



ICT Skills Snapshot

The State of ICT Skills in Victoria
November 2002



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Minister's Foreword



I am pleased to release the *ICT Skills Snapshot* for November 2002, the second of the Victorian Government's biannual assessments of the supply and demand of ICT skills in Victoria.

It builds on the *ICT Skills Snapshot*

released in June 2002, which revealed that Victoria is Australia's ICT skills heartland, with more than a third of the country's students enrolled in ICT courses located in Victoria.

The *ICT Skills Snapshot* provides valuable intelligence to the ICT industry by forecasting the direction of Victoria's high-tech industry and highlighting opportunities for people who work or seek to work in the industry.

Significantly, the November 2002 report confirms earlier industry predictions that the Victorian ICT industry would stabilise after a significant downturn in 2001, with the number of people employed from August–November 2002 higher than for the same period in 2001.

Victoria's small and medium businesses also express healthy optimism about their growth prospects for the next 12 months.

Some of the other key findings of the November 2002 report are that:

- the demand for specialist skills such as network security and enterprise architecture has grown;
- areas where demand is expected to be high over the coming year include wireless technology, web services, security, storage, MS.Net and J2EE;

- there was a slight increase in female participation in the August quarter but Victoria's ICT industry continues to be male dominated, with men accounting for 82 per cent of the workforce; and
- employers are increasingly seeking greater flexibility and multi-skilling from their IT professionals with skills such as business acumen, interpersonal skills and client relationship management in high demand.

This *ICT Skills Snapshot* also has the additional feature of comparative 1996 to 2001 Census data which provides a longitudinal view of the ICT industry. Significantly, the data shows a 31.3 per cent increase in the number of ICT professionals in Victoria.

The report is an initiative of *skills x knowledge = growth*, the Victorian Government's framework for building the State's ICT skills and knowledge base.

The *ICT Skills Snapshot* for November 2002 provides a retrospective view of the ICT industry's significant growth and associated employment opportunities. I commend it to you.



MARSHA THOMSON MP
Minister for Information and Communication Technology



Executive Summary

This report is a snapshot of the Victorian market for information and communication technology (ICT) skills as at November 2002. The report has been prepared using a range of data sources to highlight the demand for ICT skills in Victoria. A highlight of this report is the inclusion of Census data showing the five-year trends in the ICT labour market from 1996 to 2001.

Methodology

The *ICT Skills Snapshot* for November 2002 is generated from the ICT Skills Tracking and Monitoring System developed for the Victorian Government by the IT Skills Hub to identify and track the quantity and type of ICT skills and qualifications required by industry and the expected supply of these skills. The system collates all known sources of ICT skills intelligence. The system is continuously updated as new information becomes available. The most recent data has been used to produce this report.

Qualitative data obtained through a series of interviews has also been used to inform this report. The purpose of the interviews is to provide up-to-date qualitative data on future projections of skills requirements. Interviews were conducted in October 2002 with senior representatives from small and medium enterprises (SMEs), government organisations, education providers and industry leaders in ICT. The interview participants collectively employ 70,000 people in Australia. References to the views of the industry in this report are based on comments and opinions expressed in the interviews.

The next *ICT Skills Snapshot* will include supply side data analysis due to be available later this year.

Major Findings

Employers are increasingly seeking non-technical skills and greater flexibility from their employees

With a global downturn in the ICT industry and competition for jobs strong, employers are seeking more from ICT professionals. Employers are requiring people with a broader range of skills and the



capacity to re-skill, diversify and multi-task is highly regarded.

In the current market, proficiency in one technical skill is not enough. The number and range of skills required in advertised positions continues to grow. For example, since 2001 there has been a 28 per cent increase in the number of advertised technical skills for an IT manager.



This trend is also reflected in the industry interviews with organisations opting to build a flexible workforce with a range of technical and business skills, rather than specialising in only one particular technology.

There is anecdotal evidence suggesting that the distinctions between certain ICT job categories such as information technology and communications are becoming less defined. This may be part of the broader trend toward multi-skilling. For example, the technical input into wireless technology such as mobile telephones covers both sectors.

Most organisations have also taken steps to assess the skills of their workforce and to formulate plans to manage and grow the necessary technical skills to face future challenges.

The biggest challenge identified by industry is developing the behavioural or non-technical skills in their technical staff.

The most common behavioural skills in demand included:

- interpersonal and teaming skills
- communication
- client relationship management
- business acumen.

ICT professionals need to continuously review the market to determine what skills they require to remain competitive

With the market still very competitive, ICT professionals need to be proficient in one of the highly sought after skill areas such as network security and enterprise architecture or be proficient in more than one type of technology.

