

# **Information Technology Related Skills and Training Needs in Northern Alberta**

(A Study Commissioned by the Labour Market Information Clearinghouse)

## **Final Report**

Completed by

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## **Chapter 1** **Introduction**

### **I. Purpose of Study**

The research and survey associated with this study were commissioned by the Northern Labour Market Information Clearinghouse (consisting of the Northern campuses of NAIT, Grande Prairie Regional College, Keyano College and Northern Lakes College and coordinated by the Northern Alberta Development Council). The objectives of the study were to:

- Help to assess the magnitude and scope of employment opportunities in the IT field within Northern Alberta;
- Help to provide insights as to trends in the use and adoption of IT in key industries in Northern Alberta;
- Help to provide some feedback pertaining to the level of satisfaction with graduates from IT programs provided by “Clearinghouse” colleges and to gain insights as to where existing programs might be improved or new programs introduced (including programs for existing employees or programs for students); and
- Help to focus and orchestrate the concerted efforts of the post-secondary institutions, industry, business and government to address the issues and opportunities arising from the study.

### **II. Methodology**

The project was completed over the period of early March to mid-June 2007. Its principal component is a survey consisting of input from 50 participants from organizations in Northern Alberta or from organizations in Central Alberta that either had substantial dealings in Northern Alberta, had a business model that was similar to organizations in Northern Alberta or were likely to hire the kind of Information Technology (I.T.) graduates produced by the Northern colleges.

After two telephone meetings with stakeholders to develop and refine the letter of introduction and questionnaire associated with the survey, great care was taken to identify and contact the most appropriate person within the organizations of interest (usually a “Director level” I.T. or Human Resources individual). Once initial contact was made, the project was explained briefly; however, more detail was provided in a personalized letter sent via e-mail. A copy of the questionnaire was also attached at that time so that the contact would have time to reflect upon the issues and conduct any additional research required. A subsequent telephone call was made to confirm receipt of the documents (letter and questionnaire), address any concerns or issues and ideally garner participation and schedule a telephone interview. Most of the telephone interviews took between 35 and 40 minutes to complete. When it was deemed that a telephone interview was not practical or convenient, participants were given the option of completing the questionnaire and returning it by e-mail. The objective, which was achieved, was to complete at least 30 of the interviews via telephone. The study participants, showing names, titles, organizations and locations, grouped according to the three Regions of the study (Northeast, Northwest and Central) with the 30 who completed the questionnaire via a telephone interview shaded, are presented in the table on the following page. The results of the survey were compiled and analyzed to develop the final report.

In order to obtain 50 interviews, it was necessary to contact over 65 individuals and organizations. The full details of those contacted, those participating and those who refused or declined to participate are included as a separate document.

**SUMMARY OF PARTICIPANTS**

<b>Northeast</b>	<b>Northwest</b>	<b>Central</b>
<b>Mr. Leon Bevans</b> , Information Technology Coordinator, Fort McMurray Public School District	<b>Mr. Delvin Kosik</b> , InterNet Concepts Ltd. (Grande Prairie)	<b>Mr. Kevin Connors</b> , Director, Information Technology, Lilydale Inc., (Edmonton)
<b>Mr. Randy Bentley</b> , Systems Advisor, Synchrude Canada Ltd.	<b>Mr. Robert Barrett</b> , IT Department, Fort Vermillion School Division	<b>Mr. Pat Witiw</b> , Director of Information Services, Fountain Tire, (Edmonton)
<b>Mr. Rod Delint</b> , Brch Mgr, MicroAge (Fort McMurray)	<b>Mr. Jim Layher</b> , WSI (Grande Prairie)	<b>Mr. Doug Pettapiece</b> , Finning (Canada) (Edmonton)
<b>Mr. Terry Morton</b> , Chief Technology Officer, Municipality of Wood Buffalo	<b>Ms. Linda Williams</b> , Branch Manager, Acklands-Grainger Inc. (High Level)	<b>Mr. Brian Ranger</b> , Manager, Information Technology, PCL Contractors (Edmonton)
<b>Ms. Brenda Olson</b> , Career Counselor, Alberta EII (Slave Lake)	<b>Mr. Todd Kennedy</b> , Director of Technology, Pembina Hills SD (Barrhead)	<b>Mr. Rob Lake</b> , IT Planning and Forecasting Officer, University of Alberta (Edmonton)
<b>Mr. Jim Booth</b> , Manager, Information Technology, Portage College (Lac La Biche)	<b>Mr. Jeff Protz</b> , Network Administrator, Northland SD (Peace River)	<b>Mr. Rick Harcourt</b> , Harcourt Recruiting Specialists (Edmonton)
<b>Ms. Lyn Organ</b> , Corporate Networks (Fort McMurray)	<b>Ms. Nicole Baker</b> , Digital-Blues (Grande Prairie)	<b>Mr. Cecil Wright</b> , Flint Energy Ltd. (Sherwood Park)
<b>Mr. Mark Belland</b> , Chief Technology Officer, Electric Avenue – MCSNet (St Paul)	<b>Mr. Mark Scheffer</b> , Manager, Information Technology, Aspen Health Region (Westlock)	<b>Ms. Joan Isaac</b> , Associate Director, Metis Nation of Alberta (Edmonton)
<b>Mr. Randal Holt</b> , Holt Group (Athabasca)	<b>Mr. Brad Emond</b> , ITS Administrator (City of Grande Prairie)	<b>Mr. Richard Barr</b> , Director, Technology Support, The Brick (Edmonton)
<b>Ms Joanne Kurek</b> , Director of Information Technology Northern Lights SD (Bonnyville)	<b>Mr. David Leung</b> , Divisional Technology Support, Holy Family SD (Peace River)	<b>Mr. Ed Barth</b> , Technical Services, Northlands (Edmonton)
<b>Mr. Dave Hrenewich</b> , Director, Computing Services, Athabasca University	<b>Mr. Ron Scrimshaw</b> , Chief Executive Officer, Kee Tas Kee Now TC (Atikameg)	<b>Ms. Jennifer Ward</b> , IT Practice Leader, David Aplin and Associates (Edmonton)
<b>Mr. Roy Vermillion</b> , Chief Executive Officer, Athabasca TC (Fort McMurray)	<b>Mr. Darrel Shkwarok</b> , IT Site Lead, Weyerhaeuser (Grande Prairie)	<b>Ms. Val Horak</b> , Senior HR Manager, ATCO I Tek (Edmonton)
<b>Warrant Officer Dan Chauvin</b> , 4 Wing Cold Lake, CAF (Cold Lake)	<b>Mr. Rod Peters</b> , Roy Northern Environmental (Fairview)	<b>Ms. Pam Winters</b> , IT Director, North American Construction Group (Spruce Grove)
<b>Mr. Don Laking</b> , IT Director, Alberta Pacific Forest Industries, (Boyle)	<b>Mr. Luc Mercier</b> , Chief Administrative Officer, Woodlands County (Whitecourt)	<b>Mr. Dave Asquin</b> , Dir, Information Technology, Epcor (Edmonton)
	<b>Ms. Susie Goodwin</b> , Dir, Information Technology, Pomeroy Group (Grande Prairie)	<b>Mr. Ian Brett</b> IT Program Manager, AFSC (Lacombe)
	<b>Mr. Dan Reinbold</b> , Chief Information Officer, Peace Country HR (Grande Prairie)	<b>Mr. David Faber</b> , Director, IT Planning and Architecture, (City of Edmonton)
		<b>Mr. Doug Lofstrand</b> , Manager, Employee Development, Finning (Canada) (Edmonton)
		<b>Mr. Glen Horne</b> , Camenex Control Systems Ltd. (Spruce Grove)
		<b>Mr. Roger Burns</b> , Chief Information Officer, Alberta Environment (Edmonton)

There are two other significant components to the overall project. An analysis of the Demand and Supply for I.T. related positions was completed using data developed by Alberta Employment, Immigration and Industry. Secondly, a study of recent trends in the use and adoption of Information Technology in existing and emerging industries in Northern Alberta was also completed.

### **III. Organization of Report**

The balance of this report is comprised of the following Chapters:

- Chapter 2 – Summary and Analysis of Survey Results
- Chapter 3 – Analysis of Demand and Supply for Information Technology Positions
- Chapter 4 - Trends in the Use and Adoption of IT Within Key Industries
- Chapter 5 – Conclusions and Recommendations

In addition, the report is supported by:

- Appendix 1 – Letter of Introduction
- Appendix 2 – Questionnaire Used

## **Chapter 2** **Summary and Analysis of Survey Results**

The principal purpose of this Chapter is to provide a summary and analysis of the results of the survey completed for this project. The Chapter is organized according to the following major Sections:

- Section I – Computer Hardware and Software;
- Section II - Desirable Core Information Technology Skills and Knowledge;
- Section III – Desirable “Soft” Skills;
- Section IV - Level of Training Required for Information Technology Occupations;
- Section V - Familiarity With and Feedback Pertaining to Existing I.T. Programs;
- Section VI - Comments Regarding Additional IT Related Training and Services;
- Section VII - Strategies to Attract and Retain Information Technology Workers;
- Section VIII - Staffing Levels and Hiring Plans of Participating Organizations;
- Section IX - Other Trends and Issues;
- Section X - Project and Questionnaire Feedback; and
- Section XI - Classification Data.

Full details are contained in the following pages.

### **I. Computer Hardware and Software**

The questionnaire contained a section that focused on A) the hardware currently in use and expected changes over the next three years, and B) the software currently utilized and issues or problems that may inhibit full exploitation of potential according to the groupings of:

- Word Processing Software;
- Financial Software;
- Records Management Software;
- Global Positioning/Information Software;
- Desktop Publishing Software; and
- “Other” Software.

The objective of the inquiries was to obtain information that would help the four colleges in the Clearinghouse consortium to plan and assess the types of training offered, with a principal emphasis on the short-term, custom and ad hoc programs provided. The results are as summarized below.

#### **A. Computer Hardware**

Participants were asked to comment on the type of computer hardware and number currently in existence at their organizations and how these number or proportions might be expected to change over the time period of the next three years. The purpose of collecting such data was to 1) help the colleges plan for the number of shorter-term programs offered by ensuring that the hardware of the colleges was in keeping with trends within organizations and 2) to help the colleges with the planning of other longer-term courses and programs by ensuring that some of

the material covered in the courses was suitable for the configurations and sizes of operations within the kinds of organizations where many might expect to eventually find employment.

### **Key Findings**

**1. “IBM PCs” are and will continue to be the dominant type of personal computer used within organizations in Northern Alberta.**

The total number of computers addressed in the survey exceeded 47,000. Of these approximately 43,500 were “IBM PCs”, 2,000 were Apple/Macs, 1,000 were Linux based and the balance of approximately 800 were a variety of PDA devices, such as BlackBerries, and other “thin devices”

Over the period of the next three years, the number of computers is expected to grow by approximately 9% to exceed 51,000 workstations or devices, and may approach 56,000 if a longer-term plan of the Fort McMurray School Division for all students (approximately 5,000) to have PDA devices is approved. The number of Apple/Mac and Linux-based computers is not expected to grow significantly from the current numbers of 2,000 for Apple/Macs and 1,000 for Linux-based. The number of “other” PDA devices such as smart cellular phones is expected to grow from 800 to 1,200.

