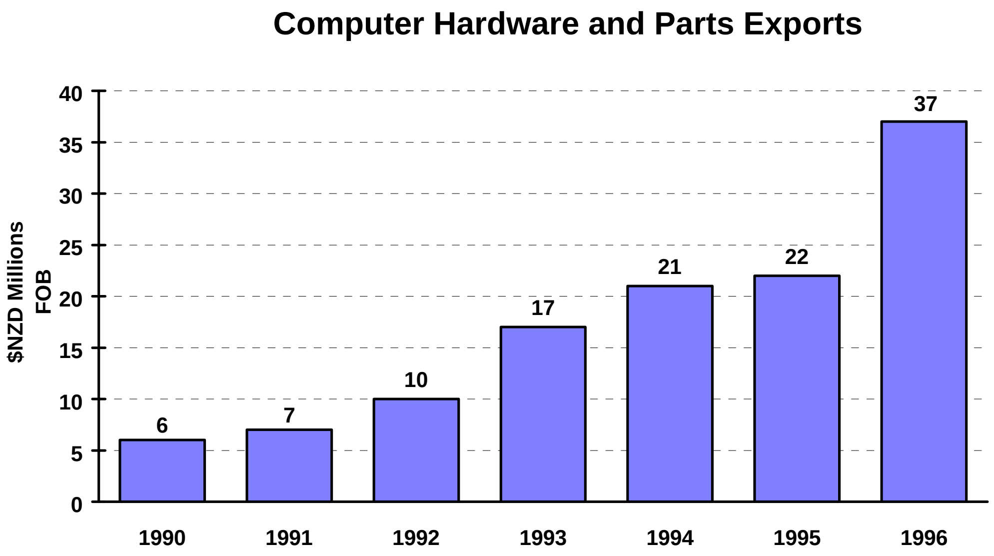


The 1996 year shows a continuation of the sustained increase in export value that has occurred over this period. The growth has come from strong rises in exports of *Wireless Communications Hardware* (a 16% increase in 1996, following no growth in 1995) and *Computer Hardware and Parts* (a 37% increase in 1996, following a 5% increase in 1995. However, the *Telecommunications Hardware* category appears quite volatile from year to year. After decreases in 1991 and 1992, exports of telecommunications equipment increased from 1993 through to 1995, before decreasing in 1996 by 35%, clearly seen in the graph above

While IT hardware exports have continued to grow over the last seven years, IT hardware imports have also grown over the same period, with just a small fall in 1996, and so the total value of the imports is still larger than the value of the exports by a factor of 10.

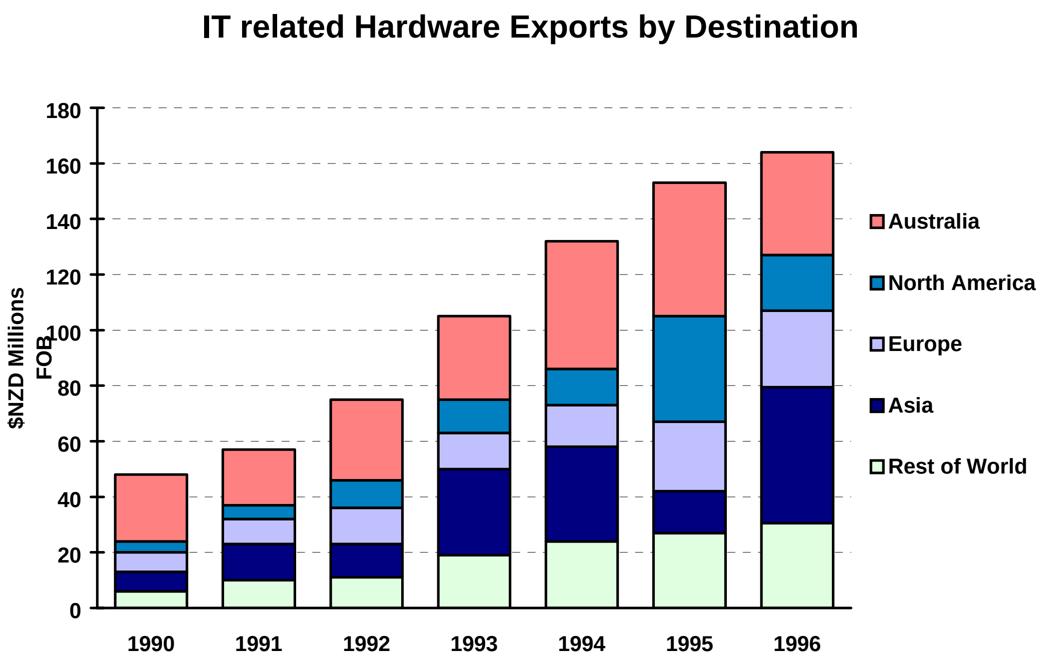
The growth of exports and decline in imports suggests the domestic IT industry is better able to meet local IT needs.

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



The export of *Computer Hardware and Parts* increased steadily to 1992, then more than doubled from $10 million to $21 million in 1994. Following slow growth in 1995, 1996 was a year of strong growth of 68% to $37 million. Exports of this category of IT hardware now make up 23% of all exports of IT hardware.

Below the IT hardware export information is shown below split by export destination:



Following a re-alignment of trading partners in 1991-1993, with exports to North America and Asia gaining ground strongly, there was strong growth in 1994 across all trading partners. In 1995 exports to Asia declined sharply but bounced back in 1996 to $49 million from $15 million, a 227% increase. In 1996, exports to North America and Australia fell by 47% and 23% respectively, while exports to Europe and the rest of the world increased by 10% and 13% respectively.