In particular employers are looking for people with the following skills over the next 12 months: web services, MS.Net, XML, SOAP and J2EE. There is less demand for people with more general



programming skills, vendor-specific skills or limited work experience.

ICT industry expenditure remains under scrutiny and investment in new projects is relatively low. Given this, the ICT industry continues to focus on short-term benefits, cost efficiencies and risk reduction.

Increases in demand for ICT skills expected

Despite a 43.4 per cent decrease in the demand overall for ICT positions in 2002 compared to 2001, trend data suggests the downturn has now plateaued and increases in demand for ICT positions are likely. (IT Skills Hub, *Market Monitor*, 2002).

Significantly, this report confirms industry predictions in the *ICT Skills Snapshot* for June 2002 that the Victorian ICT industry would stabilise with the number of people employed from August–November 2002 higher than for the same period in 2001.

Another indication that the ICT industry is regaining strength is a 4 per cent increase in national average salaries for more than 40 different ICT positions for the year to May 2002 (Australian Computer Society Remuneration Survey, 2002).

Female participation in the industry remains low, with 82 per cent of the ICT workforce in Victoria male.

There was a slight increase in female participation in the August 2002 quarter, bringing the numbers back to what they were in August 2001.

J2EE and MS.Net skills are in demand

Based on the analysis of advertised positions in 2002, the skills most in demand were J2EE skills. Other skills experiencing high growth include Peoplesoft, MS.Net and radio frequency skills. Seven per cent of all skill attributes recorded an increase in demand.

Skill areas in which industry expects high demand over the coming year are wireless technology, web services, security, storage, MS.Net and J2EE.

Small and medium enterprises are positive about the future

Many specialist ICT small and medium enterprises (SMEs) that survived the dotcom boom and subsequent bust in 2001 are now in a strong position to grow their businesses.

The downturn in the ICT industry over the last year has resulted in a healthy supply of experienced technical staff. SMEs have been able to take advantage of the situation to employ highly skilled ICT professionals at competitive rates.

The situation has also improved for ICT professionals as the SMEs surveyed indicate they have been better positioned to keep skilled staff and are more willing to invest in staff training.

SMEs that participated in the industry interviews are very positive about their growth prospects over the next 12 months.



Skills in Demand

In general there has been a decline in demand for ICT skills since the June 2002 *ICT Skills Snapshot*. However, according to Gottlieb Research 2002, which analyses changes in the demand for particular ICT skills based on the number of advertisements to recruit each skill type within a year, some skills went against the trend and recorded an increase in demand.

The highest demand increase was for Enterprise Application Integration (EAI) skills for which the number of job advertisements increased by more than 120 per cent.

Demand for One World, J2EE, Tibco and JD Edwards skills also increased substantially. (See Glossary for an explanation of the identified ICT skills).

Table 1 shows the skills most sought after in Victoria compared with the Australian total in 2002. It also shows that Victoria had approximately 23 per cent of the national ICT skills demand during this time.

In 2002, Victoria defied the national trend in a number of skills areas increasing demand for Capacity Planning, Distribution, Product Development and AS400 skills.

A number of ICT skills such as Tibco and EAI skills were highly sought after in Victoria with demand making up around half of the national demand. Demand for MQ Series Messaging, One World and Business Intelligence in Victoria was about one-third of the national demand.

Table 1 — Highest Volume of ICT Skills Demand in Victoria in 2002

Skill	No. of Ads Victoria	No. of Ads Australia
Support	5,669	25,734
Communications	5,288	23,100
Software	5,186	24,719
Design	5,179	23,540
Implementation	5,083	21,495
Analysis	3,478	15,470
Sales	3,354	14,397
Server	3,243	14,194
Networks	3,136	14,054
Unix	3,022	13,634
Consulting	2,900	8,501
Maintenance	2,845	13,542
SQL	2,815	12,487
Oracle	2,689	11,105
Finance	2,624	12,235
Training	2,538	11,661
World Wide Web	2,532	11,420
Windows NT	2,470	11,388
Java	2,355	10,215

Source: Gottlieb Research, 2002.



Table 2 — Skills Recording an Increase in Demand in Victoria Compared to Australia 2002

Table 2 features comparative data between January–June 2002 and July–December 2001. The first two columns show the skills recording the highest increase in demand between 2001 and 2002.