**2. The characteristics of the number and type of workstations and devices in each of the Regions of this study are discussed below.**

#### Northeast Region

- The number of reported computers at individual organizations ranged from a low of 10 (Holt Group) to a high of 2,200 at CFB Cold Lake and 3,200 at Syncrude.
- Most Macs (estimated at 60) were at Athabasca University.
- Rates of growth in number of computers ranged from zero for many of the smaller and/or private sector organizations (Holt Group, MCSNet, KTC Administration and Corporate Networks) to increases of 15% to 20% per year within the Regional municipality of Wood Buffalo.
- Fort McMurray School District is considering an initiative under which all students would have a portable PDA device. If this proceeds, the number of such devices could eventually exceed 5,000.
- In some instances, respondents were able to provide insights as to the proportion of employees who had MS Access to computers. These ranged from 40% at Portage College to 80% at Syncrude.

The following table provides a summary for the Region and Addendum Table 1 at the end of this chapter provides details for all participants in the Region.

#### **OVERVIEW OF WORK STATIONS OR DEVICES – NORTHEAST REGION**

Type of Workstation or Device	Current Number (2007)	Projected Number (2010)
<b>PC</b>	11,274	12,388
<b>Mac</b>	70	75
<b>Other</b>	100 BlackBerry and 100 other portable devices	125 BlackBerry and up to 5,000 plus PDA devices

### Northwest Region

- The number of reported computers ranged from a low of 7 at Digital Blues, a Grande Prairie consulting “boutique” to close to 2,00 for each of Pembina Hills School Division and Peace Country Health.
- The rate of growth in the number of computers ranged from an actual estimated decline at Weyerhaeuser, as more IT jobs are consolidated at the United States head office near Tacoma, Washington, to a high about 12% per year associated with Peace Country Health and 20% per year with the Aspen Health Region. The new hospital being built at Grande Prairie, which will be “IT state-of-the-art” will account for a significant proportion of the Peace Country Health Region increase.
- The Northwest Region has a relatively high proportion of Mac computers (910 out of 6,902, or about 13%), with the largest numbers being Pembina Hills School Division (800) and Holy Family School Division (about 110).
- The number of BlackBerry and other similar devices is still relatively small (estimated at less than 100); however, many respondents indicated that such devices would begin to grow significantly in numbers.

The following table provides a summary for the Region and Addendum Table 2 at the end of this chapter provides details for all participants in the Region.

#### **OVERVIEW OF WORK STATIONS OR DEVICES – NORTHWEST REGION**

Type of Workstation or Device	Current Number (2007)	Projected Number (2010)
<b>PC</b>	7,102	7,976
<b>Mac</b>	910	1,000
<b>Other</b>	80 BlackBerry	Starting to be adopted in more significant proportions

### Central Region

- The number of reported computers ranged from a low of 30 at Britec Computer Systems, an Edmonton consulting “boutique” with a branch office in Grande Prairie, to close to 8,000 for the City of Edmonton and 10,000 for the University of Alberta.
- The rate of growth in the number of computers ranged from zero at The Brick to up to 100% for Finning and Fountain Tire. Fountain Tire will be embarking on a major initiative to introduce computers, in conjunction with radio frequency technology to capture client data “at the source” in all retail outlets. The trend of capturing data at the source will also affect the requirements of North American Construction Group. According to Finning participants, the repair and maintenance of heavy equipment will require more and more “rugged” computer technology “in the field”. and Finning. The configuration of hardware will move to about 75% laptop and 90% of staff will have dedicated equipment.
- The University of Alberta has the highest number of Mac and Linux computers, with each type estimated to be about 1,000 in number.
- Epcor has approximately 600 “thin devices” deployed in 2006 and used in activities such as meter reading.



- The number of BlackBerry and similar devices is estimated to be approximately 600, with Epcor being the largest user (about 300 devices). The use of such devices is expected to grow within all organizations.

The following table provides a summary for the Region and Addendum Table 3 at the end of this chapter provides details for all participants in the Region.

#### OVERVIEW OF WORK STATIONS OR DEVICES – NORTHWEST REGION

Type of Workstation or Device	Current Number (2007)	Projected Number (2010)
PC	26,500	29,000
Mac	1,025	1,050
Linux	1,000	1,000
“Thin Devices”	600	600
Other	600 BlackBerry	1,000 BlackBerry

## **B. Software**

For a number of software categories, respondents were asked to comment on up to the top three products used and, if possible, discuss the relative weighting of use for the type of application, and any deficiencies or “gaps” in terms of the ability of staff to fully utilize the software.

### **Key Findings**

#### **Word Processing Software**

1. **With respect to word processing software, MS Word (frequently as part of an MS Office “suite”) is the most commonly used product by a significant margin.**

While not all respondents were asked to discuss software used by their organizations, due to issues such as the context or primary objective of the interview and time constraints or apparent lack of awareness by the respondent (for examples, interviews with recruitment firms were limited to approximately 20 minutes and had a primary focus on the types of skills in demand), MS Word was the word processing software used by over 42 of the 50 participants. WordPerfect was utilized by two organizations (Acklands-Granger and KTC Administration in some instances such as compliance with the Federal Government’s Indian and Northern Affairs). In addition, Open Office” and other Linux based applications were used in limited amounts (MCSNet, Athabasca University and the University of Alberta).

2. **The best opportunities for Clearinghouse colleges to provide training are likely with companies that are expected to have a need for greater use of computer technology “in the field”.**

Based upon this survey, representative companies would include Finning, Fountain Tire as well as the North American Construction Group. Existing staff members tend to be more of a “trades” orientation and struggle with the conjunction of computer technology and repair and service, as a result of a lack of such training for older workers or a

tendency to be less comfortable and avoid such activities among younger workers. In addition, AEII clients would benefit by having greater MS Access to introductory computer and keyboarding classes. Would help to reduce demands on service centre staff.

The following table provides an overview of the use of word processing software among the three Regions associated with this study, as well as other additional commentary to provide context.

#### OVERVIEW OF WORD PROCESSING SOFTWARE UTILIZED

	Product	Frequency	Comments
<b><u>Northeast Region</u></b>	MS Word	13	<ul style="list-style-type: none"> <li>• ATC staff has only a basic understanding.</li> <li>• CFB staff mostly self - taught with minimal formal training.</li> </ul>
	WordPerfect	1	<ul style="list-style-type: none"> <li>• KTC also uses WordPerfect to be in keeping with software used by Indian and Northern Affairs</li> </ul>
	Open Office	2	<ul style="list-style-type: none"> <li>• Linux product used by MCSNet for 90% of word processing and Athabasca University for about 5% of word processing</li> </ul>
<b><u>Northwest Region</u></b>	MS Word	13	<ul style="list-style-type: none"> <li>• Pomeroy hospitality staff need more training</li> </ul>
	WordPerfect	1	<ul style="list-style-type: none"> <li>• Acklands - Granger</li> </ul>
<b><u>Central Region</u></b>	MS Word	12	<ul style="list-style-type: none"> <li>• Finning field staff have very limited knowledge of features and functionality</li> </ul>
	WordPerfect	1	<ul style="list-style-type: none"> <li>• Alberta Environment legal staff</li> </ul>
	MS Office	6	
	Open Office and Linux Tec	1 each (2 total)	<ul style="list-style-type: none"> <li>• U of A</li> </ul>

#### **Financial Software**

- 1. MS Excel holds a dominant position in regard to financial software applications; however, there is a high number of other applications within this category.**

Excel was reported as used for financial applications within 15 of the organizations participating in this study. However, as noted, there is a wide variety of other financial applications. To some extent, the applications are dependent on the type of organization. For example, municipalities use a product called Bellamy, and health Regions used a product called Medi-tech. Larger organizations had a tendency to use Oracle, SAP and/or JD Edwards based products.

- 2. The wide array of software utilized may make it more difficult to devise training programs that would be in demand; however, there may be opportunities for more advanced training in Excel.**

Participants from Weyerhaeuser, Lilydale and Peace Country Health were of the opinion that their staff would benefit from more advanced knowledge of Excel. For relatively new or unsophisticated users a better understanding of "how to get help" would free-up considerable time for IT staff. A better understanding of macros and V-Basic programming would help users to be more efficient.

The following table provides an overview of the financial software used by participants.

**OVERVIEW OF FINANCIAL SOFTWARE UTILIZED**

	Product	Frequency	Comments
<b><u>Northeast Region</u></b>	Excel	7	
	Quick Books	2	
	AccPac, New Views, Coda OAS, COGNOS – Budgeting, Hagen Version 8, Infinium, LIMS, Agresso Business World, Bellamy and custom applications, Samco Accounting Systems, MYOB	1 of each	<ul style="list-style-type: none"> <li>• Aggresso Business World used by Portage College</li> <li>• Hagen Version 8 being phased out by Regional Municipality of Wood Buffalo due to lack of geographic interface</li> <li>• Bellamy used by RD of Wood Buffalo</li> <li>• Samco used by Pomeroy Group; noted need for training</li> </ul>
<b><u>Northwest Region</u></b>	Excel	4	
	Simply Accounting	2	
	Bellamy	2	
	Medi-Tech	2	
	EREB, Quick Books, CASH, MS Money, Vision Enterprise-wide, IBM O/S 400 custom	1 each (6 total)	
<b><u>Central Region</u></b>	Excel	4	
	IBM mainframe with Oracle or JD Edwards	3	<ul style="list-style-type: none"> <li>• PCL, ATCO and Flint Energy and North American Construction Group</li> </ul>
	Oracle	2	<ul style="list-style-type: none"> <li>• The Brick and Epcor</li> </ul>
	PeopleSoft	2	<ul style="list-style-type: none"> <li>• AFCS and Alberta Environment</li> </ul>
	Great Plains Tier 1, CODA Version 4, SAP	1 each (3 total)	<ul style="list-style-type: none"> <li>• Great Plains (Fountain Tire)</li> <li>• CODA Version 4 (Finning)</li> <li>• SAP (City of Edmonton)</li> </ul>

**Records Management Software**

1. **The most frequently used Records Management software products are: MS Access and MS SharePoint; however, no one product has a clearly dominant position among survey participants. Among participant with operations of “enterprise” size or scope, Oracle is the most frequently used records management product.**

MS Access and MS SharePoint were both used by six participants. MS Access has been noted as having limitations as organizations grow in size and complexity. Oracle was used by four more complex survey participants. Other products that were used by more than one organization were Xerox DocuShare (3) and MySQL (3). The “balance” of the market is comprised of a wide range of records management products, 10 in the Northeast Region, 13 in the Northwest Region and seven in the Central Region. Some of the products have been designed for specific sectors (such as MediTech in health care settings) and some are considered to be obsolescent (such as Filemaker Pro used by Roy Northern Environmental), and may be indicative of a lower priority assigned to such functions. Because there is such a wide variety of products, the opportunities to provide training related to Records Management software may be limited at the present time.

The following table provides a summary and overview of the Records Management software used within the three Regions of the study, and shows the frequency of use for each, and also provides additional comments considered to be helpful.