2.3 Software and Services Exports

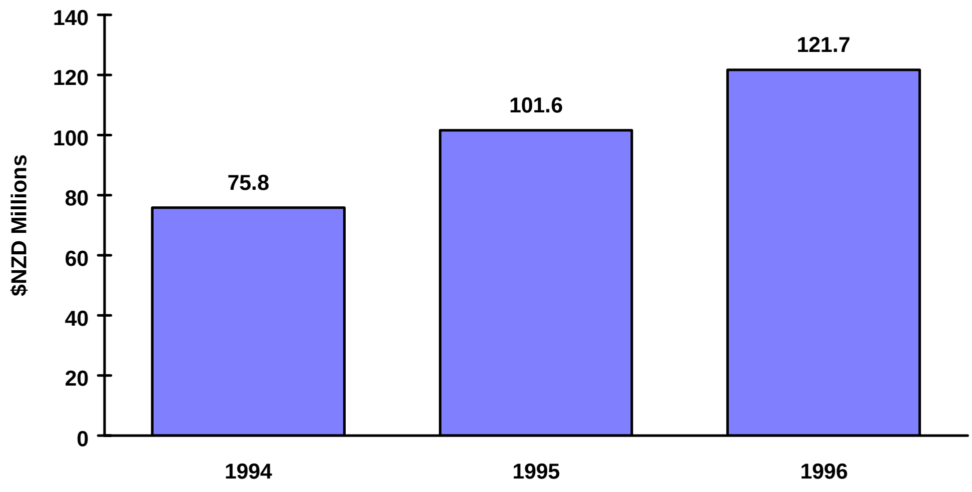
The information in this section is taken from a survey of IT businesses conducted by Statistics New Zealand and now in its third year. The survey was sponsored by the Ministry of Commerce, ITANZ, Tradenz and Statistics New Zealand.

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

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. Secondly it does not comprehensively cover non-IT businesses or IT businesses with 2 full time equivalent staff or less. Both of these limitations tend to cause the survey to underestimate the actual export figures.

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

Software and Services Exports



The survey finds software and computer services exports were $121.7 million in the 1996 financial year, a 19.8% increase from the 1995 figure of $101.6 million. The 1995 figure has been revised very slightly from last year’s issue of this paper due to re-classification of income by some firms.

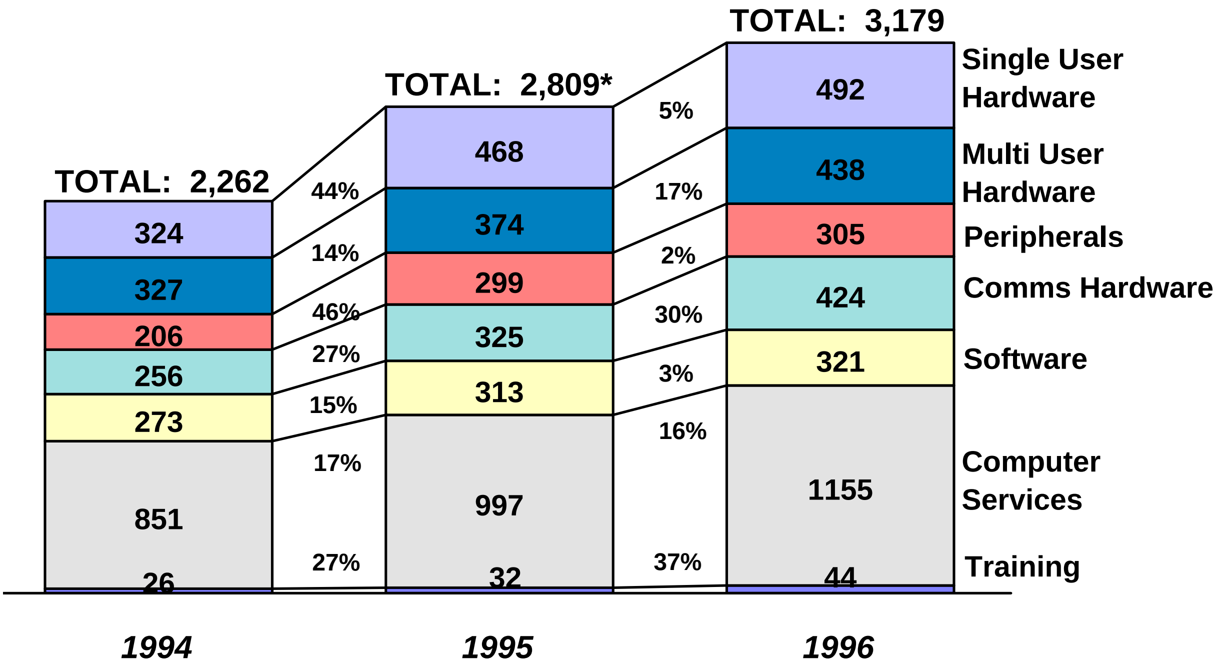
The survey also finds a total hardware export figure of $170 million, down slightly from the 1995 figure of $176 million. This is not directly comparable to the IT hardware export figures captured at the border and given earlier in this paper because of: differences in the accounting year; the exclusion of export costs such as freight and insurance; and the aforementioned restriction of the survey to IT related firms with at least 2 staff members.

It should also be noted that a number of revisions were made to the 1995 survey data when the 1996 data was presented due to more accurate information becoming available. In some cases, the original survey responses were inconsistent with company accounts. Additionally, improved information about non-respondent companies became available. The data for non-respondent companies is imputed based upon the experience of similar responding firms at the time of the survey. These revisions make direct comparisons between the figures used here with the 1995 figures published in last year's paper not possible.

3. New Zealand IT Market

The information in this section is taken from a survey of IT businesses conducted by Statistics New Zealand and now in its third year. For more information about the survey see the previous section, Software and Services Exports.

New Zealand Computer Hardware, Software and Services Market
NZD millions



* The 1995 figures include a number of revisions due to more accurate information becoming available as described in the previous section.

The figures used in the graph above 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 time 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.

Once the revisions of the 1995 figures are taken into account, the total IT market grew by 13.2% in the 1996 financial year, following 24% growth the year previously. All categories showed some growth over the year, from the 2% growth in the *Peripheral Equipment* category to the 37% growth in the *Training and Education in IT* category.

The combined computer hardware categories grew 13.2% in the 1996 year. While there was further growth in the single user systems category, this levelled off to just 5%. This may reflect ongoing falls in PC prices. Most of the growth in hardware sales is due to the 17% increase in sales of multi-user systems and 30% increase in sales of communications hardware and cables.

Sales of software and computer services continued to increase in 1996 by 12.6% to $1.47 billion. This follows a 17% increase in 1995. The 1996 increase was largely on the back of a 16% increase in sales of computer services to end-users. Software sales, however, increased by just 2.6% over the 1995 financial year figure, suggesting software suppliers are not finding much room for software price increases. This is despite the ongoing increases in the capability of the hardware enabling more software to be loaded onto each machine.

4. IT Industry Employment

The IT Industry comprises those industry sectors whose business is IT related eg software houses. However, there are non-IT occupations within the IT industry (eg an accountant in a computer company), and IT occupations in non-IT industries (eg a programmer in a bank).

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 Statistics New Zealand Business Directory produced by Statistics New Zealand. Staff numbers are full time equivalents.