Skill	Victoria No. of Ads	Victoria % Increase	Australia No. of Ads	Australia % Change	% Victoria ads to Australia ads
EAI	360	121.4	771	26.1	46.7
One World	172	68.8	608	11.8	28.3
J2EE	674	68.5	2,962	7.0	22.6
Tibco	485	59.4	914	20.8	53.1
JD Edwards	338	56.1	1,213	23.8	27.9
Capacity Planning	461	29.4	1,701	-19.2	27.1
Distribution	310	26.3	1,843	-22.6	16.8
Product Development	297	20.0	1,497	-39.9	19.8
AS/400	306	18.6	1,634	-36.5	18.7
Netware	214	16.2	854	0.0	25.1
MQ Series Messaging	352	16.0	1,023	-34.6	34.4
Risk Assessment	177	15.9	979	-32.5	18.1
Business Systems	253	12.6	1,138	-25.3	22.2
VPN	187	12.5	867	-28.2	21.6
Business Intelligence	432	11.8	1,462	-11.3	29.5

Source: Gottliebsen Research, 2002.

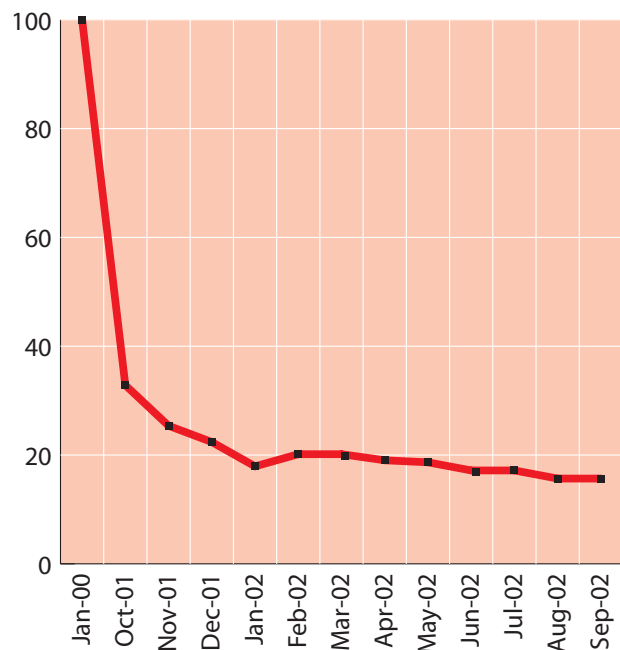
Department of Employment and Workplace Relations ICT Vacancy Index

The Department of Employment and Workplace Relations (DEWR) ICT Vacancy Index is based on a weekly count of ICT vacancies on six online sites — Jobnet, CareerOne, Seek, Fairfax IT Jobs, Employment and Monster. The composite series commences in January 2000 and a four-weekly average has been applied to smooth volatility in the data. These sites are quite dynamic and operate in a sector with very high vacancy turnover. Consequently, the ICT Vacancy Index should be viewed as a broad indicator of trends in the demand for ICT skills, and care should be exercised in using the following figures.

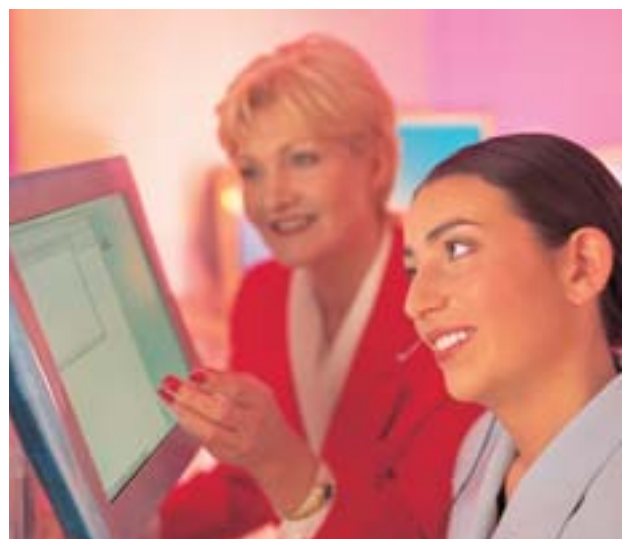
The ICT Vacancy Index rose by 0.4 per cent over the four weeks to mid September 2002 to 22.7 per cent (January 2000 = 100). The five Australian ICT online recruiting sites included in the index averaged around 8550 advertisements in the four weeks to mid September 2002. ICT positions may be advertised on more than one site. The number of advertisements is an indicator of demand for ICT skills and not a measure of the number of ICT jobs available.