**SUMMARY OF RECORDS MANAGEMENT SOFTWARE USED BY SURVEY PARTICIPANTS**

	Product	Frequency	Comments
<b>Northeast Region</b>	MS Access	2	ATC, CFB Cold Lake
	Oracle V 8 and 9	2	
	MS One Note, Tiger Paw, MySQL, Post Graph, BOSS, TRIM, Liberty, Maplewood SIS, PeopleSoft, DocuShare	1 each (10 total)	BOSS is in-house software used by MicroAge. TRIM used by ALPAC for all records management PeopleSoft used by CFB Cold Lake
<b>Northwest Region</b>	MS Access	3	
	Xerox DocuShare	2	
	MS SharePoint	2	
	On-line MYSQL	2	
	I Manage, Muni-metrics, Medi-Tech, MIT SIRS, Filemaker Pro, ISIS, Filenet, Documentum, Century File, Outlook, Geo-media	1 each (13 total)	<ul style="list-style-type: none"> <li>• MIT SIRS used by Holy Family SD</li> <li>• Filemaker Pro used by Roy Northern but considered obsolescent</li> <li>• ISIS used by Fort Vermillion SAD</li> <li>• Filenet and Documentum used by Weyerhaeuser</li> <li>• Geomedia is a custom software used by Woodlands County</li> </ul>
<b>Central Region</b>	MS Share Point	3	<ul style="list-style-type: none"> <li>• City of Edmonton, North American Construction Group; Emerging with Flint Energy</li> </ul>
	Oracle	2	<ul style="list-style-type: none"> <li>• PCL and The Brick</li> </ul>
	Replacing MS Access with a tier 1 software	1	<ul style="list-style-type: none"> <li>• Fountain Tire – losing too much data with MS ACCESS</li> </ul>
	Content on Demand, MS Access, Oracle and PeopleSoft, TRIM, Bentley, Project Wise, OpenText	1 (8 total)	<ul style="list-style-type: none"> <li>• Content on Demand used by Finning</li> <li>• MS ACCESS used by Lilydale although not adequate .</li> <li>• Oracle and PeopleSoft used by U of A</li> <li>• TRIM, Project Wise and Bentley used by ATCO.</li> <li>• Epcor currently has no formal records management software. Issue under review.</li> <li>• OpenText used by Alberta Environment – new initiative</li> </ul>

**Design/Estimating Software**

**1. The most often used Design/Estimating software product is AutoCAD.**

AutoCAD was be used by seven survey participants. Beyond AutoCAD, 18 other products were used by participants. With only 24 out of the 50 participating organizations

using such software, and with the wide variety of products – and no apparent gaps or issues in exploiting the software to its full potential - the opportunities for new courses or training programs may be limited.

The following table provides a summary and overview of the Design/Estimating software used within the three Regions of the study, and shows the frequency of use for each, and also provides other comments considered to be helpful.

**SUMMARY OF DESIGN/ESTIMATING SOFTWARE USED BY SURVEY PARTICIPANTS**

	Product	Frequency	Comments
<b>Northeast Region</b>	AutoCAD	4	
	Excel, Softplan, MS Project, Photoshop, Photo Elements	1 each (5 total)	
<b>Northwest Region</b>	AutoCAD	2	
	Visio	2	
	Micro-media studio, Adobe Photoshop, Adobe Illustrator	1 each (3 total)	
<b>Central Region</b>	AutoCAD	3	<ul style="list-style-type: none"> <li>• Northlands (Edmonton), NACG, Epcor</li> </ul>
	OLAV (Business intelligence tool), Surtax Prima Vera, AutoCAD LT, Meeting Matrix, Hard Dollar, Micro Position, custom (2)	1 each (8 total)	<ul style="list-style-type: none"> <li>• Lilydale uses OLAV</li> <li>• Northlands uses AutoCAD LT, and Meeting Matrix.</li> <li>• Hard Dollar used by NACG</li> <li>• Micro Position used by Epcor</li> <li>• Custom software used by PCL and Flint Energy</li> </ul>

**Global Positioning Software**

- At present, at least among participants of this survey, the use of Global Positioning and Global Information Systems software is relatively limited; however, the future growth prospects are significant.**

Of the organizations participating in the survey, only nine were users of Global Positioning/Global Information Systems software. There is a range of products used and the only product used more than once is AccuMap. Notwithstanding the limited use among participants, the Region is growing rapidly. Organizations such as Fountain Tire, Epcor, Flint Energy and Lillydale plan to use such products for fleet management as well as more specific and accurate mapping. On balance, this is an Region of emerging importance and further, more in-depth research may be warranted to gauge the demand for training programs. The biggest demand is likely workers in the field and those involved in fleet management and maintenance. Many such workers exist in the oil and gas exploration industries.

The following table provides a summary and overview of the Global Positioning software used within the three Regions of the study, and shows the frequency of use for each, and also provides additional comments considered to be helpful.

**SUMMARY OF GLOBAL POSITIONING SOFTWARE USED BY SURVEY PARTICIPANTS**

	Product	Frequency	Comments
<b>Northeast Region</b>	In-house custom, TRIMBLE, ESRI, GeoMedia Pro, Wenco Truck Dispatch and Surpac	1 each (6 total)	<ul style="list-style-type: none"> <li>• MCSNet has custom system</li> <li>• TRIMBLE and ESRI used by ALPAC</li> <li>• Wenco Truck Dispatch and Surpac used by Syncrude</li> </ul>
<b>Northwest Region</b>	Ground station on top of Grande Prairie City Hall, AutoDesk Map Guide, AccuMap, GeoMedia	1 each (4 total)	<ul style="list-style-type: none"> <li>• AccuMap used by Roy Northern</li> <li>• Geomedia used by Woodlands County (custom software)</li> </ul>
<b>Central Region</b>			<ul style="list-style-type: none"> <li>• Emerging with Fountain Tire, Lilydale, Epcor and Flint Energy</li> <li>• City of Edmonton uses a variety of products; however, specific names not mentioned.</li> </ul>

**Desktop Publishing Software**

- Among study participants, MS Publisher is the most frequently used software product for Desktop Publishing, followed by Adobe Acrobat and MS PowerPoint.**

MS Publisher was used by 15 of the study participants, while Adobe Acrobat was used by eight participants, and MS PowerPoint was used by three participants. A range of other products was also used.

The following table provides a summary and overview of the Desktop Publishing software used within the three Regions of the study, and shows the frequency of use for each, and also provides additional comments considered to be helpful.

**SUMMARY OF DESKTOP PUBLISHING SOFTWARE USED BY SURVEY PARTICIPANTS**

	Product	Frequency	Comments
<b>Northeast Region</b>	MS Publisher	7	
	Adobe Acrobat	3	<ul style="list-style-type: none"> <li>• ALPAC for about 15%, Adobe CS3 Design Premium at Portage College</li> </ul>
	Dream Weaver, Interleaf, In-Design, PowerPoint, Typing Tutor, FrontPage	1 each (6 total)	<ul style="list-style-type: none"> <li>• In-Design used by ALPAC for about 45% of applications</li> <li>• FrontPage used by CFB Cold Lake</li> </ul>
<b>Northwest Region</b>	MS Publisher	6	
	Adobe Acrobat	2	
	Corel Draw	2	<ul style="list-style-type: none"> <li>• Corel Draw used by Roy Northern and Pomeroy</li> </ul>
	Adobe Suite, Adobe Photoshop Illustrator, PageMaker, Corel Draw, Corel Photopaint	1 each (5 total)	<ul style="list-style-type: none"> <li>• Photo Paint used by Roy Northern Environmental</li> </ul>
<b>Central Region</b>	MS PowerPoint	3	<ul style="list-style-type: none"> <li>• Finning staff need to make greater use of Publisher</li> </ul>
	MS Publisher	3	<ul style="list-style-type: none"> <li>• Lilydale, U of A, Epcor</li> </ul>
	Adobe	3	<ul style="list-style-type: none"> <li>• Northlands (Edmonton), Flint Energy, ATCO</li> </ul>
	Visio, MS Word	1 each (2 total)	<ul style="list-style-type: none"> <li>• Both used by Epcor</li> </ul>

**“Other” Software**

**1. Participants reported using a wide range of “Other” software products.**

Most of the products were designed for specific applications in various settings such as Emergency Response, Hotel and Restaurant Management, Data-mining, X-ray management, Project Management and specific Construction situations, such as concrete leveling. The Pomeroy Group has indicated that some training assistance may be required for the implementation of a new accounting system, however, it is expected that the opportunities for developing specific courses or programs will be limited.

The following table provides a summary and overview of the “Other” software used within the three Regions of the study, and shows the frequency of use for each, and also provides additional comments considered to be helpful.

**SUMMARY OF “OTHER” SOFTWARE USED BY SURVEY PARTICIPANTS**

	Product	Frequency	Comments
<b>Northeast Region</b>	CAIS, Outlook, Excel, MS Access, HUGH, Vista Business, XP Professional, Lotus Notes, Acrobat, FlowPoint, FrontPage	1 each (11 total)	<ul style="list-style-type: none"> <li>• CAIS is a client management software used by AEII.</li> <li>• HUGH used by AEII in conjunction with Students Finance Board.</li> <li>• IVARA used by ALPAC for maintenance and purchasing.</li> <li>• ESSRI is ALPAC GIS.</li> </ul>
<b>Northwest Region</b>	CRISIS 911, Bud Mack, Business Revitalization, CAMELOT, Hansen, PACS, Visual Studio Developer, Acrobat, CISCO 50 Security, MS Activity, Web Trans, Win PM, Maitr'd	1 each (11 total)	<ul style="list-style-type: none"> <li>• Camelot is municipal assessment software.</li> <li>• Hansen helps to manage municipalities.</li> <li>• CISCO 50 Security and MS Activity used by Holy Family SD.</li> <li>• Pembina Hills SD uses web-based Acrobat.</li> <li>• Aspen Health Region uses PACS for x-rays.</li> <li>• Win PM (property management used by Pomeroy).</li> <li>• Maitr'd (Point of Sale System used by Pomeroy)<sup>1</sup></li> </ul>
<b>Central Region</b>	Dream weaver	2	<ul style="list-style-type: none"> <li>• U of A, Britec</li> </ul>
	Envoy/Omni Oracle application, Near real time performance management, Balanced Score Card (custom), Workflow Management (custom), Laser leveling, COGNOS, MS Access,	1 each (7 total)	<ul style="list-style-type: none"> <li>• AFSC uses Envoy/Omni.</li> <li>• Fountain Tire has custom balanced scorecard and workflow management.</li> <li>• PCL uses laser leveling.</li> <li>• COGNOS and MS Access used by Epcor for data mining</li> <li>• City of Edmonton has over 1,000 software applications</li> </ul>

1. Pomeroy also uses Opra (property management) and Positouch (point of sale) in small amounts

## **II. Desirable Core Information Technology Skills and Knowledge**

In order to gain a better understanding of the types of skills and knowledge that graduates of the Northern Information Technology programs will need to have to meet the needs of organizations in Northern Alberta, participants were asked, for the time frame of the next three years, to rate the importance of graduates having a grounding in or exposure to a selection of "Knowledge Regions". The Knowledge Regions were supported by examples of the material and concepts considered to be applicable. A scale of "1" to "5" was used with "1" being of "very low importance" and "5" being of "very high importance. In addition, participants were asked to elaborate on any other software, hardware or skills or requirements or Knowledge Regions not listed in the questionnaire or examples.