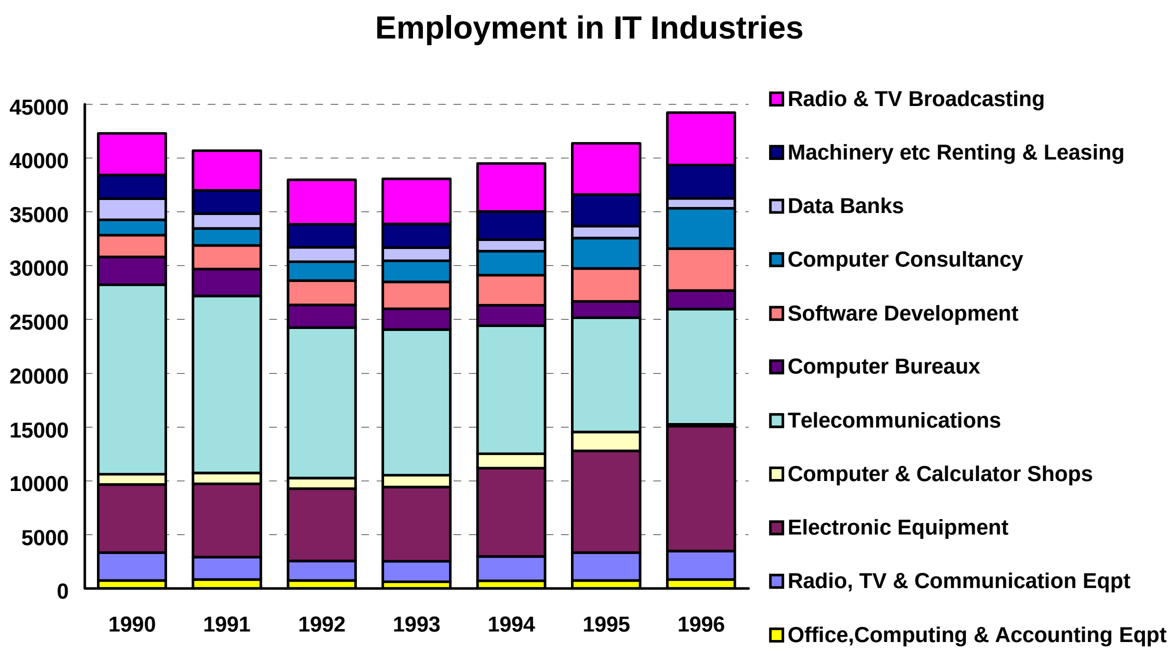
A coverage change in 1994 added businesses identified through data matching with IRD, and those which had originally voluntarily registered for GST but whose turnover subsequently grew to over $30,000pa. It removed businesses whose turnover had dropped below $30,000pa. The effect on the figures was neutral 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. The 1994 figures given here are the revised ones.

A further change occurred in 1996 with the redesign of the Retail Trade Survey in 1995 to conform to the ANZSIC (Australia and New Zealand Standard Industrial Classification) classification. A problem was discovered with the classification of computer distributors. Many were incorrectly classified as ‘computer retailers’ when they should have had an industry classification of ‘computer wholesaling’ or in a few cases ‘business services’. Each computer distributor was contacted directly to determine what sort of activity they actually performed so that the industry coding could be amended where necessary.

Due to this latest re-classification, there is a significant drop in numbers in the *Computer and Calculator Shops* (computer retailing) category between 1995 and 1996, while an offsetting increase has occurred in the *Electronic Equipment* (computer wholesaling) category.

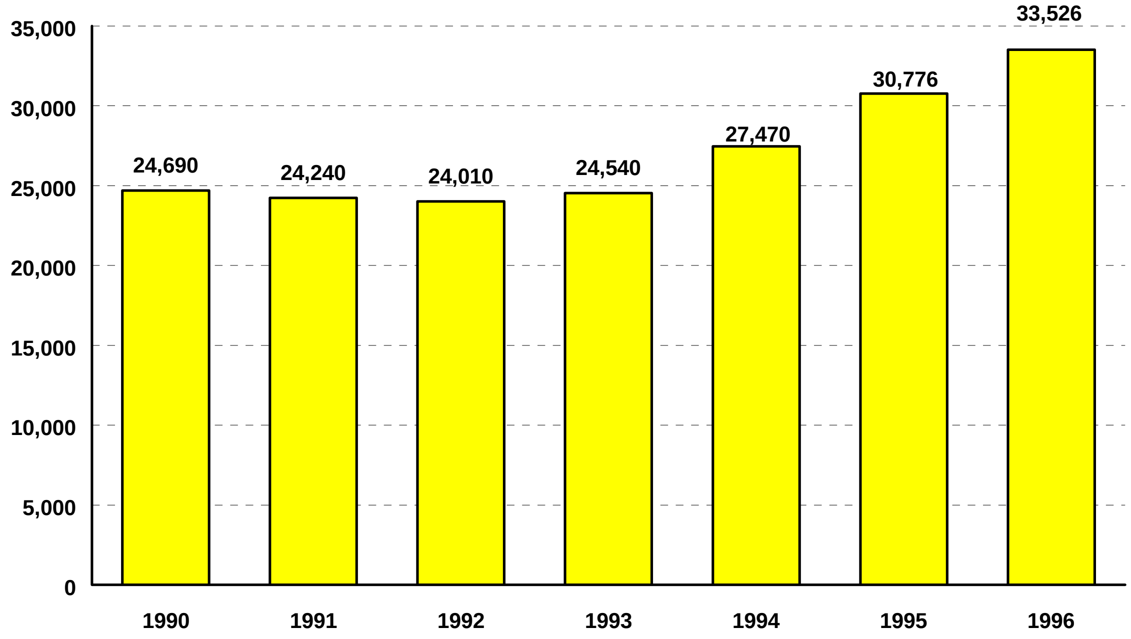
The following chart shows that employment in the IT industry has risen steadily since 1992. In the 1996 calendar year, there was an increase in employment in every category, except for the *Computer and Calculator Shops* category, as described above, and the *Data Banks* category. The number employed in the Data Banks category has been falling since 1990. For the first time since 1992 there was a small increase in employment in the

Telecoms sector. Categories to show significant increases over the last year are the *Electronic Equipment* (a 22.5% increase), *Software Development* (27%) and *Computer Consultancy* (32%) categories.



The following chart also shows the same trend of a continuing rise in employment in the IT industry. It graphs the same data as the chart above with the exception of the telecommunications industry. There was a 9% increase in employment in the non-telecommunications IT industry in 1996, following a 12% increase in each of the previous two years.