The ICT Vacancy Index declined during 2001, and is now 84.6 per cent below the Index peak recorded in September 2000. In September, Victoria had 25.9 per cent of ICT online vacancies (around 2100). Compared with January 2000 (when the Victoria ICT Vacancy Index was set at 100 per cent), Victoria has a current vacancy index of 15.5 per cent.

DEWR ICT Vacancy Index for Victoria (January 2000 = 100)



Note: This is for Victoria only. The graph uses January 2000 as the base percentage amount.





Emerging Skills

The industry interviews and research conducted by Gottlieb Research (IT Skills Hub, *Market Monitor*, 2002) have identified a number of skills that will be in demand over the coming 12 months. These include:

- wireless technology
- web services
- security
- storage
- MS.Net and J2EE.

Of the emerging skills identified in the *ICT Skills Snapshot* for June 2002, industry interviews indicate that security and online and web services will remain in high demand.

While the other emerging skills reported in the June 2002 report, such as Linux and supply chain, are in less demand due to the increased business focus on the application of technologies such as wireless technology, web services etc, they remain important.

Wireless Technology

Significant investments by Australian telecommunications companies in wireless local area networks and a growth in wireless implementation in the United States suggest that the downturn in demand for wireless skills may be short lived and that growth in this area is expected.

Some industry pundits suggest that wireless solutions could become the biggest enterprise trend since the Internet revolution.

Web Services

Web services are standards that enable the use of applications or services on a network in a consistent and secure manner. Industry interviews indicate that most organisations remain unaware of the full potential of web services applications.

There are promising signs that this is changing with the demand for web services skills increasing in Australia by 91.7 per cent in 2002 (IT Skills Hub, *Market Monitor*, 2002).

The key skills relating to Web services are:

XML

Extensible Markup Language, a specification developed by the Worldwide Web Consortium (W3C). XML is a pared-down version of Standard Generalised Markup Language (SGML), designed especially for Web documents. It allows designers to create their own customised tags, enabling the definition, transmission, validation, and interpretation of data between applications and between organisations.

SOAP

Simple Object Access Protocol provides a way for applications to communicate with each other over the Internet, independent of platform. SOAP was developed by Microsoft, DevelopMentor, and Userland Software and has been proposed to the Internet Engineering Task Force (IETF) as a standard.

SAML

Short for Security Assertion Markup Language, an XML-based framework for ensuring that transmitted communications are secure.

XCML

Extensible Access Control Markup Language — XCML is a computer language that can be used to create web pages, multimedia projects and full applications.

XRML

Extensible Rights Markup Language (XRML) provides a universal method for specifying rights and issuing

permissions (licenses) associated with works by content owners, aggregators, retailers, publishers and software developers.

XML Schema

XML Schemas define a richer set of datatypes such as booleans, numbers, dates and times, and currencies — which is invaluable for e-commerce applications. XML Schema is defined in the W3C's XML Schema Working Group Working Draft published on May 6, 1999.

WSDL

Web Services Description Language — describes a service so it can be used by other applications.

UDDI

Universal Description Discovery and Integration — enables a Web Service to be listed as a directory.

JAX-RPC

Defines a set of standard Java APIs that let customers create XML-based Web Services using SOAP.

Security

ICT security continues to be a high priority not only from an e-commerce perspective but also from new concerns about global terrorism. ICT security is no longer restricted to building a big e-wall or firewall. Increasingly ICT security is being seen as an integral element of risk management.

Demand for risk management skills in Victoria rose by 15.9 per cent over the past six months compared to a national decrease of 32.5 per cent. Given the global environment it is expected that risk management and ICT security will continue to be skills in demand.

Storage

The storage of accumulated data and back-up information from computers is an ongoing issue for business. Industry interviews indicate that few organisations have staff dedicated to storage.