### **Key Findings**

- 1. Based upon the responses, and with an overall average importance score of 3.3, the Knowledge Regions can be broken down into High Importance (score of 4.0 or greater), Medium Importance, (score of between 3.0 and 4.0) and Lower Importance (less than 3.0) clusters, as discussed and illustrated below.**

It is hoped that by showing the perceived importance of the Knowledge Region, outlining the concepts, material and knowledge Regions considered to be important and by providing additional commentary that is considered to be relevant that this section will be of benefit as a guideline in planning and developing future programs and courses. In some instances, suggestions were made more than once, and in such cases the frequency of notation is indicated in parenthesis in the Important Concepts column.

#### High Importance

<b>Knowledge Region and Score</b>	<b>Important Concepts</b>
Internet (4.3)	Security, Privacy Issues, E-learning, PCI Compliance, Browser plug-ins, and Collaboration tools
Systems and Computer Security (4.2)	Anti-virus Software, Data Encryption, Anti-hacking, Data recovery (2), Spyware, Citrix-based EPN, and Firewalls
Document Management and Groupware (4.0)	Lotus Notes and Domino, MS Exchange and Outlook, Search Engines, MS Share Point (4), and Xerox Docushare
Operating Systems (4.0)	Linux, Apple Mac, MS XP, MS NT, MS Vista Mainframe Systems, Real Time, IBM O/S 400, UNIX, XMS, Virtualization, Vware, MS Vista, MS CE, Clustering, and Back-up Sites

The scores for each of the preceding Knowledge Regions were relatively consistent (within .2 of the overall average) across each of the Regions of the study.



Medium Importance

<b>Knowledge Region and Score</b>	<b>Important Concepts</b>
Personal Use Software (3.9)	MS Suites, WordPerfect Suites, Teleworking, and PDA use
Networks – Hardware and Software (3.7)	Fibre Optics, LAN, DSL, VPN, V Laning, CISCO Certification, Wireless LANS, Field Buses (in relation to instrumentation), Converged networking
Servers – Hardware and Software (3.6)	Server Types (IBM, Linux , Sun Servers, Intel Virtual, Microsoft, Blade, HP and CISCO), associated Satellite VOIP technologies
Telephony, Mobile and Wireless (3.6)	Blue tooth (3), VOIP, Fax, Text to Speech, Voice Recognition, Unified Communication, Wireless tablets, SOX, CSOX
Applications and Systems – Languages for Development and Management (3.5)	NET (5), MySQL (2), Oracle, C/C++, Java, Perl, Visual Basic and Studio., ASP, HTML, XML, InfoPath, Basic COBOL, Software Engineering Concepts
Storage (3.4)	RAID, Data Recovery, Storage Devices, SAN (2), NAS, Near Line Storage
Enterprise Systems (3.3)	People Soft, SAP, Data Mining, Supply Chain, Intranets, Business Process Re-engineering, Visual Financials, Hansen, SharePoint Portal, Citizen access, Security, Web transactions, XML
Electronic Commerce (3.1)	Web-site Management, Smart Cards, E-mail Broadcast, Security, Product Catalogues

It may be appropriate to consider Networks – Hardware and Software as a High Importance Knowledge Region. There is a range of average responses that is worthy of note. The average score for Northeast participants was 4.2, while the average scores for Northwest and Central Region participants were 3.4 and 3.5, respectively. It is noted that for both the Northwest and Central Region responses, two “outriders”, where the importance score was very low (Acklands – Grainger and Fort Vermillion School Division in the Northwest and the two Finning responses in the Central Region), contributed to the overall lower score.

There is also a considerable range of responses with respect to the importance of Applications and Systems – Languages for Development and Management. While the average importance score was 3.5, the importance score in the Northwest Region was 2.8 and the importance score in the Central Region was 4.1. The low Northwest importance score is likely explained by the type of participants which, at face value, would not seem to have a strong need for programming skills. The higher Central Region importance score is explained in that the sample of participants had a higher proportion of head offices and thus a greater need for programming skills.

With respect to Storage, the average importance score for the Northeast and Northwest Regions was 3.1 and 3.2, while the importance score for the Central Region was 3.8. Again, the presence of more developed or sophisticated head office users in the Edmonton Region had a greater need for the storage of greater quantities of data and were more concerned about associated security issues.

The average importance scores for Enterprise Systems have a wide range (3.5 in the Northeast, 2.5 in the Northwest and 3.9 in the Central Region). The differences are

explained by the differences in the size and sophistication of participants from the Central Region.

While the overall average importance score for Electronic Commerce is 3.1 (2.8 in the Northeast and 3.0 in the Northwest), the higher score of 3.5 in the Central Region is explained by a larger proportion of participating organizations having direct dealings and business transactions than for the other two Regions (i.e. Epcor in the Central Region vs. Syncrude in the Northeast and Peace Country Health in the Northwest).

Lower Importance

Knowledge Region and Score	Important Concepts
Electronic Publishing (2.9)	XML (2), Front Page, Portal/Plumbtree, EXB, XSLD, Desktop Publishing, Forms Processing, STML, HTML
Data Capture (2.7)	Voice recognition, RFID (7), Libraries Bar Codes, Optical Character Recognition, Automatic Identification
CAD, Computer Design, Graphics (2.2)	AutoCAD, Computer Aided Manufacturing, Remote Sensing, Global Positioning, AutoDesk, Map Guide, Mapping, GPS, Visio, Micro Station
Microprocessors, Semiconductors and Embedded Systems (1.9)	Chip Technology, Microprocessors, Nanotechnology, Virtualization and grid computing
Artificial Intelligence and Robotics (1.3)	Computer Vision, Expert Systems, Industrial Control Systems, AutoCAD

Electronic Publishing received a relatively low score (2.9) because many participants were of the view that the skill set was now within the realm of commonly accepted knowledge, or not an IT function. The higher score of 3.4 for the Northwest Region reflects a bias towards the web site design nature of participants such as Digital Blues and Internet Concepts.

There is a significant range in the importance scores for the Data Capture Knowledge Region (overall average of 2.7, 2.9 in the Northeast, 1.9 in the Northwest and 3.3 in the Central Region). The skill or knowledge item mentioned most often was Radio Frequency ID, which is becoming of major importance to organizations such as Fountain Tire, Epcor and Finning as efforts are made to capture data at the source

CAD, Computer Design, Graphics, Modeling and Multimedia (average importance score of 2.3) were often not considered to be “mainstream” IT functions. The score is even lower in the Northwest Region because of the absence of a construction or engineering orientation of the survey participants. Notwithstanding the low score for the overall category Global Positioning software is expected to grow in importance.

The following table provides an overview of the differences in the importance scores between Regions, provides an overall average importance score for each Knowledge Region and also summarizes the examples used in the questionnaire and the additional notes and comments provided by participants.

**SUMMARY OF THE IMPORTANCE OF SELECT CORE SKILLS AND TRAINING**

Knowledge Region	Illustrative Examples	Northeast Importance Score	Northwest Importance Score	Central Regions Importance Score	Average Importance Score	Additional Noted Important Knowledge Regions
<b>Applications and Systems – Languages for Development and Management</b>	Oracle, SQL, C/C++, Java, Perl, Visual Basic,	3.4	2.8	4.1	3.5	Visual Basic and Studio, .NET (5), ASP, MySQL (2), HTML, XML, InfoPath, Basic COBOL, Software Engineering Concepts
<b>Artificial Intelligence and Robotics</b>	Computer Vision, Expert Systems, Industrial Control Systems	1.3	1.0	1.6	1.3	AutoCAD, SCADA
<b>CAD, Computer Design, Graphics, modeling and Multimedia</b>	AutoCAD, Computer Aided Manufacturing, Remote Sensing, Global Positioning	2.3	1.8	2.5	2.2	AutoDesk, Map Guide, Mapping, GPS, Visio, Micro Station
<b>Data Capture</b>	Bar Codes, Optical Character Recognition, Automatic Identification	2.8	1.9	3.3	2.7	Voice recognition, RFID (7), Libraries
<b>Document Management and Groupware</b>	Lotus Notes and Domino, MS Exchange and Outlook, Search Engines	3.9	4.2	3.8	4.0	MS Share Point (4), Xerox Docushare, OpenText
<b>Electronic Publishing</b>	Desktop Publishing, Forms Processing, STML, HTML	2.5	3.4	2.9	2.9	XML (2), Front Page, Portal/Plumbtree, EXB, XSLD
<b>Electronic Commerce</b>	Web-site Management, Smart Cards, E-mail Broadcast	2.9	3.0	3.5	3.1	Security, Product Catalogues
<b>Enterprise Systems</b>	People Soft, SAP, Data Mining, Supply Chain, Intranets, Business Process Re-engineering	3.6	2.5	3.9	3.3	Visual Financials, Hansen, SharePoint Portal, Citizen access, Security, Web transactions, XML
<b>Internet</b>	Security, Privacy Issues, E-learning	4.3	4.5	4.1	4.3	PCI Compliance, Browser plug-ins, Collaboration tools
<b>Microprocessors, Semiconductors and Embedded Systems</b>	Chip Technology, Microprocessors, Nanotechnology	2.4	1.5	1.9	1.9	Virtualization and grid computing
<b>Networks - Hardware and Software</b>	Fibre Optics, LAN, DSL	4.2	3.4	3.5	3.7	VPN, V Laning, CISCO Certification, Wireless LANS, Field Buses, Converged networking
<b>Operating Systems</b>	Linux, Apple Mac, MS XP, MS NT, MS Vista Mainframe Systems, Real Time	4.2	4.0	3.9	4.0	IBM O/S 400, UNIX, XMS, Virtualization, Vware, MS Vista, MS CE, Clustering, Back-up Sites
<b>Storage</b>	RAID, Data Recovery, Storage Devices	3.4	3.1	3.8	3.4	SAN (2), NAS, Near Line Storage
<b>Servers - Hardware and Software</b>	IBM Servers, Linux Servers, Sun Servers	3.9	3.4	3.6	3.6	Intel and Virtual Servers, Microsoft Servers, CISCO, Satellite Technologies, VOIP technologies, Blade Servers, HP Servers
<b>Personal Use Software</b>	MS Suites, WordPerfect Suites, Teleworking	3.8	3.8	4.1	3.9	PDA use
<b>Systems and Computer Security</b>	Anti-virus Software, Data Encryption, Anti-hacking	4.1	4.3	4.1	4.2	Data recovery (2), Spyware, Citrix-based EPN, Firewalls
<b>Telephony, Mobile and Wireless Computing</b>	Blue tooth, VOIP, Fax, Text to Speech, Voice Recognition	3.8	3.4	3.7	3.6	VOIP (2), Unified Communication, Wireless tablets, SOX, CSOX
<b>Average</b>		3.4	3.1	3.4	3.3	

**2. A number of participants also provided comments as to additional Knowledge Regions considered to be of importance.**

The following table summarizes the responses. In each case, the item referenced is a “one off”, sometimes more specific than the context of the Knowledge Regions in the preceding pages, or in other cases highly relevant to the needs of the participant.

The following table summarizes the responses, by Region, as to “Other” Knowledge Regions” considered to be important.

