



NOVEMBER 2005

INFORMATION TECHNOLOGY PROFESSIONAL: OCCUPATIONAL SKILL SHORTAGE ASSESSMENT

Current Situation: Genuine skill shortage

Short-term Outlook: Genuine skill shortage

1 Executive Summary

1.1 Results from the 2004 Survey of Employers who have Recently Advertised indicate that a shortage of Information Technology (IT) professionals in New Zealand has emerged. The fill rate for IT professionals has dropped from 89% in 2003 to 53% in 2004; the average number of suitable applicants has decreased to 1.8 per vacancy, down from 3.8; and the number of specialisations in shortage has risen from 13 to 54.

Table 1: Employer Survey Indicators, 2004

	Fill Rate	Average Number of Suitable Applicants
IT Professionals	53%	1.8
All Professionals Surveyed	56%	1.7

Source: Survey of Employers who have Recently Advertised, Department of Labour.

1.2 Employment of IT professionals has grown rapidly since the early 1990s. From mid-2001, growth has escalated. The number of employed IT professionals has increased from approximately 9,000 at the beginning of 2001 to 23,000 in early 2005. On average, almost 3,500 new jobs have been created each year over this period.

1.3 The IT profession has been well supplied with new graduates from the tertiary education system, with more than 1,800 IT degrees awarded in 2003. A comparison of the number of degrees awarded with the number of IT professionals employed yields a training rate of 9.4%. This is considerably higher than the average training rate of 5.5% for all professional occupations surveyed by the Department of Labour. Graduate outflows have been supplemented by a positive net migratory inflow of IT professionals over the last few years.

1.4 The emerging shortage of IT professionals is explained by the growth in employment significantly exceeding the growth in supply since the upturn in the IT market in early 2001. The level of training of IT professionals is high relative to other professional occupations surveyed in the Survey of Employers who have Recently Advertised. It has been insufficient, however, to meet the escalating demand for IT professionals over the past few years.

2 Introduction

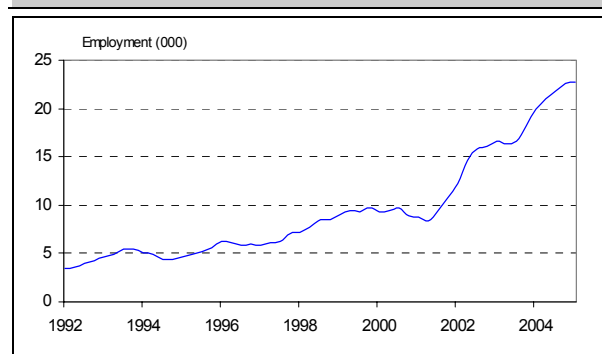
- 2.1 The purpose of this report is to investigate skill shortages in the IT profession in New Zealand. It aims to assess whether there is a shortage of IT professionals, the skill sets or specialisations in shortage, and the factors contributing to this situation. It also offers a short-term outlook for shortages in this occupation group.
- 2.2 In this report, the term 'IT professionals' refers to three occupations: Systems Analyst (New Zealand Standard Classification of Occupations [NZSCO] code 21311), Computer Applications Engineer (21312), and Systems Manager (21313). These occupations cover professionals who 'develop systems and procedures for computerised data processing systems, analyse data processing needs and problems of clients or employers and develop appropriate systems and procedures, maintain all operating software and assess the operational efficiency of current and proposed software'¹. Computer programmers and other IT support occupations such as technicians and web developers are not classified as IT professionals under NZSCO, and are consequently not included in this report.
- 2.3 Further background to this occupational report, including a discussion of the methodology; a glossary of terms; and an overview of the Department's *Survey of Employers who have Recently Advertised*, including the survey questionnaire, can be found in the 'Background and technical note' at <http://www.dol.govt.nz/publications/jvm/job-ad-professionals.asp>.

3 Demand for IT Professionals

3.1 Historical Demand

- 3.1.1 Employment of IT professionals has grown rapidly since the early 1990s, according to the Household Labour Force Survey². The number of employed IT professionals more than doubled between 1991 and 1999 from 3,500 to 9,500. This compares with growth of 21% in all occupations, and 16% in professional occupations as a whole. After an eighteen month decline in employment at the beginning of the new millennium (following the unwinding of Year 2000 [Y2K] compliance projects), employment of IT professionals has surged since mid-2001. The number of employed IT professionals has increased from approximately 9,000 at the beginning of 2001 to almost 23,000 in early 2005. Over this period, almost 3,500 new jobs, on average, have been created each year.