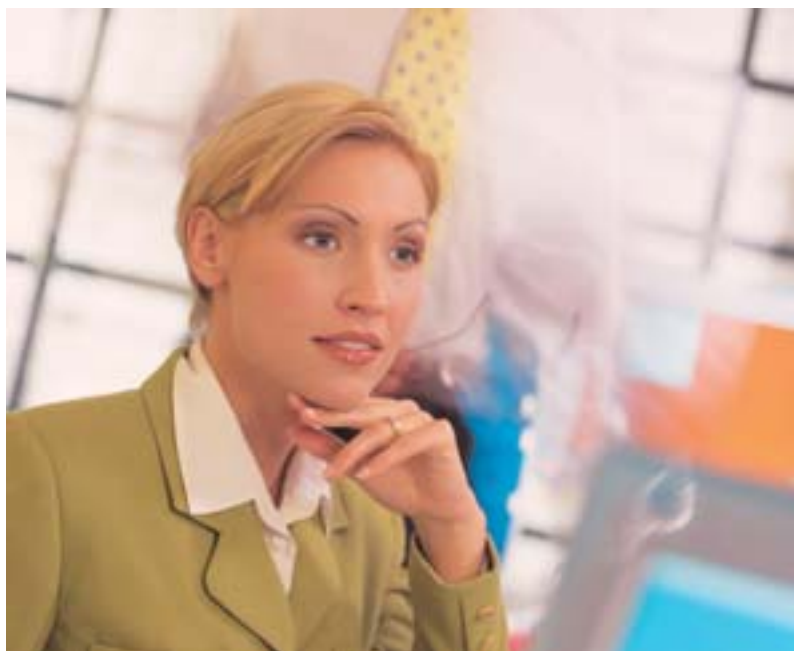
Storage solutions have shifted from storage hardware to the development of storage software.

As the software storage market develops over the next five years, career paths and opportunities will grow in the storage sector.

MS.Net and J2EE

Victoria has the highest demand in Australia for J2EE skills, with an increase of 68.5 per cent from December 2001 compared with the national demand increase of 7 per cent.

Conversely, the Victorian demand for MS.Net skills increased by 2.2 per cent while the national demand increased by 72.2 per cent.





Salary Movements

The remuneration of computer professionals continued to rise throughout 2002.

Average salary packages for IT professionals rose by 4 per cent in the 12 months to May 2002 (Australian Computer Society Remuneration Survey, 2002).

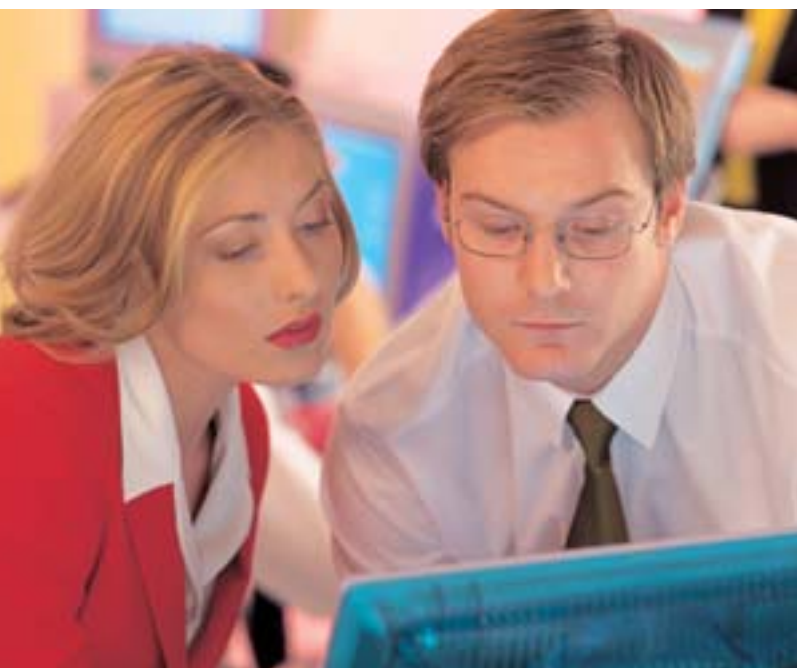
Based on the Total Employment Cost (TEC) which includes the value of base salary, bonuses, superannuation and the value of fringe benefits such as motor vehicles, the most lucrative ICT positions were in General Management and Sales & Marketing positions. This is despite a slight fall in the TEC for Sales & Marketing positions during the year.

The TEC for higher level positions, such as General Manager, Consultant, Project Manager and IT Manager rose substantially over the past year. Remuneration for middle level and specialist ICT jobs generally increased, with Research & Development positions increasing by a massive 52 per cent.

Table 3 — ICT Salary Movements 2001–2002

Jobs	2001	2002
Sales & Marketing	\$162,203	\$160,717
General Management	\$126,911	\$160,782
Consulting	\$107,284	\$117,994
Project Management	\$104,400	\$111,498
IT Management	\$103,109	\$118,590
Database Administrator	\$87,007	\$83,399
Project Leader	\$86,400	\$97,834
Systems Management	\$82,998	\$85,674
Research & Teaching	\$80,727	\$79,706
Research & Development	\$78,840	\$119,853
LAN Manager	\$76,656	\$64,468
Analysis & Testing	\$70,841	\$77,625
Programmer/Analyst	\$68,394	\$73,060
Teaching/Training Only	\$65,655	\$61,405
Computer Support	\$64,240	\$68,982

Source: Australian Computer Society Remuneration Survey 2002.