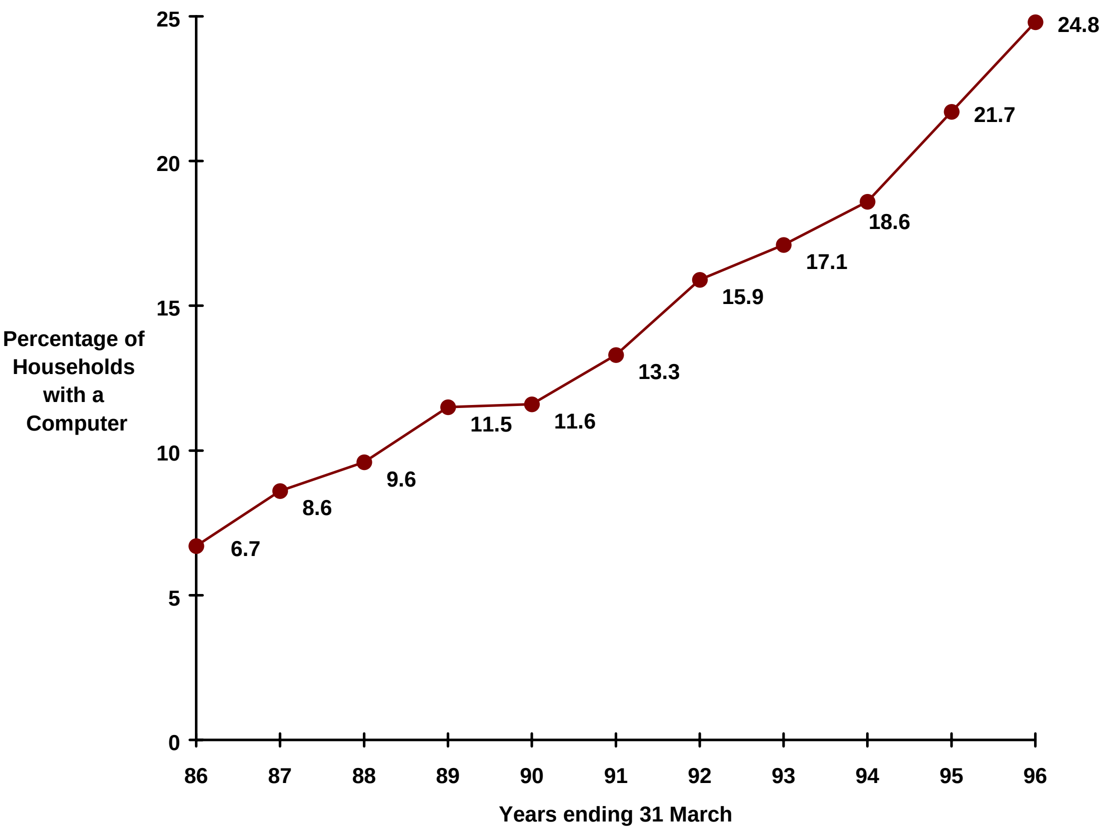
Employment in IT Industries excluding Telecommunications



5. Computers in Homes

The figures used in this section are taken from the annual Household Economics 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 that one in four New Zealand homes now has a mains operated computer. The 1995 and 1996 March years show relatively larger increases in the numbers of computers in homes, as the graph indicates by the steeper upward curve over the latter part.

6. Computers on the Internet

The data presented in this section covers the number of hosts (computers) connected 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

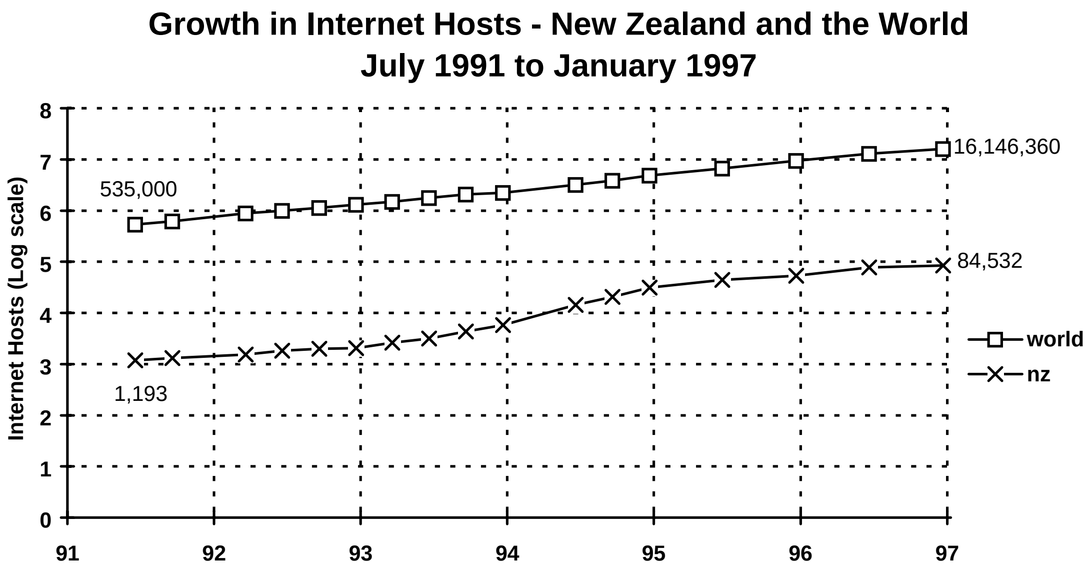
The Internet in New Zealand has essentially a two-tier structure. The first tier is wholesalers, ie those who operate offshore links and bring overseas Internet traffic to New Zealand. The second comprises retailers, known as Internet Service Providers (ISPs). Internet users are customers of ISPs, who are in turn customers of the wholesalers.

6.2 Number of Computers on the Internet

The data for this section is derived from the results of a survey undertaken every six months by Network Wizards. The full survey results are available on that company's web server at www.nw.com.