Figure 2: Employment of IT Professionals (1992-2005)



Source: Household Labour Force Survey, Statistics New Zealand.

¹ New Zealand Standard Classification of Occupations.

² All figures are annual averages of four quarters' data.

3.2 **Future Demand**

- 3.2.1 The Department of Labour (the Department) expects that the strong employment growth for IT professionals experienced in the current market will continue over the medium term.
- 3.2.2 In the longer term, the Information and Communications Technology (ICT) industry has been identified under the New Zealand Government's Growth and Innovation Framework (GIF) as one of the three sectors to lead the country's future economic growth³. GIF proposes a growth target of 100 ICT companies, each earning over \$100 million in sales per year, by 2012. Should this be achieved, ICT will increase its current contribution of 4.3% of GDP to 10% by 2012. Government support given to this sector will likely contribute to strong growth in demand for IT professionals.
- 3.2.3 The Department's view of future growth for IT professionals in New Zealand is also influenced by occupational employment projections from other developed countries. The Australian Department of Employment and Workplace Relations (DEWR) regards the computing and IT occupations as comprising one of five occupational groups with the highest employment growth rate prospects. DEWR considers that the growing importance of computer applications within businesses, including Internet and e-commerce, will encourage future growth in demand.
- 3.2.4 Similarly, the United States Bureau of Labor Statistics (BLS) predicts employment of computer professionals to increase by 5.3% per annum between 2000 and 2010⁴. This is in contrast to the forecast 2.3% per annum increase for all professionals, and 1.4% per annum increase for all occupations. The development of increasingly sophisticated technologies, the adoption of such technologies by businesses, and the falling prices of computer hardware and software, are some of the reasons given by the BLS for the strong growth in demand for IT professionals.

3.3 **Summary**

- 3.3.1 Employment of IT professionals grew rapidly during the 1990s. Employment dipped in 2000 following the unwinding of Y2K compliance projects, but since mid-2001 it has grown even more rapidly than during the 1990s. 3,500 jobs per annum on average have been created between mid-2001 and early 2005. The strong growth experienced in the current market is expected to continue over the medium and long term.

³ Ministry of Economic Development, 'The Growth and Innovation Framework Sector Taskforces: Progress with Implementation', June 2005.

⁴ United States Bureau of Labor Statistics, 'Employment by Occupation, 2002 and projected 2012', February 2004.

4 Supply of IT Professionals

4.1 Higher Education

4.1.1 More than 1,800 undergraduate degrees with an IT major were awarded in 2003, according to data from the Ministry of Education. A comparison of graduate output with employment⁵ of IT professionals yields a training rate of 9.4%. The training rate is a rudimentary measure of the rate at which supply can potentially grow through training. At 9.4%, the training rate for IT professionals is considerably higher than the average training rate (5.5%) for all professional occupations surveyed by the Department. The equivalent training rate for IT professionals in New South Wales, Australia, is substantially lower (3.8%)⁶.

Table 2: Enrolments and Achievements of IT Qualifications Degrees

	Total Students Enrolled				Number of Achievements		
	2000	2001	2002	2003	2002	2003	2004 (estimated)
Degree and Diploma - Postgraduate	3941	4593	4924	4676	1851	1895	1873

Source: Ministry of Education.

4.1.2 The high training rate means that compared to other occupations studied there is a large pool of newly qualified graduates. However, a number of employers interviewed for the Survey of Employers who have Recently Advertised (SERA) were looking for staff with at least five years experience. In the past, some employers have been reluctant to take on graduates because they have perceived graduates as high risk. Factors contributing to this risk perception include:

- The substantial investment in on the job training required to up skill a graduate;
- Poaching once this training has occurred; and
- The perception that graduates have a tendency to re-assess their career paths after a couple of years in the industry.

4.1.3 This reluctance to employ new graduates is of some concern as there are large numbers of new IT graduates entering the market each year. As a means of addressing this reluctance, the majority of IT recruitment agencies provide graduate placement free of charge.

⁵ The Department estimates that approximately 18,000 IT professionals were employed in New Zealand in 2003.

⁶ In this report, comparisons are made between New Zealand and New South Wales, Australia to contextualise the findings. Given that there are no national level estimates of training rates available, state-level data have been used. New South Wales is Australia's most populous state with the largest economy and its economy most closely resembles the structure of the New Zealand economy. It was thus deemed to provide the most suitable jurisdiction for labour market comparisons.