Distribution of Skills 1996–2001

The Australian Bureau of Statistics' Census data records the number of people who identify themselves as ICT professionals living in Victoria and provides details of the employment categories in which they are employed.

The number of people employed as ICT professionals in Victoria has grown by 31.3 per cent from 1996 to 2001. The number of people working in ICT professions increased across most Victorian Labour Force Regions except for All Gippsland and Goulburn–Ovens–Murray areas. The decline in these areas is largely due to a decrease in the numbers identified as Electronic Engineering Associate Professionals and Communications Tradespersons.

The following table lists the total distribution of ICT skills by Victorian Labour Force Region from 1996 to 2001.

Table 4 — Location of ICT Professionals — Summary

Labour Force Region	Totals		% diff
	1996	2001	
All Gippsland	844	736	-12.8
Barwon–Western District	2,287	2,656	16.1
Central Highlands–Wimmera	849	995	17.1
Goulburn–Ovens–Murray	1,328	1,217	-8.4
Loddon–Mallee	1,016	1,105	8.7
Melbourne	38,097	52,069	36.6
Mornington Peninsula	1,835	1,966	8.7
Other	0	30	—
Total	46,256	60,774	31.3

Source: Australian Bureau of Statistics 1996 and 2001 Census.

Note that Appendix 2 quotes the ABS Quarterly Labour Force Survey (LSF) data. This data is not strictly comparable to the Census data due to the difference in scope, coverage, timing, collection methodology, measurement of underlying labour force concepts, etc.

The number of people employed as Information Technology Managers, Computing Professionals and Computing Support Technicians grew across all Labour Force Regions.

The number of people identifying as Electronics Engineering Associate Professionals and Communications Tradespersons declined in all Labour Force Regions. This may be due to people reclassifying into another category due to re-training or changing jobs or it may be that advances in technology are reducing the demand for these skills.

The following table lists the total distribution of ICT skills across the ICT Occupation Classifications for Victoria from 1996 to 2001.





Table 5 — Categorisation of ICT Professionals — Summary

ICT Occupation	Totals		
	1996	2001	% diff
Information Technology Managers	4,176	7,622	82.5
Computing Professionals	23,874	37,639	57.6
Electronics Engineering Associate Professionals	6,544	3,714	-43.3
Computing Support Technicians	5,640	7,173	27.1
Communications Tradespersons	6,022	4,626	-23.2
Total	46,256	60,774	31.3

Source: Australian Bureau of Statistics 1996 and 2001 Census.
Note: Cells in this table have been randomly adjusted to avoid the release of confidential data.

A detailed breakdown of the Labour Force Region by ICT Occupation Classification for Victoria can be found in Appendix 3.

The following table lists the distribution of ICT skills across industries in Victoria from 1996 to 2001. Most industry sectors experienced growth in ICT occupations in the period except for the Mining, Construction, Communication Services and Government Administration and Defence industries.

The majority of ICT jobs in Victoria are in the Property and Business Services industry sector, which includes people, employed in Scientific Research, Technical Services, Computer Services, Legal and Accounting Services, and Marketing and Business Management Services.

The number of people employed in ICT occupations in Victoria in the Property and Business Services sector grew by 90.7 per cent from 1996 to 2001.

Other major industry sectors which experienced significant growth in ICT occupations include Agriculture, Forestry and Fishing (106.6 per cent),

Property & Business Services (90.7 per cent), Education (63.5 per cent), Retail Trade (58.3 per cent), Accommodation, Cafes & Restaurants (52.5 per cent), and Electricity, Gas & Water Supply (49.0 per cent).

Table 6 — ICT Skills by Industry

Industry	Total		
	1996	2001	% diff
Agriculture, Forestry and Fishing	45	93	106.6
Mining	182	154	-15.4
Manufacturing	4,397	5,230	18.9
Electricity, Gas & Water Supply	422	629	49.0
Construction	1,145	828	-27.5
Wholesale Trade	3,129	3,717	18.9
Retail Trade	1,838	2,910	58.3
Accommodation, Cafes & Restaurants	80	122	52.5
Transport & Storage	920	985	7.0
Communication Services	10,638	7,996	-24.9
Finance & Insurance	4,097	5,327	30.0
Property & Business Services	13,327	25,425	90.7
Government Administration & Defence	2,245	2,085	-7.2
Education	1,474	2,411	63.5
Health & Community Services	715	980	37.0
Cultural & Recreational Services	826	979	18.5
Personal & Other Services	324	390	20.3
Non-Classifiable Economic Units	391	304	-22.3
Not stated	61	209	42.6
Total	46,256	60,774	82.5

Source: Australian Bureau of Statistics 1996 and 2001 Census.