**OTHER KNOWLEDGE REGIONS CONSIDERED TO BE IMPORTANT**

Knowledge Regions	Northeast Importance Score	Northwest Importance Score	Central Regions Importance Score	Comments
Mobile Phones	4.0			
Enterprise Architecture	4.0			
Change and Project Management	4.0			
Data Classification/ILM	4.5			
Navigation and Use of Web-sites		5.0		More specific to the requirements of organizations that develop web sites
Video Conferencing		3.0		Thought to aide Peace Country Health with employee training
Asset Management		3.0		
Occupational Health and Safety		2.0		Thought to be good “back ground skill” in a pulp and paper environment
Routers and switches		3.0		
Flash Objects		5.0		More specific to the requirements of organizations that develop web sites
Databases and Distributed Databases			4.0	
IT Controls			5.0	Important to merge IT with many process applications such as wastewater treatment, and pulp manufacture, for example

**III. Desirable “Soft” Skills**

As part of the questionnaire, participants were asked for input as to how important it was for graduates of Information Technology programs to posses certain “soft skills”. In providing their input, participants were asked to use a scale of “1” to “5” in which “1” corresponded to “very low importance” and “5” corresponded to “very high importance for a grouping of nine “soft skills” as listed below:

- Business Writing;
- Making Presentations;
- Dealing With Customers;
- Conflict Resolution and Problem Solving;
- Cultural Sensitivity;
- Listening;
- Basic Financial/Accounting;
- Stress Management; and
- Prior Experience (Co-op or Otherwise)

In addition, participants were invited to “add” or comment on other “soft skills” considered to be important and, if possible, provide a rating of the importance on a “1” to “5” scale.

### **Key Findings**

- 1. The “common soft skills” considered to be the most important were: “dealing with customers (average of 4.6 out of 5.0)”;** “conflict resolution and “problem solving” (average of 4.5 out of 5); and “listening” (average of 4.5 out of 5.0). In comparison, the “average” importance score was 4.0 out of 5.0.

The high ratings for the “soft skills” are representative of the crucial linkages between Information Technology and other staff within organizations in order to be able to understand issues and devise solutions. They also take into account the importance of having a basic understanding of the operations of aspects.

- 2. The “common soft skills” considered to be of lesser importance, having a rating equal to the average of 4.0, or less, included: “business writing (average score of 3.9 out of 5.0); “stress management” (average score of 3.8 out of 5.0) “making presentations” (average importance score of 3.7 out of 5.0); “cultural sensitivity” (average score of 3.6 out of 5.0); “prior experience” (average score of 3.4 out of 5.0); and “basic finance ‘accounting (average score of 3.1 out of 5.0).**

The scores for business writing and basic financial/accounting skills reflect on the one hand that new graduates would not be placed into situations where such skills would be required; however, in contrast, the findings in other sections of the survey suggest that new graduates are severely lacking in communication skills and do not have a grounding in business skills to be able to appreciate the linkages between information technology and the needs of the overall organization, or phrased in another way, that “information technology departments exist to serve the overall organization and not visa versa.

Based upon the input of participants, it was generally considered that while it was important for new graduates to have a basis of confidence and skills to make presentations, such tasks would likely fall under the purview of more experienced workers or management.

In addition, while it was also considered important for new graduates to have attributes of cultural sensitivity and stress management, and that there may be value in including such matters in formal training programs to some extent, it was generally considered that by the interview phase, it would be determined if individuals “had the basic DNA” of such attributes.

- 3. As mentioned above, participants were also asked to provide input as to the importance of “other soft skills”, and for the most part they are related to business skills, decision-making, and personal management.**

“Soft skills” that received an importance rating of 5.0 included:

- Using money wisely;
- Reasoning and logical thinking;
- Technical writing;
- Being able to work effectively alone or on a team;

- Business processes;
- Time management/priority setting;
- Decision-making; and
- Business analysis.

“Soft skills that received an importance rating of between 4.0 and 5.0 included:

- Project management (schedule, scope, quality and budget) – 4.7; and
- Understanding of government in relation to First nations, a basis of extra-curricular activities, communication skills and commitment – all 4.0.

“Soft skills” that received an importance rating of between 3 and 4 included:

- Leadership - 3.5; and
- A basic understanding of occupational health and safety issues - 3.0.

The following table provides a summary of responses from the three Regions used for the study as well as an average of the responses. The rows above the “Average” line represent the nine “common soft skills”, while the rows below represent additional input provided by participants.

#### SUMMARY OF THE IMPORTANCE OF “SOFT SKILLS”

Soft Skill	Northeast Average Score	Northwest Average Score	Central Regions Average Score	Overall Average Score
Business Writing	3.8	3.6	4.1	3.9
Making Presentations	3.5	3.8	3.8	3.7
Dealing With Customers	4.5	4.7	4.6	4.6
Conflict Resolution and Problem Solving	4.5	4.6	4.4	4.5
Cultural Sensitivity	3.5	3.9	3.6	3.7
Listening	4.4	4.8	4.3	4.5
Basic Financial/Accounting	2.7	3.1	3.4	3.1
Stress Management	3.5	4.1	3.7	3.8
Prior Experience	3.4	3.5	3.3	3.4
<b>Average</b>	<b>3.8</b>	<b>4.0</b>	<b>4.1</b>	<b>4.0</b>
Using Money Wisely	5.0			5.0
Reasoning and Logical Thinking	5.0			5.0
Understanding of government in relation to First Nations	4.0			4.0
Technical Writing	5.0			5.0
Business Process Skills	5.0		5.0	5.0
Time Management/Priority Setting	5.0			5.0
Ability to Work Alone and in Team	5.0			5.0
Project Management Skills		4.7	4.5	4.6
Occupational Health and Safety		3.0		3.0
Decision Making		5.0		5.0
Business Analysis		5.0		5.0
Extra-curricular activities		4.0		4.0
Demonstrated leadership		3.5		3.5
General Communication Skills			4.0	4.0
Commitment			4.0	4.0

#### **IV. Level of Training Required for Information Technology Occupations**

Participants were requested to provide an opinion as to whether a college level (generally accepted to be two years beyond high school) or a university level (generally accepted as a four year degree) education was required for a range of Information Technology related occupations. Over the course of the project, more than 868 “votes” were cast in this regard. For the most part, the occupational categories were based upon the Government of Canada’s National Occupational Category (NOC) classifications. Specific and detailed information pertaining to the occupations can be found at <http://www23.hrdc-drhc.gc.ca/2001/e/generic/welcome.shtml>.

##### **Key Findings**

**1. Generally speaking, a college level education was considered to be adequate for most of the occupational categories.**

Of the more than 868 “votes”, 654 were in support of a college level education for the occupations selected and 214 supported a university level education.

The 10 occupational categories, for which a college level education was considered to be most suitable, along with the total number of votes, are summarized in the following table.

**OCCUPATIONAL CATEGORIES FOR WHICH A COLLEGE LEVEL EDUCATION IS MOST SUITABLE**

<b>Occupational Category</b>	<b>College Votes</b>	<b>University Votes</b>	<b>College to University Ratio</b>
Customer Support Analyst	39	1	39.00/1
Web Technician	39	2	19.50/1
Computer Equipment Technician	38	2	19.00/1
Data Entry Clerk	38	2	19.00/1
Desktop Publishing Operator	37	1	37.00/1
Graphic Designer /Illustrator	36	4	9.00/1
Graphic Arts Technician	36	3	11.67
Webmaster	33	4	8.25/1
Automated Systems Technologist	32	5	6.40/1

**2. There were a number of occupational classifications for which the most appropriate level of education was not evident.**

Such occupations include: Computer Programmer; Information Systems Quality Assurance Analyst; Systems Auditor; Systems Security Specialist; Database Analyst; Database Administrator; and Health Information Management Professional. In such instances, factors such as the seniority of the position, and the experience and the adaptability of the individual could be major factors. The number of college votes for these occupations, compared with the number university votes is summarized in the following table.

**OCCUPATIONAL CATEGORIES FOR WHICH THE APPROPRIATE  
 LEVEL OF EDUCATION IS NOT CLEAR**

<b>Occupational Category</b>	<b>College Votes</b>	<b>University Votes</b>	<b>College to University Ratio</b>
Computer Programmer	24	15	1.6/1
Information Systems Quality Assurance Analyst	28	12	2.33/1
Systems Security Specialist	19	21	.90/1
Database Analyst	27	13	2.07/1
Database Administrator	27	14	1.93/1
Health Information Management Professional	24	11	2.18/1
Systems Auditor	17	20	0.85/1

**3. There were three occupational categories for which a university level of education was generally accepted as being required.**

Two of the occupational categories (Computer and Software Engineer, with 28 University “votes” and 11 “College votes”, and Software Engineer, with 28 “University votes” and 10 “College votes”) were from the NOC classifications. In addition, a category known as a Business Analyst, received 3 “University votes”. It was considered to be important for Business Analysts to have a foundation in Information Technology as well as several functional Regions such as Human Resources, Supply Chain or Finance. The presence of a foundation in the functional aspects of business is a common “thread” for other occupational categories mentioned by participants as requiring a university level of education such as Business and Control Systems Integrator (emerging in operations such as pulp and paper plants), Workflow Analysts and IT Project Managers. If counted as a single group, there would be seven “University votes”.

The following table provides an overview of all “votes” according to NOC occupational categories as well as others mentioned by participants. The summary is presented with a breakdown according to the three Regions of the study (Northeast, Northwest and “Central”) as well as an overall summation.



**OCCUPATIONAL CATEGORIES AND MOST APPROPRIATE LEVEL OF EDUCATION BY REGION**

Type of Position	Northeast		Northwest		Central		Total	
	College	University	College	University	College	University	College	University
Computer and Network Operator	11	1	11	1	16	1	37	3
Web Technician	12	1	12		16	1	39	2
Customer Support Analyst	12		12		16	1	39	1
Systems Tester	10	2	10	2	13	4	33	7
Graphic Arts Technician	11	1	11	1	15	1	36	3
Computer Programmer	6	4	6	6	12	6	24	15
Info Systems Quality Assurance Analyst	7	4	10	2	11	7	28	12
Interactive Media Developer	9	2	10	1	15	2	34	4
Database Administrator	9	2	6	6	13	6	27	14
Webmaster	10	2	10	1	14	1	33	4
Broadcast Maintenance Technician	5		11		13	2	28	2
Automated Systems Technologist	10	1	10	2	13	2	32	5
Graphic Designer /Illustrator	11	1	11	2	15	1	36	4
Health Info Management Prof	8	2	9	3	8	6	24	11
Computer Equipment Technician	12		11	1	15	1	37	2
Data Entry Clerk	12		11	1	16	1	38	2
Desktop Publishing Operator	12		11		15	1	37	1
Systems Auditor	5	4	7	5	5	12	17	20
Systems Security Specialist	6	6	6	6	7	10	19	21
Database Analyst	11	1	6	6	10	7	27	13
Software Engineer	4	7	3	9	3	13	10	28
Computer and Info Systems Manager	4	9	3	9	6	12	12	30
Radio Frequency Technologist			1				1	0
Wireless Technologist			1				1	0
Business and Control Systems Integrator				1			0	1
IT Project Coordinator			1				1	0
Systems Analyst	2						2	0
Project Manager	2	1					2	1
Workflow Analyst		1					0	1
Business Analyst		3					0	3
IT Business Consultant		1					0	1
IT Project Manager						2	0	2
Architects						1	0	1
<b>Total</b>	<b>201.0</b>	<b>54.0</b>	<b>200.0</b>	<b>65.0</b>	<b>267.0</b>	<b>101.0</b>	<b>654.0</b>	<b>214.0</b>

Additional notes derived from the interviews may provide some useful context:

- Much of the material can be self-taught, and not requiring a formal credential, according to Internet Concepts' Delvin Kosek and Jeff Protz of Northlands School Division
- Universities, in general, don't seem to be able to keep pace with change (Jeff Protz - Northlands School Division)
- For Fort McMurray School District, IT graduates need to have an understanding of how school districts work
- Fountain Tire Look for willingness and desire for lifelong learning.
- MCSNet uses it own training and screening; aptitude and willingness to learn are more important.