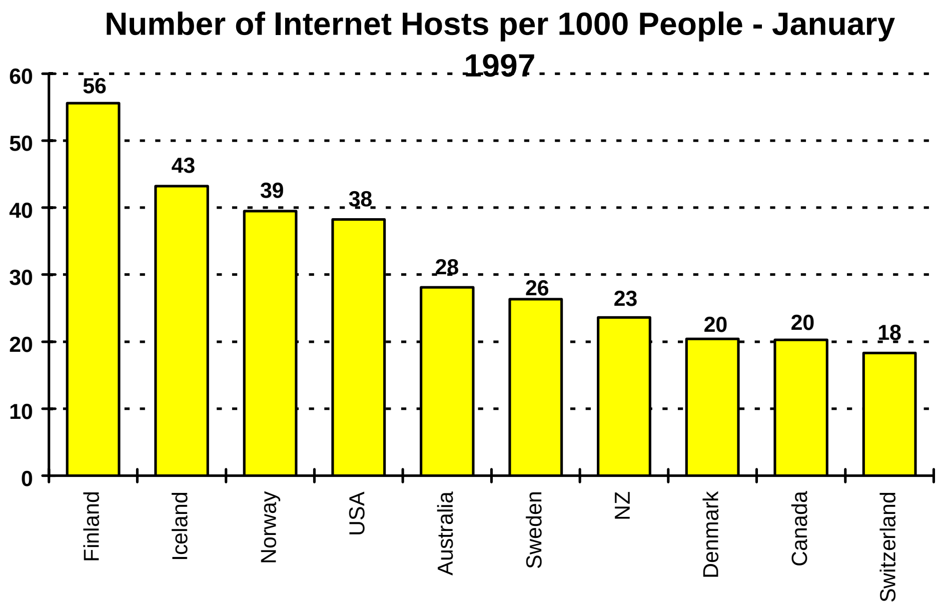
The number of "hosts" (computers) on the Internet is often regarded as a measure of the number of people with access to the Internet. To be counted as a host, a computer must have its own Internet address and be permanently and directly connected to the Internet. Home or small business computers which connect by dialling up to a service provider are therefore 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 following graph shows the growth in the number of hosts connected to the Internet in New Zealand, as well as the number connected worldwide, from July 1991 through to January 1997.



The straight rising lines on this logarithmic graph tell the same story as the exponential curve usually seen on graphs of growth of the Internet. Growth in the number of hosts in New Zealand has slowed over the last year, shown by the levelling off of the lower line on the right hand side. New Zealand's Internet had been growing much faster than much of the rest of the world up to 1995, but this extreme rate of growth has levelled off in 1995 and 1996 to a more normal rate, where "normal" in the context of the Internet currently means an annual rate of somewhere between 60% and 80%.

Mainly due to the earlier exponential rates of growth New Zealand now has the seventh highest number of Internet hosts for every 1,000 people. This is shown in the following graph of the ten countries with the highest Internet host counts by population. Interestingly, six out of the ten countries are countries where English is not the first language.



7. Organisations on the Internet

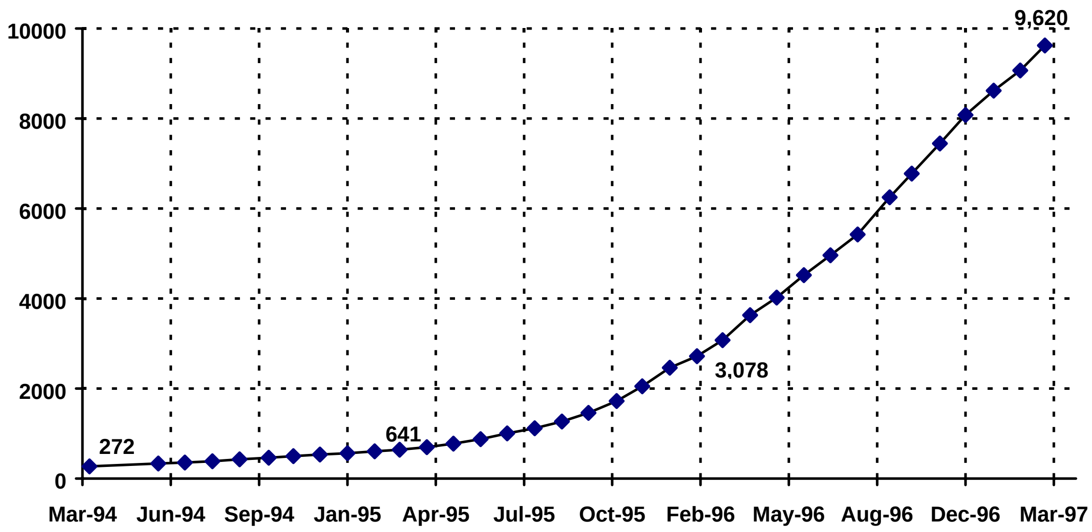
The data in this section is derived from figures supplied by Mark Davies of Victoria University of Wellington.

When an organisation connects to the Internet, it typically registers a "domain name". In this section we attempt to estimate the number of organisations connected by counting the registered 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 following graph shows the total number of network connected organisations as a time series over the last three years.

New Zealand Internet Domains



It is clear that there is strong growth in the registering of domains in New Zealand. There are now 9620, or over three times as many registered domain names as there were in March 1996. This mean that nearly 10,000 New Zealand organisations have some form of Internet connection.

Over the year to March 1997, registrations grew at 213%, although at times during the past year the annual growth rate has been as high as 420%. Since March 1994 the monthly growth has been compounding at an average of 11%.

7.1 Types of Organisation

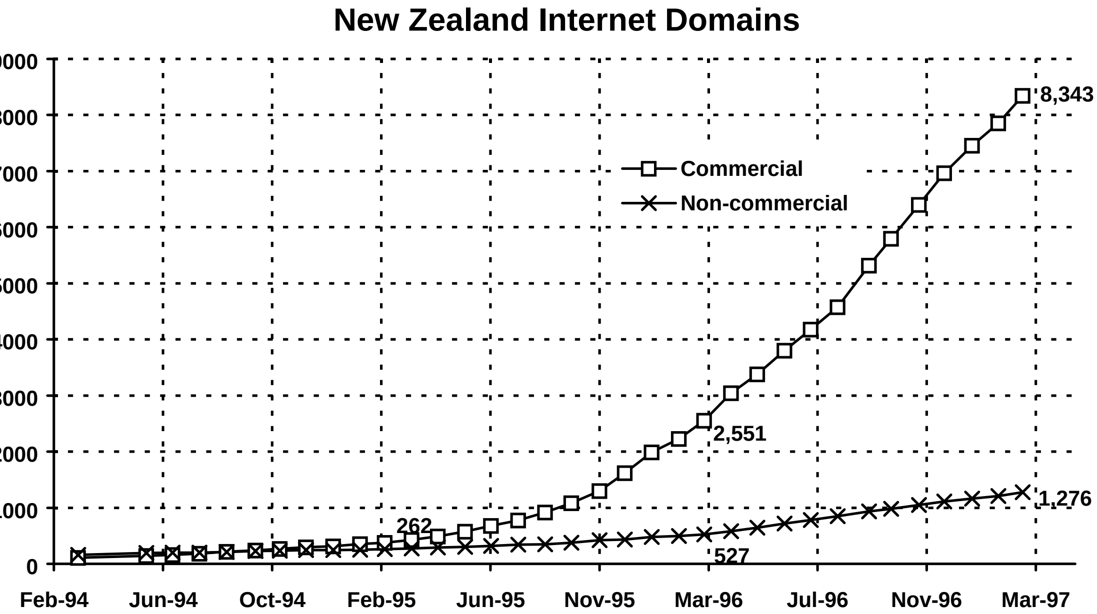
Organisations are allocated domain names according to organisation type. The penultimate part of a name, such as the “co” in name.co.nz is used to categorise domains. This part of the name is often called a second level domain. In New Zealand the following second level domains are used:

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

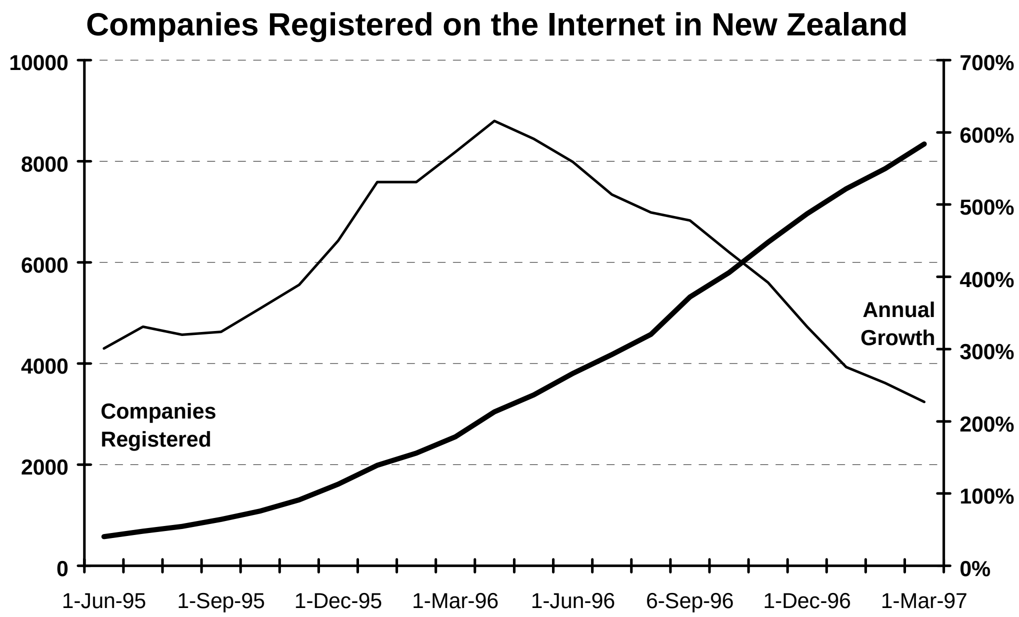
While there is provision for individuals to have domain names of their own in the gen.nz domain, most do not. Therefore numbers of domains registered is not a good indicator of individuals using the Internet.

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



This graph shows a significant rise in the number of commercial domain registrations over the last year from 2,551 to 8,348, an annual growth rate of 227%. Over the same period growth in the registrations of non-commercial domains has also been increasing rapidly at a rate of 142% from 527 to 1,276, although this increase is somewhat overshadowed by the growth in commercial domain registration.

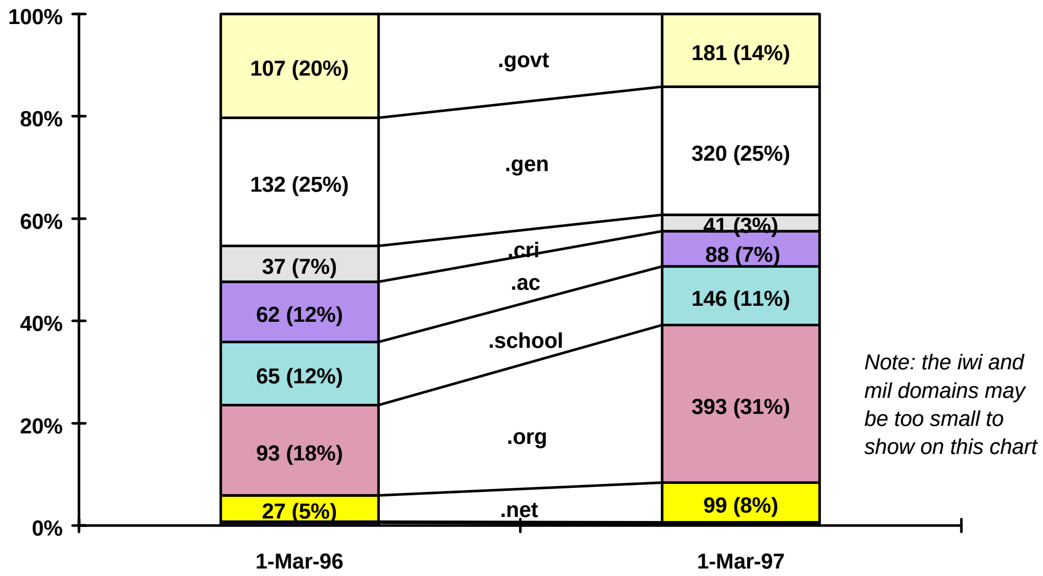
The following graph charts the commercial domain information as in the graph above, however, a line mapping the annual growth rate is added.



This graph also shows the substantial growth in the registration of New Zealand companies on the Internet. However, the line plotting the annual growth shows that the annual growth rate peaked in April 1996, and has been falling steadily since, although it is still at 227%.

The following graph shows how the non commercial domain registrations are split for the March 1996 and 1997 years. As can be seen, there has been significant growth in the number of organisations registering under the org. domain over the year. This domain now comprises 31% of the non-commercial domains.