ICT Skills Shortages in Victoria

The Department of Employment and Workplace Relations (DEWR) assessed skill shortages in the ICT industry during the first half of 2002. The Department monitors skill shortages by combining industry intelligence with statistical information about demand and supply. The table below shows the Department's assessment of where the current skill shortages (S) and recruitment difficulties (D) are in Victoria.

According to the definitions used by DEWR, there is currently not an ICT skills shortage in Victoria. However, employers are experiencing difficulties recruiting for the following ten ICT skills.

Table 7 — ICT Skill Shortages in Victoria

Skill	Supply
Application development and software engineering	
Delphi	D
Progress	D
Internet, networking, LAN, WAN	
Java Security and electronic commerce	D
Client-server applications	
PeopleSoft	D
Siebel	D
System Software Support	
Data warehousing	D
Communications	
Photonics	D
E-commerce	
E-commerce security (non-programming)	D
Security	
CISSP	D
PKI	D

Source: Department of Employment and Workplace Relations, 2002.

Note: Skill shortages (S) occur when employers are unable to fill or have considerable difficulty in filling vacancies for an occupation, or specialised skill needs within that occupation, at current levels of remuneration and conditions of employment, and reasonably accessible locations. Recruitment difficulties (D) occur when employers have some difficulty in filling vacancies for an occupation. There may be an adequate supply of skilled workers but employers are still unable to attract and recruit sufficient suitable employees.





To Find Out More

For more information on the Victorian Government's ICT skills initiatives, visit www.mmv.vic.gov.au/skills



Appendix 1

The following organisations contributed to the preparation of this report:

- Adacel
- Australian Computer Society
- BCA IT Ltd
- Citrus
- Classic Blue
- Commercial Interactive Media
- Deloitte Touche Tohmatsu
- Ericsson
- Global Pacific
- Hewlett Packard
- IBM GSA
- Infogrames Melbourne House
- iP3 Systems
- La Trobe University
- Lightbulb
- Microsoft
- Monash University
- National Australia Bank
- Nortel Networks
- Novell
- Oracle
- Persuade Communications
- PriceWaterhouseCoopers
- Recruitment and Consulting Services Association
- RMIT University
- Sensis
- Siemens
- Sineware
- Spherion
- Sun Microsystems
- Swinburne University
- Swish Group
- TATE
- Telstra
- TopWheel
- Webscan
- Westpac





Appendix 2

Australian Bureau of Statistics Quarterly Labour Force Survey — Persons Employed in ICT, Victoria (000s)

	Feb-01	May-01	Aug-01	Nov-01	Feb-02	May-02	Aug-02
<i>Information technology manager</i>	8.2	10.6	6.8	8.9	8.0	9.6	9.7
<i>Computing professionals</i>	55.5	54.2	47.1	49.5	60.5	59.4	55.5
<i>Electronic engineering associate professionals</i>	5.0	3.8*	5.6	3.0*	3.8*	2.6*	2.4*
<i>Computing support technicians</i>	9.8	8.8	7.4	6.8	8.8	5.8	5.9
<i>Communications tradespersons</i>	7.6	8.4	6.4	5.2	5.0	5.0	6.2
<i>Total ICT group</i>	86.1	85.8	73.3	73.4	86.1	82.4	79.7

* As this estimate has a Relative Standard Error (RSE) of greater than 25 per cent, care should be exercised in using it.



Australian Bureau of Statistics Quarterly Labour Force Survey — Persons Employed in ICT by Sex, Victoria (000s)