- Athabasca University has a preference for college-educated individuals for entry-level positions.
- Postsecondary training is preferred by ALPAC; however, hiring based more upon experience and fit. Focus is to build skills within the organization, rather than “hiring the skills”.
- PCL normally only hires graduates with university degrees and promotes from within.
- College level satisfactory for Computer and Information Systems Manager if supplemented by business skills, according to Alberta Environment’s Roger Burns.

## **V. Familiarity With and Feedback Pertaining to Existing I.T. Programs**

Participants were asked to rate their familiarity with the existing information technology programs at the four colleges using a scale of “1” to “5” with “1” being very “unfamiliar” and “5” being “very familiar. In addition, in cases where a familiarity score of “4” or greater was provided, participants were asked to rate the suitability of the range of material covered in the course as well as the suitability of the complexity of the material as well as the “overall marketability” of the course, program or credential in terms of gaining employment. As with above a scale of “1” to “5” was used with “1” representing a “very poor score” and “5” representing a “very good score”.

### **A. Awareness and Familiarity**

#### **Key Findings**

- 1. The degree of familiarity that study participants had with the existing I.T. related programs at the four colleges must be considered to be very low.**

The overall average score for familiarity with the I.T. programs and courses was 1.6. The average scores within the Regions is also very low (1.6 for the Northeast Region and Central Region and 1.4 for the Northwest Region).

The degree of familiarity that survey participants had with I.T. programs in their own Regions was only slightly better than the overall and Regional average scores. For example, the degree of familiarity that Northeast participants had with the programs at Keyano College ranged from 1.1 to .6 points higher than participants from the Northwest. Northwest participants had familiarity scores for Grande Prairie College programs that were between 1.3 and .6 points higher than the corresponding scores for Northeast participants. The programs or courses that had the highest familiarity scores were associated with Northwest participants and the short-term/workforce development type courses at Grande Prairie College (2.7) and Northeast participants associated with the Computer Information Systems Diploma at Keyano College (2.4). The lowest familiarity scores were associated with the 30 Hour Computer Network Certificate and 10-module Operating and Maintenance course, both at Northern Lakes College. The overall average familiarity scores for these two programs/courses were both 1.2, and the familiarity scores on a Regional basis ranged from 1.0 to 1.4.

The number of participants who rated their degree of familiarity as a “4” or more and where as such considered to be in a position to provide feedback on the programs and courses ranged from a low of 1 to a high of 6. The feedback received is discussed in Section “B”, below.

## **B. Ratings of Programs**

This section provides a summary of the specific feedback received from participants regarding the I.T. programs at the Northern Campuses of NAIT, Grande Prairie College, Keyano College, and Northern Lakes College. It is suggested that the findings be used with some caution due to the relatively low number of participants who were “qualified” to provide ratings for the programs, and the “skewing” that can occur under such circumstances. Nevertheless, the scores and accompanying narrative feedback, in some instances, are insightful.

### **Key Findings**

#### **1. NAIT Northern Campuses**

The feedback from participants, with the number noted in the table, resulted in the following ratings.

**RATINGS FOR NAIT NORTHERN CAMPUS PROGRAMS**

<b>Course/Program Description</b>	<b>Suitability of Range of Material Score</b>	<b>Suitability of Complexity of Material Score</b>	<b>Score for Marketability of Credential</b>
Continuing Education online basic computer literacy and computer applications courses.	4.3 (6 responses)	3.4 (5 responses)	4.3 (6 responses)
At the High Level and Peace River campuses, courses include the MS Office Suite of products, accounting software, and introductory courses in MS Windows.	3.0 (4 responses)	3.0 (4 responses)	3.5 (4 responses)

#### **Comments:**

- It is possible that some participants associated the Continuing Education programs with those at the Edmonton campus, which are held in very high regard, resulting in a higher score.
- The programs were rated highly (4s and 5s) by participants from Alberta Employment, Immigration and Industry and the Metis Nation of Alberta, both of whom have a strong mandate toward reintegration of workers. Todd Kennedy of Pembina Hill School Division rated the suitability of the complexity of the material a 3.0.

#### **2. Grande Prairie Regional College**

The feedback from participants, with the number noted in the table, resulted in the following ratings.

**RATINGS FOR GRANDE PRAIRIE REGIONAL COLLEGE PROGRAMS**

Course/Program Description	Suitability of Range of Material Score	Suitability of Complexity of Material Score	Score for Marketability of Credential
Various short-term ad hoc “upgrading” courses	4.3 (3 responses)	4.3 (3 responses)	4.0 (3 responses)
The first two years toward a Bachelor of Science in Computing Science or Computers and Information Technology	3.8 (4 responses)	3.8 (4 responses)	3.8 (4 responses)
Short-term, intensive and semester length one day per week in classroom courses under Continuing Education/Workforce Development	4.3 (4 responses)	4.3 (4 responses)	4.0 (4 responses)

Comments:

- Ratings were generally between 4.0 and 5.0 with the exception of one participant. Nicole Baker of Digital Blues in Grande Prairie considered the material in the two university transfer programs to be “too old” and assigned a rating of 2.0. Her ratings for the Continuing Education programs were neutral with a rating of 3.0

**3. Keyano College**

The feedback from participants, with the number noted in the table, resulted in the following ratings.

**RATINGS FOR KEYANO COLLEGE PROGRAMS**

Course/Program Description	Suitability of Range of Material Score	Suitability of Complexity of Material Score	Score for Marketability of Credential
Computer Information Systems Diploma	3.2 (4 responses)	2.8 (4 responses)	3.8 (4 responses)
Computer Information Systems Co-op Diploma	3.6 (5 responses)	3.6 (5 responses)	3.6 (5 responses)
Workforce Development in-class courses	3.7 (3 responses)	3.7 (3 responses)	3.7 (3 responses)
Online delivery of applications such as MS Office	3.0 (1 response)	3.0 (1 response)	3.0 (1 response)
Customized training developed specifically for your business or workforce location	5.0 (1 response)	5.0 (1 response)	5.0 (1 response)

Comments

- Ratings were generally between 4.0 and 5.0 with the following exception. Lyn Organ of Corporate Networks in Fort McMurray considered the Computer information Systems Diploma to be too basic and was also lacking in that it did not include “trouble shooting. She assigned a “1” for all categories.

**4. Northern Lakes College**

The feedback from participants, with the number noted in the table, resulted in the following ratings.

### RATINGS FOR NORTHERN LAKES COLLEGE PROGRAMS

Course/Program Description	Suitability of Range of Material Score	Suitability of Complexity of Material Score	Score for Marketability of Credential
A 10 month long Computer Technician	3.5 (4 responses)	3.5 (4 responses)	4.0 (4 responses)
A 30- hour long "Computer Network" certificate			
10 Module Computer Operating and Maintenance "course"	5.0 (1 response)	5.0 (1 response)	5.0 (1 response)

#### Comments

- Ratings were generally between 4.0 and 5.0 with the following exception. Todd Kennedy of Pembina Hills School Division noted that based on his experience, the students of the 10-month long Computer Technician program had "poor skills" and assigned a rating of 2.0 for suitability of range and complexity of material.

The following table provides a summary of the preceding discussion and shows the familiarity scores for each course or program and the ratings of each course or program by Region.

**SUMMARY OF SCORES PERTAINING TO FAMILIARITY AND RATINGS OF PROGRAMS**

Campus/Score	Northeast Familiarity Score	Northwest Familiarity Score	Central Region Familiarity Score	Overall Familiarity Score	Suitability of Range of Material Score	Suitability of Complexity of Material Score	Score for Marketability of Credential
<b>NAIT Northern Campuses</b>							
Under the Continuing Education "ed2go" program, online basic computer literacy and computer applications courses.	1.7	1.9	1.6	<b>1.6</b>	4.3 (6 responses)	3.4 (5 responses)	4.3 (6 responses)
At the High Level and Peace River campuses, courses include the MS Office Suite of products, accounting software, and introductory courses in MS Windows, the Internet and web design. Classes are broken into varying levels of complexity and run in the evenings and weekends.	1.8	2.2	1.6	<b>1.7</b>	3.0 (4 responses)	3.0 (4 responses)	3.5 (4 responses)
<b>Grande Prairie Regional College</b>							
Various short-term ad hoc "upgrading" courses	1.4	2.0	1.3	<b>1.6</b>	4.3 (3 responses)	4.3 (3 responses)	4.0 (3 responses)
The first two years toward a Bachelor of Science in Computing Science or Computers and Information Technology	1.6	1.7	1.4	<b>1.6</b>	3.8 (4 responses)	3.8 (4 responses)	3.8 (4 responses)
Short-term, intensive and semester length one day per week in classroom courses under Continuing Education/Workforce Development	1.4	2.7	1.5	<b>1.9</b>	4.3 (4 responses)	4.3 (4 responses)	4.0 (4 responses)
<b>Keyano College</b>							
Computer Information Systems Diploma	2.4	1.4	1.6	<b>1.8</b>	3.2 (4 responses)	2.8 (4 responses)	3.8 (4 responses)
Computer Information Systems Co-op Diploma	2.3	1.7	1.5	<b>1.8</b>	3.6 (5 responses)	3.6 (5 responses)	3.6 (5 responses)
Workforce Development in-class courses	2.2	1.1	1.5	<b>1.6</b>	3.7 (3 responses)	3.7 (3 responses)	3.7 (3 responses)
Online delivery of applications such as MS Office	1.6	1.0	1.3	<b>1.3</b>	3.0 (1 response)	3.0 (1 response)	3.0 (1 response)
Customized training developed specifically for your business or workforce location	1.6	1.1	1.4	<b>1.4</b>	5.0 (1 response)	5.0 (1 response)	5.0 (1 response)
<b>Northern Lakes College</b>							
A 10 month long (September to June) Computer Technician program leads to a certificate that allows individuals to be service technicians.	1.3	2.2	1.3	<b>1.6</b>	3.5 (4 responses)	3.5 (4 responses)	4.0 (4 responses)
A 30- hour long "Computer Network" certificate	1.0	1.4	1.2	<b>1.2</b>			
A computer Operating and Maintenance "course, taught in 10 modules	1.3	1.0	1.2	<b>1.2</b>	5.0 (1 response)	5.0 (1 response)	5.0 (1 response)
<b>Average</b>	<b>1.6</b>	<b>1.4</b>	<b>1.6</b>	<b>1.6</b>			

## **VI. Comments Regarding Additional I.T. Training and Services**

Participants were asked for input as to any additional courses, services or programs that should be offered by any of the colleges and to provide a reason or explanation for their comments, if possible. The nature of the responses is such that they can be grouped into those that are "college specific" and those that are of a more general nature.