4.2 **Migration**

4.2.1 The supply of IT professionals through international migration flows has increased rapidly over the past few years⁷. The net outflows experienced in the late 1990s and early 2000s have reversed to a strong net inflow. Although permanent and long-term (PLT) departures of computing professionals have risen slowly from 338 in the year to August 1998 to 473 in the year to August 2004, the larger increase in arrivals has more than compensated for this. Table 2 shows that PLT arrivals rose from a low of 133 in the year to August 2000, to a four-year high of 749 in the year to 2003. The net effect of these two forces is that net migration rose from a loss of 182 computing professionals in 1999 to a net gain of 237 in 2004.

Table 3: Annual PLT Arrivals, Departures and Net Migration of Computing Professionals (August Years)

	1998	1999	2000	2001	2002	2003	2004
Arrivals	269	192	133	206	569	749	710
Departures	338	374	314	336	448	421	473
Net Migration	-69	-182	-181	-130	121	328	237

Source: External Migration, Statistics New Zealand.

4.2.2 A number of recruitment agencies and employers surveyed expressed concern about the ability of many suitably qualified immigrants to effectively function in the workplace. This was attributed to the potential difficulties posed by immigrants having English as a second language. Increasingly, IT professionals in New Zealand are required to interact directly with clients, and therefore need strong communication and client liaison skills.

4.3 **Summary**

4.3.1 The IT profession has been well supplied with new graduates from the tertiary education system, with more than 1,800 IT degrees awarded in 2003. A comparison of the number of degrees awarded with the number of IT professionals employed yields a training rate of 9.4%. This is considerably higher than the average training rate of 5.5% for all professional occupations surveyed by the Department. Graduate outflows have been supplemented by a positive net migratory inflow of IT professionals over the last few years.

5 **Results from the Department's Original Research**

5.1 **Employer Recruiting Experiences - Survey of Employers who have Recently Advertised (SERA)**

5.1.1 Employers interviewed in the 2004 SERA filled only 53% of their vacancies within eight weeks⁸ of advertising (Table 4). There were 1.8 suitable applicants per

⁷ It should be noted that these estimates could underestimate the migrant flows of computer professionals, as the occupations of approximately 40% of persons entering and leaving New Zealand are not recorded or are unidentifiable.

⁸ Employers are approached approximately eight weeks after advertising a vacancy. If they have not completed their recruitment process after eight weeks, employers are approached at a later stage when the process has been completed.

vacancy. This suggests that there is a shortage of IT professionals in New Zealand. Occupations with fill rates lower than about 80% are typically regarded as being in shortage. Employers recruiting for IT professionals had slightly less success in filling their vacancies than did the total sample of employers attempting to fill professional positions (56%) in the SERA.

- 5.1.2 The SERA results suggest that the IT recruitment environment has become considerably more difficult for employers since the previous survey in 2003. The fill rate for IT professionals dropped from 89% to 53%, and the number of suitable applicants declined from 3.8 to 1.8 per vacancy.

Table 4: SERA Results IT Professionals and All Professionals Surveyed, July 2004

	Number of Employers	Number of Vacancies	Number of Vacancies Filled	Fill Rate	Number of Suitable Applicants	Average Number of Suitable Applicants Per Vacancy
IT Professionals	28	38	20	53%	70	1.8
All Professionals Surveyed	207	296	167	56%	503	1.7

Source: Survey of Employers who have Recently Advertised, Department of Labour.

- 5.1.3 The emergence of a shortage of IT professionals may be explained by the growth in demand significantly exceeding the growth in supply since the upturn in the IT market in early 2001. The number of IT professionals employed between 2001 and early 2005 has grown by 3,500 on average per annum.
- 5.1.4 In contrast, the annual number of IT professionals being trained has only grown to about 1,850 since 2002. This has been supplemented by a small level of net migration (an average of approximately 140 per annum since 2001). The fact that the number of IT professionals employed grew faster than the number of IT professionals being supplied (through either training or migration) can probably be explained by the presence of a surplus of IT professionals which emerged during the slow IT market of late 1999 and early 2001. However, this excess had probably been absorbed into the labour market by the time the SERA was conducted in 2004. A shortage has therefore emerged with the now increasing growth in demand.