New Zealand Non-commercial Internet Domains

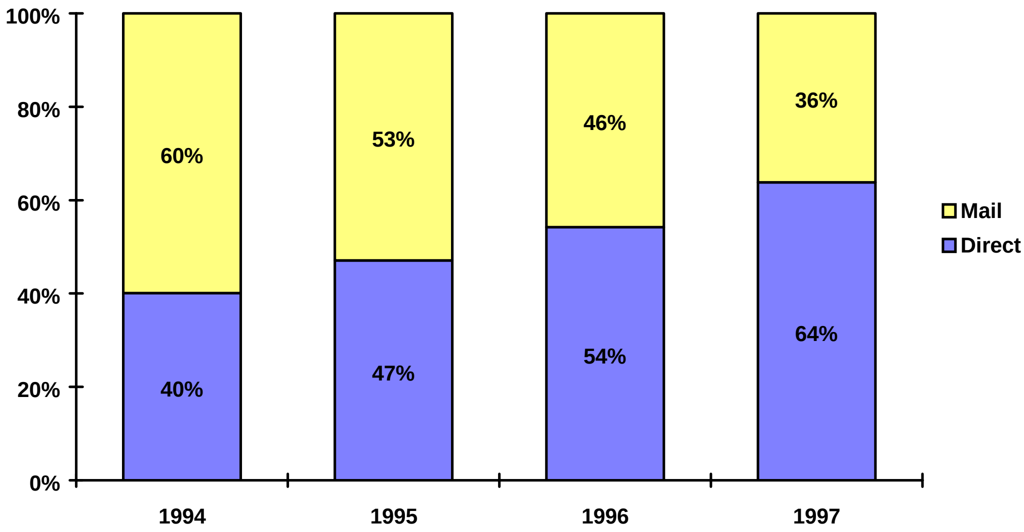


7.2 Direct Connection Versus Mail-Only Connection

There are two ways in which an organisation can connect to the Internet: a direct connection allowing full access, or a mail only connection. The latter type of connection would typically be used to enable the users of a corporate mail system to send and receive Internet mail messages, without providing 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 for the March 1994-97 years. It indicates the proportion of organisations connecting directly to the Internet is growing. By 1997, 64% of connected organisations were directly connected, up from 40% in 1994.

Split Between Directly Connected and Mail-Only Connected Organisations

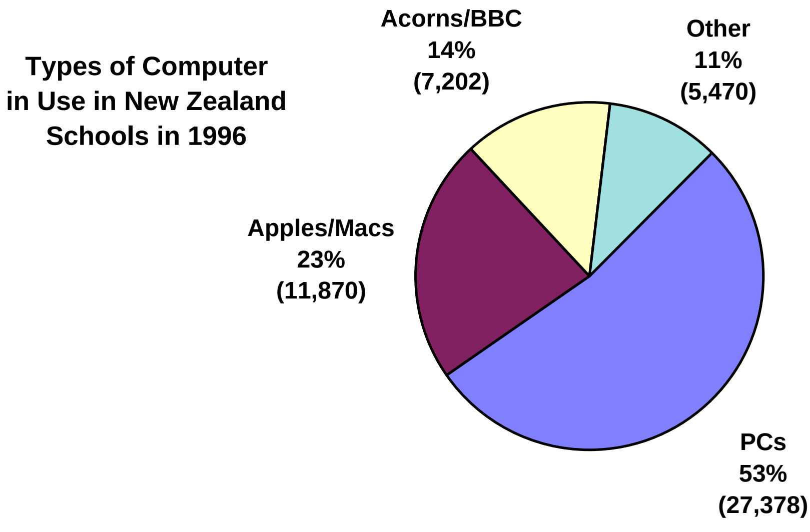


8. Computers in New Zealand Schools

The information in this section is taken from a survey of New Zealand schools and was provided by the Ministry of Education. The survey results were originally published by the Ministry of Education in November 1996[1]. The survey aimed to determine the numbers and types of computers in New Zealand schools and the extent to which schools are, or intend to be connected to the Internet.

All New Zealand schools - a total of 2,736 - were sent forms to complete. 2,673 schools responded, a 98% response rate. However, further information received from schools following the survey indicated that a number treated the survey as relating to only those computers used for administration and did not include those used in classrooms. Additionally a number of schools did not include those computers considered to be ‘useless’ or obsolete. These two factors suggest the numbers used here tend to underestimate the actual numbers of computers in New Zealand schools.

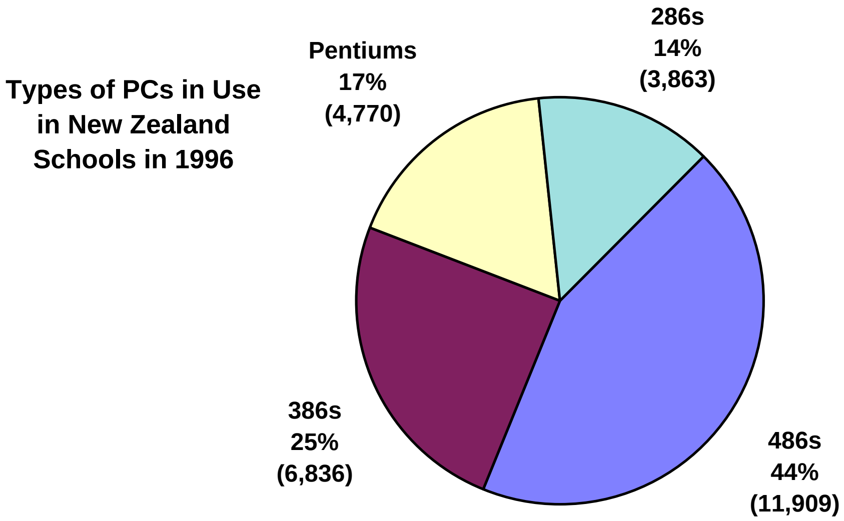
Almost all New Zealand schools have computer equipment of some kind available. The survey found a total of 51,920 computers available for staff or student use among the responding schools, or on average 19.4 computers per school. The chart below shows what type of computers were found to be available. As can be seen, the majority of these were IBM compatible PCs. Computers in the ‘other’ category cover a diverse range, including models that may be considered outdated.



A breakdown of the IBM compatible PCs category by processor class is shown below. The most common type is the PC based on the 486 chip and

[1] J Larry Owens: *A Survey of Computer Use in New Zealand Schools*; Ministry of Education Research Bulletin, Wellington, November 1996.

there were 11,909 of these in use, or 44% of all PC type computers. This type is also the most common overall, representing 23% of all the computers available in schools.