### **A. College Specific Comments**

#### **Key Findings**

- The suggestions indicate that it may be warranted for curriculum planners to explore how it might be possible to integrate a greater emphasis on project management, network administration, web site design and CISCO training.**

Over the course of this survey, the perceived need for graduates to have stronger project management skills has been noted. Participants have noted that in the past, many public sector I.T. projects have been "out of control" and more skills in the Regions of budget, quality, schedule and scope as well as a base in business skills such as economics would be helpful in this regard.

There is a perceived shortage of network administration skills and a sense that the web site design training available in Northern Alberta is in need of "modernization. It is necessary for students to travel to Edmonton for some networking related training.

The use of CISCO systems and software is growing in importance. However, at present, there is no training available in Fort McMurray or Grande Prairie.

The following table provides, by Region, a summary of the institution specific comments received in relation to new programs or services.

#### **COMMENTS PERTAINING TO SPECIFIC COLLEGES**

<b>College</b>	<b>Northeast Description</b>	<b>Reason</b>	<b>Northwest Description</b>	<b>Reason</b>	<b>Central Description</b>	<b>Reason</b>
NAIT			Project Management	To assist overworked instructors	MySQL, Data networks and design desktop support using remote tools	
			Network Administration	High cost to go to Edmonton	Power Builder, Java, VB, .NET	Needed by AFSC
Keyano	Systems Administrator					
	Network Administrator	Current training inadequate				
Grande Prairie	CISCO	Not available	Up-date web design (3)		CST is too technical	
			CISCO courses (2)	Not available in NW Alberta	Basic degree is good	
			Project management	Control problem within public sector		
			RFID			
Northern Lakes			Broadband wireless			
			Video conferencing			
			Disaster Planning			

## **B. General Comments**

### **Key Findings**

1. **While a wide range of comments were made, those that are considered to warrant further review, and the frequency of the comment in parenthesis, include:**

- **Integration of more strategy, economics and business skills in general and more emphasis on operations and adding value (3);**
- **Integration of ITIL best practices concepts (2);**
- **Standardization of shorter-term courses (2);**
- **Make greater use of and increase awareness of e-learning options (2); and**
- **Introduce MySQL and PHP training.**

Throughout the course of the administration of this survey, there has been considerable feedback to the effect that employers would prefer graduates who are more well rounded, embrace lifelong learning and have a sufficient grasp of business and economic skills to allow them to appreciate how their I.T. related actions and services add value to organizations. At present, there is a perception among many employers that I.T. graduates with college level training in particular lack such a basis; they may understand the technology; however, have a limited grasp of how it serves the organization.

ITIL or Information Technology Infrastructure Library concepts can be applied to ensure that best practices are followed. The adoption of best practices ensures that optimal solutions are entertained and the associated reporting and monitoring aspects tie in with the business and economic themes of the preceding paragraph.

Standardization of the various short-term and e-learning (from perhaps a content and administration perspective) may result in a situation where there is a more efficient (from the perspective of the consumer) method of acquiring such training and more effective (from the point of the colleges) method of delivering the services if there is a larger critical mass. It might be possible to broaden the number of venues where such training could be obtained (when private study is not desirable). Participants from Finning have noted that there is a growing, and currently largely un-served, market for company field staff to have greater computer training as a growing emphasis is placed on field and remote collection of data and integration of computer technology to equipment servicing. At present, it is not practical for Finning Field staff to obtain the training in Edmonton or other larger centers.

MySQL is an "open source database", that is growing in acceptance because of its ease of use , and flexibility in that it be built on a variety of platforms. PHP is a widely-used general-purpose scripting language that is especially suited for Web development and can be embedded into HTML. At present, according to survey participants, no such training exists in Northern Alberta.

The following table provides, by Region, a summary of the preceding and other comments received in relation to new programs or services.



**GENERAL COMMENTS BY REGION**

Northeast		Northwest		Central	
Comment	Reason	Comment	Reason	Comment	Reason
Teach graduates more logical thinking skills and how to write software and run networks		GIS technology and its use – specific to software being used across the province	Growing use of GIS technology	More strategy, economics and business skills in general and more emphasis on operations and adding value (3)	Concern that IT graduates are not well-rounded and losing touch with the relationship with the purpose of their organizations
Provide a foundation for dealing with project management and change management.		Standardize the courses	Demand is not sufficient; would likely result in a better course(s)	Programs for youth to explore IT careers (such as IBM Ignite Camp – 15 to 18 year olds – or SAIT model)	This method is considered to be of high potential for Metis students who would otherwise be disadvantaged
Need to market short-term programs better and have more liaison with employers		Introduce MySQL and PHP training	Currently only available in Calgary	Greater MS training	To help Finning achieve greater levels of computer literacy
Would be desirable for instructors to move around	Human contact for students	Network convergence (voice, video, data)		Need to instill good fundamental skills and a mindset for continual learning	
More availability to remote communities via online methods		Enterprise scale applications	Growing size and complexity of systems	Need for a better foundation of how a computer works	
Likely a need to standardize programs as not enough clientele to support the differing programs		Transfer programs with U of A	IT occupations may be limited in advancement without a degree	Too much reaction, at times, to “hot” technologies	
Make e-learning modules available 24/7		Greater user skills focus via on-line methods		More project management in general	
Don't concentrate so much on Microsoft products		Video conferencing technology	More efficient method of training health care staff	Student summer employment or coop program	
Networking		MCSE training and exams	Not available in NW Alberta	Security Compliance Auditor	
Linux		MS Level 2 training	Staff would become more efficient	Field bus based systems	Merger of IT with instrumentation and process controls
Wireless	Growing use of WILAN				
ITIL – awareness and Foundation Essentials (2)	Industry best practices for IT				
More “train the trainer “	Meet demand				
IT training at Portage College	To provide the Lakeland Region with IT professionals				

## **VII. Strategies to Attract and Retain Information Technology Workers**

Participants were asked to rate the importance of a selection of strategies in regard to attracting and retaining information technology workers, and were also given the opportunity to speak to other strategies not contained in the selection. A scale of “1” to “5” was used for the rating, where “1” was not at all important” and “5” was extremely important”.

### **Key Findings**

- 1. On an “overall average” basis, the strategies or measures considered to be the most important for attracting and retaining information technology workers were: upgrading the skills of current employees (4.3 out of 5.0); improving succession planning (4.0 out of 5.0) and mentoring of younger workers by older or more experienced workers (3.9 out of 5.0). In contrast, the “average” score of importance was 3.6 across all measures or strategies and Regions of the study.**

For the first two, the importance was relatively consistent across the three Regions of the study. For the third, the importance of mentoring was very high in the Northeast and the Central Regions of the study, 4.2 and 4.3, respectively, yet fairly low (3.3) in Northwestern Alberta. The reason for the difference is not clear.

- 2. The strategies or measures considered to be of least importance were retaining workers beyond the traditional retirement age (average score of 2.7), contracting out (average score of 2.6), and relocating work (average score of 2.1).**

Generally speaking the information technology work force is younger than the work forces of other industries or sectors and there is yet to be a group of workers that might be considered as “older”. Contracting out was for the most part used as an option to manage spikes in workloads or to obtain access to skills that were not normally available in-house. A noteworthy exception is Epcor, contained in the “Central” Region figures, where a growing portion of information technology functions such as “customer support functions,” “networks”, “storage” “servers” and telephony related functions have been outsourced to companies such as Acrodex and Telus, and contribute to the score of 3.1.

- 3. There are some noteworthy differences across the three Regions of the study in terms of the importance scores assigned to certain strategies or measures.**

Attracting workers from other organizations had an average importance score of 3.3 yet was rated as a relatively important 3.9 in the “Central” Region and only 3.0 in Northeastern and Northwestern Alberta. Based upon comments received in other parts of the questionnaire, the [slightly] more favourable housing situation in Edmonton as well as perceptions in terms of climate, lifestyle and amenities, as compared to Grande Prairie and Fort McMurray, result in a relatively stronger willingness for workers to relocate.

- 4. There were a number of “other” specific strategies mentioned as being important for attracting and retaining information technology workers.**

Strategies or measures that were rated a 5.0 in importance included:

- Living allowances and more benefits;
- Retention bonuses;
- Performance bonuses; and
- Improved pay benefits and culture.

Strategies or measures that were rated between 4.0 and 5.0 included:

- Team based culture / flex- time;
- Remote working;
- Retention Bonuses;
- Building on Current Culture;
- Providing Health Benefits;
- Pay for home Internet;
- Working from home;
- Improve Team Atmosphere;
- Brand as a good place to work;
- Further Education;
- Provide Latest tools/software; and
- Training

The following table provides an overview of the importance rating assigned to the strategies or measures used to attract and retain information technology workers. It provides a breakdown according to the three Regions of the study and also provides scores for additional specific strategies or measures referenced by participants.

**SUMMARY OF THE IMPORTANCE OF STRATEGIES OR MEASURES  
 USED TO ATTRACT AND RETAIN INFORMATION TECHNOLOGY WORKERS**

Strategy or Measure	Northeast Average Score	Northwest Average Score	Central Average Score	Overall Average Score
Attracting workers from other organizations	3.0	3.0	3.9	3.3
Hiring recent university graduates	2.9	3.5	3.1	3.2
Hiring recent college graduates	3.1	3.5	3.5	3.4
Upgrading skills of current employees	4.7	3.8	4.4	4.3
Improving succession planning	3.9	3.9	4.3	4.0
Retaining workers beyond "traditional" retirement age	3.0	2.4	2.6	2.7
Mentoring of young workers by older workers	4.1	3.3	4.2	3.9
Changing job descriptions	3.7	2.7	3.3	3.2
Relocating work	2.2	2.0	2.1	2.1
Contracting out	2.2	2.6	3.1	2.6
<b>Average</b>	<b>3.3</b>	<b>3.3</b>	<b>4.3</b>	<b>3.6</b>
<b>Other Specific Measures:</b>				
Ensuring job satisfaction	3.5			3.5
Living allowance / more benefits	5.0			5.0
Team based culture / flex time	4.0			4.0
Remote working	4.0			4.0
Retention Bonuses	5.0			5.0
Building on Current Culture		4.0		4.0
Pay and benefits and culture		5.0		5.0
Providing Health Benefits		4.0		4.0
Pay for home Internet		4.0		4.0
Working from home		4.0		4.0
Performance bonuses			5.0	5.0
Improve Team Atmosphere			4.0	4.0
Brand as a good place to work			4.5	4.5
Further Education			4.0	4.0
Provide Latest tools/software			4.0	4.0
Training			4.0	4.0

Participants were also asked to provide comments in relation to the applicability of a number of statements regarding their organizations. A scale of “1” to “5” was again used with “1” representing “very low applicability and “5” representing “very high applicability.