5.2 **Experiences of IT Recruitment Agencies – 2004 Survey**

- 5.2.1 Thirteen IT recruitment agencies were approached in 2004 regarding their general impressions about the market for IT professionals. The IT recruitment agents predicted an upward surge in the demand for IT professionals. This has been confirmed with the IT labour market showing a revival. IT recruitment agents reported a large increase in the number of job vacancies on their books compared to the same time in the previous year. IT recruitment agents felt the positive environment would continue at least for the medium term. Some factors on which they based this positive outlook were:

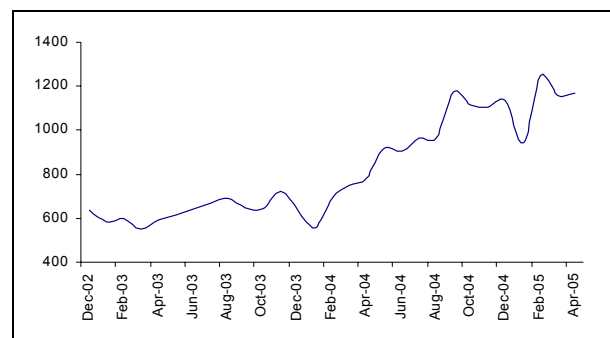
- New Zealand businesses are becoming more confident at pitching for overseas contracts, and as a result there has been a rise in the number of overseas contracts awarded;
- Companies are seeking to recruit senior level managers for new projects, with demand for team leaders and the lower level IT staff required to carry out the actual project work expected to subsequently increase;
- A number of large, and potentially longer term, Government IT projects have recently started; and
- The IT contract market is now robust. IT professionals who had previously moved into permanent roles after a slowdown in the IT market have shifted back into contracting, and hourly rates are climbing. A rise in the number of IT professionals entering the contract market is usually indicative of a strengthening IT market.

5.2.2 As part of the survey, the IT recruitment agencies were provided with a list of approximately 124 specialisations and asked to identify those specialisations in which they had experienced difficulty filling vacancies. A list of specialisations in shortage is shown as Table 5. Specialisations in shortage are those that were identified by more than 50% of agencies as being in shortage. It is possible that this list understates shortages among IT professionals due to the rapidly changing nature of the IT market and the continual emergence of new technologies.

5.3 **The Job Vacancy Monitor - Changes in Market Conditions**

5.3.1 The number of advertised IT vacancies measured in the Department's Job Vacancy Monitor has grown rapidly since the beginning of 2004 after showing little change in 2003. There were almost 70% more vacancies measured in January 2005 compared to the same month in 2004. Strong growth has continued through 2005, with annual growth rates exceeding 40% in the first four months of 2005. This rapid growth in vacancies suggests that recruiting conditions for employers have become increasingly difficult since early 2004 as growth in demand has outstripped growth in supply.

Figure 1: IT Job Advertisements: December 2002 to April 2005



Source: Job Vacancy Monitor, Department of Labour.

Table 5: IT Specialisations in Shortage

Databases (DBMS)	Networking Technologies	E-Commerce and ERP (Enterprise resource planning)
Data Warehousing	CCNA (Cisco Certified Network Admin)	SAP
MS SQL Server	CCNE (Cisco Cert Network Engineer) CGI	Oracle
Oracle	Cisco	Oracle Financials
Sybase SQL Server	Firewall/Internet Security	PeopleSoft
	IPX	
Application Development	Network Design	System Security
C	Novell Netware	CISSP
C#		E-commerce security
C#.net	Office/Email/Groupware	Network security
C++	Microsoft Exchange	
Embedded C		OLAP/Reporting/Data mining (Online Analytical Processing)
	Operating Systems	Crystal Reports
Java	HP/UX	SAS
Oracle Forms	SUN OS	
.net	Sun Solaris	Networking Technology
OO.net	Unix	Master CNE
Visual Basic		Wireless Engineers
Visual Basic.net	Component Technologies	
Visual C++	EJB	Systems Management/Infrastructure
XML	J2EE	Citrix
	OLE	SMS Server
Application Design		
UML	Process and Systems Management	Telcoms
Rational Rose	BPR	Broadband CDMA
	Knowledge Management	
Web Development	Project Management	
JSP	Systems Analysis	
Vignette		

6 Outlook

- 6.1 This report concludes that a shortage of IT professionals existed in New Zealand at the time of the 2004 SERA. This shortage has emerged since the previous survey conducted in 2003. The emergence of this shortage is explained by the growth in demand (as measured by employment) significantly exceeding the growth in supply. With the fill rate for IT professionals dropping from 89% to 53%; the numbers of suitable applicants dipping to 1.8 per vacancy, down from

3.8; and the number of specialisations in shortage climbing from 13 to 54; the indications are that the market has tightened and may continue to hold at this level unless current supply or demand trends change.

For queries regarding this report please contact info@dol.govt.nz.

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