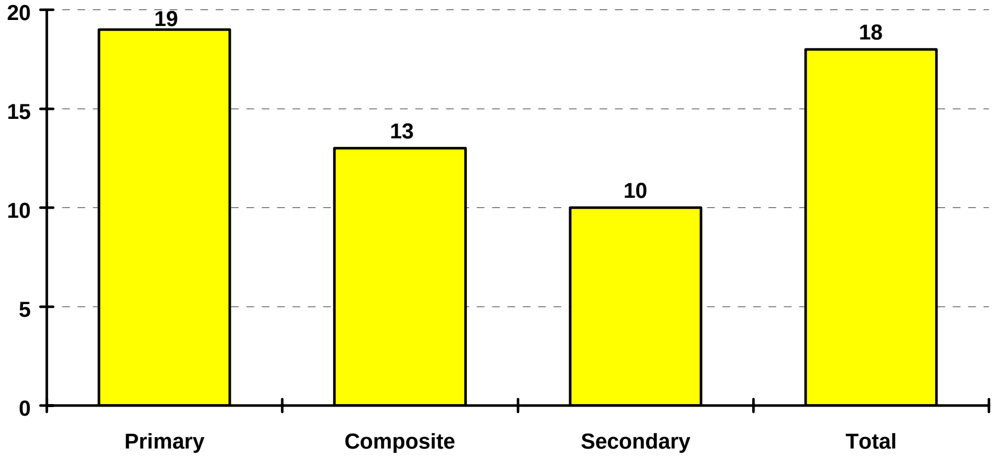
8.1 Student-Computer Ratios

The number of computers per student across all schools and by school type is described in this section. As the survey did not discriminate between computers used by teachers and those used by students, the number of computers used is the total number of computers reported. Schools were only included if information was available on both the number of computers and the student roll as at July 1995.

The following chart shows the mean student-computer ratio for each school type - primary (including intermediate), composite (including area) and secondary - and the overall mean student-computer ratio. The latter was taken as the mean of all the student-computer ratios calculated for each school. Each school's student-computer ratio was calculated as the total number of computers available for use at the school divided by the school's roll as at July 1995.

As can be clearly seen, secondary schools had a higher number of computers available per student than primary and composite schools.

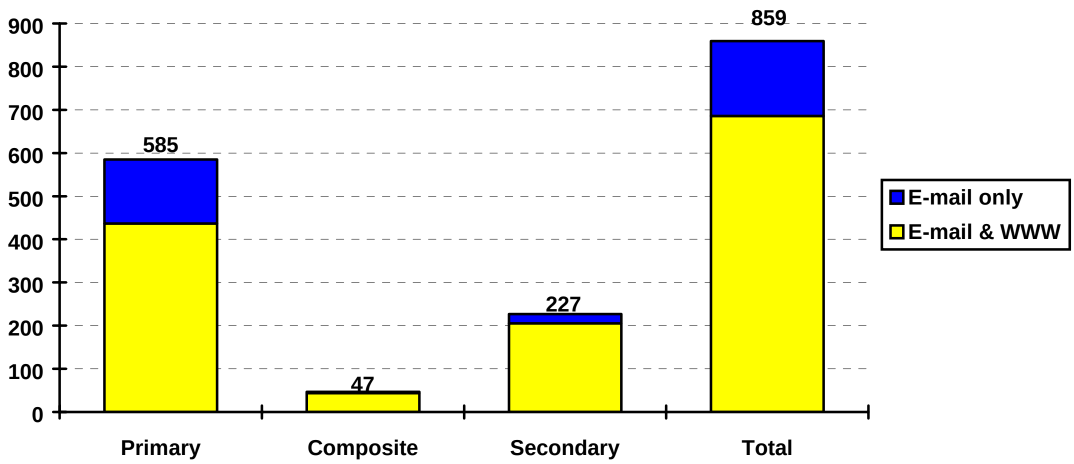
Mean Student-Computer Ratio by School Type in 1996



8.2 Internet Connections in Schools

The survey also asked respondents several questions about the Internet. Each school was asked if they had any computers connected to the Internet, and if so, how many were e-mail connected only and how many were connected for both e-mail and world wide web access.

Number of Internet Connections by Type and School in 1996



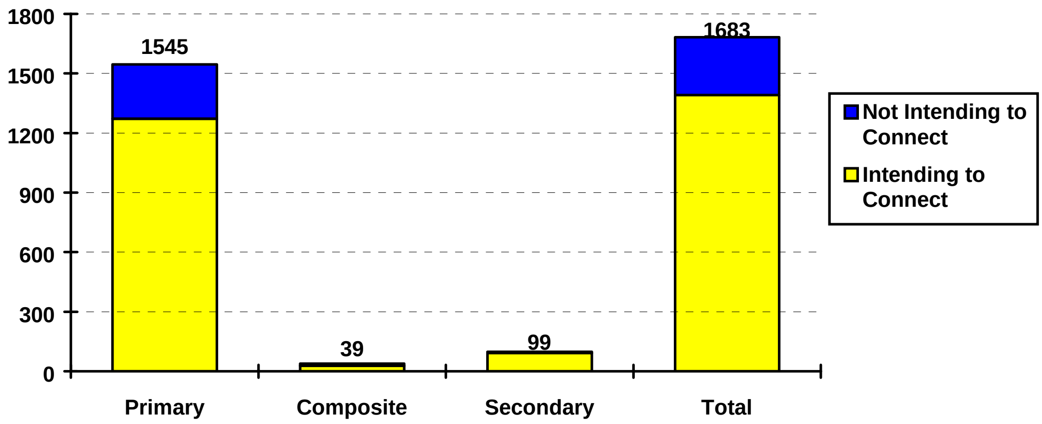
The chart above shows that 859 or 32% of the responding schools had at least one computer connected to the Internet and the majority of Internet connections are 'full' connections ie both e-mail and the world wide web. Only 173 or 20% of the connected schools had an e-mail only connection.

While the absolute numbers of primary schools with a connection is higher than the number of secondary and composite schools, just 585 or 26% of primary schools had a connection, while 47 (54%) of the composite schools and 227 (68%) of the secondary schools had an Internet connection.

8.3 Intention to Connect to the Internet

To gauge the future growth of Internet connections in schools, those schools not yet connected to the Internet were asked whether they intended to connect to the Internet by January 1998. The following chart indicates that a majority (83%) of the schools without an Internet connection were intending to connect by January 1998. Almost all (93%) of the unconnected secondary schools were intending to connect and 82% of the unconnected primary schools also intended to get connected by January 1998.

Schools Intending to Connect to the Internet by January 1998



9. Enquiries

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