	Feb-01	May-01	Aug-01	Nov-01	Feb-02	May-02	Aug-02
Males							
<i>Information technology manager</i>	6.7	7.2	4.5*	6.4	5.4	7.9	8.0
<i>Computing professionals</i>	42.1	42.8	37.1	40.8	48.8	49.7	45.6
<i>Electronic engineering associate professionals</i>	5.0	3.5*	5.3	3.0*	3.8*	2.6	2.4
<i>Computing support technicians</i>	6.8	7.0	6.2	4.6	6.8	4.7	3.5
<i>Communications tradespersons</i>	7.6	8.4	6.4	5.2	5.0	5.0	6.2
Total ICT group	68.2	68.9	59.5	60.0	69.8	69.9	65.6
Females							
<i>Information technology manager</i>	1.4*	3.5*	2.3*	2.5*	2.6*	1.7	1.7
<i>Computing professionals</i>	13.4	11.4	10.0	8.7	11.6	9.7	9.9
<i>Electronic engineering associate professionals</i>	0.0*	0.3*	0.3*	0	0.0*	0.0	0.0
<i>Computing support technicians</i>	2.9*	1.8*	1.2*	2.2*	2.0*	1.1	2.4
<i>Communications tradespersons</i>	0.0*	0.0*	0.0	0.0	0.0	0.0	0.0
Total ICT group	17.7	17.0	13.8	13.4	16.2	12.5	14.0

* As this estimate has a Relative Standard Error (RSE) of greater than 25 per cent, care should be exercised in using it.



Appendix 3

Australian Bureau of Statistics Victorian 1996 and 2001 Census — Labour Force Region by ICT Classification

Labour Force Region	Information Technology Managers			Computing Professionals			Electronics Engineering Associate Professionals		
	1996	2001	% diff	1996	2001	% diff	1996	2001	% diff
All Gippsland	52	58	11.5	232	284	22.4	195	81	-58.5
Barwon–Western District	218	382	75.2	922	1,443	56.5	417	213	-49.0
Central Highlands–Wimmera	50	121	142.0	278	459	65.1	168	67	-60.2
Goulburn–Ovens–Murray	89	124	39.3	396	533	34.5	387	182	-53.0
Inner Eastern Melbourne	1,036	1,752	69.1	5,920	9,093	53.9	852	550	-35.5
Inner Melbourne	399	898	125.0	2,251	4,378	94.4	220	112	-49.1
Loddon–Mallee	69	114	65.2	306	506	65.3	237	128	-46.0
Mornington Peninsula	156	231	48.0	647	927	43.2	490	284	-42.1
North Eastern Melbourne	291	497	70.7	1,852	2,870	54.9	547	305	-44.3
North Western Melbourne	146	310	112.3	1,110	1,884	69.7	363	170	-53.2
Outer Eastern Melbourne	442	771	74.4	2,294	3,250	41.6	811	498	-38.6
Outer Western Melbourne	343	785	128.8	2,334	3,957	69.5	762	442	-42.0
South Eastern Melbourne	190	317	66.8	1,291	1,917	48.4	568	331	-41.8
Southern Melbourne	695	1,262	81.5	4,041	6,135	52.8	527	324	-38.6
Other	0	0	0.0	0	3	—	0	27	—
Total	4,176	7,622	82.5	23,874	37,639	57.6	6,544	3,714	-43.3



Computing Support Technicians			Communications Tradespersons		
1996	2001	% diff	1996	2001	% diff
111	124	11.7	254	189	-25.6
303	291	-4.0	427	327	-23.5
106	170	60.0	247	178	-28.0
134	130	-3.0	322	248	23.0
1,110	1381	24.4	646	456	-29.5
348	564	62.0	175	124	-29.2
117	132	12.8	287	225	-21.7
207	232	12.0	335	292	-12.9
473	676	42.9	584	423	-27.6
346	409	18.2	361	275	-23.9
624	720	15.3	739	576	-22.1
671	926	38.0	683	573	-16.2
383	551	43.8	503	441	-12.4
707	867	22.6	459	299	34.9
0	0	0.0	0	0	0.0
5,640	7,173	27.1	6,022	4,626	-23.2





Glossary

ABAP	Advanced Business Application Programming	ICT	Information and Communications Technology
ASP	Active Server Pages	J2EE	Java 2 Platform Enterprise Edition
B2B	Business to Business	JD Edwards	Comprehensive set of products such as supply chain management, supplier relationship management and enterprise resource planning
CCIE	Cisco Certified Internetwork Expert	JES2	A client-server, object-oriented user interface for managing systems from a personal computer
CISSP	Certified Information Systems Security Professional	Photonics	Photo-electronics
Citrix	An access portal server	PKI	Public Key Infrastructure
CRM	Customer Relationship Management		
EAI	Enterprise Application Integration		
ERP	Enterprise Resource Planning		
HTML	Hypertext Markup Language		



SAP	Systems, Applications, Products in Data Processing
SME	Small and Medium Enterprises
Tibco	Integration server software for enterprises
Tuxedo	An e-commerce transactions platform
VET	Vocational Education and Training
VPN	Virtual Private Network
WDM	Wavelength Division Multiplexing
XML	Extensible Markup Language





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