### **Key Findings**

- 1. The statements having the highest degree of agreement relate to: the difficulty of finding qualified workers; the existence of a strong priority on upgrading skills; the existence of a clear understanding of what new skills are needed; the existence of strong competition for the employment of new workers; and the existence of a high priority on recruitment.**

The average score for difficulty in finding qualified workers was 4.2 out of 5.0 and relatively consistent across all Regions. A close second was the existence of a strong priority on upgrading skills. In this case, the overall average score was 4.1; however, there were some differences between Regions. In the Northeast and Northwest, the average scores were 4.0 and 3.9, respectively, while in the Central Region, the score of 4.5 is suggestive of a higher priority. Based upon the data from other sections of the questionnaire, it is possible that the relatively better availability of training in the Edmonton Region may be a factor in this regard. The average score for the existence of a clear understanding of the skills that were needed was 3.9 and more or less consistent across all Regions (slightly lower at 3.8 for the Northeast Region). Finally, the average score for the existence of strong competition from other employers for new employees was 3.8. Here there exists some variation between Regions. The Northwest Region had a score of 3.5 compared to 3.9 for the Northeast Region and 4.0 for the Central Region. At this time, the data do not offer an explanation for the difference. The average score for the existence of a high priority on recruitment was 3.7. The average scores of 3.9 for the Northwest and Central Regions was offset by a lower score of 3.3 for the Northeast Region. In comparison to the scores noted above, the overall average score was 3.4.

- 2. The statements having the lowest applicability or agreement relate to: poor information on employee’s current skills; the lack of availability of internal upgrading resources; and a lack of needed skills available internally.**

The average score for poor information on employee’s skills was 2.1 indicating relatively low applicability or agreement. The scores for the Northeast Region (2.3) and Central Region (2.5) are relatively consistent; however, the score of 1.6 for the Northwest Region indicates a much lower level of applicability and is perhaps suggestive of more rigorous human resources practices in documenting the skills of employees. The relatively low and consistent score pertaining to a lack of internal training or upgrading resources (average of 2.3) is suggestive that organizations believe that they have adequate budgets and devote sufficient resources in this regard.

- 3. For the remaining statements (in relation to “increased efforts by other employers to hire organization’s employees”, “a lack of qualified new graduates”, “a lack of availability of needed skills internally” and “a strong priority on succession planning”), the scores were between 2.5 and 3.5 and indicative of a “neutral” view.**

The average score for the “existence of increased efforts by other employers to hire employees” was 3.3 and indicative of a competitive job market but not a serious situation

of “poaching” employees as exists for certain trades. The average score of 3.5 for the “existence of a lack of availability of new graduates’ was relatively consistent across all jurisdictions (slightly higher at 3.7 in the “Central” Regions) and not indicative of a dire shortage. The discussion on pages 50 to 52, using projections developed by Alberta Employment Immigration and Industry, support such a position over the very near term but suggest that the shortages will be exacerbated somewhat in the years ahead. The average score of 2.9 in relation to a “lack of available skills internally was relatively’ consistent across all Regions. Finally, the average score for the “existence of a strong priority on succession planning” was 3.3. The score of 2.9 for the Northeast Region was the result of very low “1” scores for the Fort McMurray School Division and a company called MicroAge who’s participants considered the lack of succession planning to be a serious problem for the Information Technology departments.

The following table provides a summary of the average responses to each of the statements and also provides a comparison of the scores for each Region of the study as well as overall average scores for each statement.

**SUMMARY OF RESPONSES IN RELATION TO STATEMENTS OF SITUATION**

<b>Statement of Situation</b>	<b>Northeast Average Score</b>	<b>Northwest Average Score</b>	<b>Central Average Score</b>	<b>Overall Average Score</b>
There is a strong internal priority on upgrading skills	4.1	3.9	4.5	4.1
There is a clear picture of what new skills are needed	3.8	3.9	3.9	3.9
There are increased efforts by other employers to hire our employees	3.2	3.4	3.3	3.3
There is strong competition from other employers for new workers	3.9	3.5	4.1	3.8
We have difficulties finding qualified workers	4.1	4.1	4.2	4.2
There is a lack of qualified new graduates	3.3	3.3	3.5	3.4
There is a lack of needed skills available internally	2.8	2.9	3.0	2.9
There is poor information on employees’ current skills	2.1	1.6	2.5	2.1
There is a lack of internal training/upgrading resources	2.1	2.1	2.6	2.3
There is a high priority on recruitment	3.3	3.9	3.8	3.7
There is a strong priority on succession planning	3.0	3.4	3.5	3.3
<b>Average</b>	<b>3.2</b>	<b>3.3</b>	<b>3.5</b>	<b>3.4</b>

**VIII. Staffing Levels and Hiring Plans**

In order to gain insights with respect to the composition of the Information Technology workforce, participants were asked to provide information regarding 1) the current number of employees, 2) the number of new positions expected to be added over the next three years, and 3) an estimate of the degree of difficulty expected in hiring the new staff, using a scale of “1” to “5” in which “1” was representative of “very little difficulty” and “5” was representative of “great difficulty”.

**Key Findings**

**1. Number of Existing Positions in Occupational Categories**

The total number of Information Technology related positions associated with the organizations participating in this survey is 639.5. Of this total, 201 or 31.4% were in the Northeast Region, 123 or 19.2% were in the Northwest Region and 315 or 49.3% were in the Central Region. The average number of positions in each of the Occupational Categories was 27.3. The following table shows the number of positions and percentage of the total associated with the 22 principal Occupational Categories in the survey. The table also shows the distribution of the number of positions for Occupational Categories that are above and below average in number.

**NUMBER OF POSITIONS BY OCCUPATIONAL CATEGORY**

<b>Occupational Category</b>	<b>Current Number of Positions</b>	<b>Percentage of Table Total</b>
Computer and Network Operator	107	16.7%
Customer Support Analyst	75.5	11.8%
Computer Equipment Technician	75	11.7%
Computer Programmer	63	9.9%
Web Technician	44	6.9%
Computer and Info Sys Mgr	35	5.5%
Software Engineer	34	5.3%
<b>Average</b>	<b>27.3</b>	
Database Administrator	23	3.6%
Systems Security Specialist	20	3.1%
Graphic Arts Technician	17	2.7%
Database Analyst	16	2.5%
Webmaster	15	2.3%
Info Systems Quality Assurance Analyst	12	1.9%
Graphic Designer /Illustrator	10	1.6%
Health Info Management Prof	10	1.6%
Desktop Publishing Operator	9	1.4%
Data Entry Clerk	7	1.1%
Systems Auditor	6	0.9%
Broadcast Maintenance Tech	6	0.9%
Systems Tester	6	0.9%
Interactive Media Developer	5	0.8%
Automated Systems Technologist	4	0.6%
Other, as Below	41	6.4%
<b>Total</b>	<b>639.5</b>	<b>100.0%</b>

In addition to the numbers in the table above, the overall position count includes the following occupations and totals: Systems Analyst (14); Account Managers (9) GIS Technicians (8); IT Project Managers (4); Business Analysts (2); and Senior Analyst, IT Project Coordinator, Technology Analyst and IT Project Manager (1 of each).

## 2. Number of Positions to be Added Over the Next Three Years

According to the survey participants, the total number of positions to be added over the next three years is estimated to be 194 or an increase of approximately 30.3%. On a Regional basis, the number of positions to be added and the percentage increases are:

Region	Number to be Added	Percentage Increase
Northeast	67.0	33.3%
Northwest	67.0	54.5%
Central	60.0	19.9%

On an overall total basis, the following table shows a summary of the number of positions to be added according to Occupational Category. The table also shows the Occupational Categories for which the growth in numbers is expected to be above and below the average increase of 7.1

### POSITIONS TO BE ADDED ACCORDING TO OCCUPATIONAL CATEGORY

Occupational Category	Positions to be Added
Customer Support Analyst	27
Computer and Network Operator	20
Computer Equipment Tech	19
Computer Programmer	18
Web Technician	10
GIS Technicians	8
Database Analyst	8
<b>Average</b>	<b>7.1</b>
Database Administrator	7
Computer and Info Sys Mgr	7
Systems Security Specialist	6
Data Entry Clerk	5
Graphic Arts Technician	4
Health Info Management Prof	4
Software Engineer	4
Info Systems Quality Assurance Analyst	3
Webmaster	3
Graphic Designer /Illustrator	3
Systems Tester	2
Broadcast Maintenance Tech	2
Systems Auditor	2
Automated Systems Tech	1
Interactive Media Developer	0
Desktop Publishing Operator	0

In addition to the numbers in the table above, the number of positions to be added includes: Systems Analyst (7.0); IT Project Manager (7.0); Admin Support (6.0); Account Manager (5.0); Senior Analyst (2.0); VOIP Network Engineer (1.0); and Technology Analyst (1.0).

### 3. Expected Hiring Difficulty

The overall average Expected Hiring Difficulty is approximately 2.6 on a scale of “1” to “5”. There were 14 Occupational Categories for which the degree of Hiring Difficulty was expected to exceed the average.

The table below shows the level of Expected Hiring Difficulty cross-referenced by the number of positions to be added and the preferred level of education for the Occupation Category based upon the discussion and finding in Section IV, earlier (C= College, U=University, U/C represents either but with a preference for University, and C/U represents either with a preference for College).

**SUMMARY OF EXPECTED HIRING DIFFICULTY CROSS-REFERENCED BY  
 NUMBER OF POSITIONS TO BE ADDED AND PREFERRED LEVEL OF EDUCATION  
 FOR THE OCCUPATIONAL CATEGORY**

Occupational Category	Expected Hiring Difficulty	Positions to be Added	Preferred Level of Education
Database Analyst	4	8.0	C/U
Computer and Network Operator	3.9	20.0	C
Computer Programmer	3.9	18.0	C
Computer and Info Sys Mgr	3.9	7.0	U
Systems Auditor	3.5	2.0	U/C
Web Technician	3.4	10.0	C
Graphic Designer /Illustrator	3.2	3.0	C
Computer Equipment Tech	3.1	19.0	C
Customer Support Analyst	3	27.0	C
Database Administrator	3	7.0	C/U
Systems Security Specialist	3	6.0	U
Software Engineer	2.8	4.0	U
Graphic Arts Technician	2.7	4.0	C
Broadcast Maintenance Tech	2.7	2.0	C
<b>Average</b>	<b>2.6</b>		
Info Systems Quality Assurance Analyst	2.2	3.0	C/U
Webmaster	1.9	3.0	C
Health Info Management Prof	1.7	4.0	C/U
Automated Systems Tech	1.7	1.0	C
Data Entry Clerk	1	5.0	C
Systems Tester	1	2.0	C
Interactive Media Developer	0.3	0	C
Desktop Publishing Operator	0.3	0	C

The table suggests that the requirements are very suitable to be met by the four colleges and shows potential priority Regions where the Expected Hiring Difficulty and Number of Positions to be Added is highest.

The following table provides an overall overview of the current workforce, estimates of the number of new positions to be added over the next three years as well as indicators of the expected hiring difficulty for the new positions.



**OVERVIEW OF IT STAFFING, HIRING INTENTIONS AND EXPECTED HIRING DIFFICULTY**

Occupation Type	Northeast			Northwest			Central			Total		
	Current	To be Added	Difficulty	Current	To be Added	Difficulty	Current	To be Added	Difficulty	Current	To be Added	Difficulty
Computer and Network Operator	29.0	10.0	4.5	15.0	5.0	3.6	63.0	5.0	3.5	107.0	20.0	3.9
Web Technician	12.0	6.0	3.8	6.0	4.0	3.0	26.0	0.0	0.0	44.0	10.0	3.4
Customer Support Analyst	21.0	9.0	3.3	17.5	11.0	3.9	37.0	7.0	3.5	75.5	27.0	3.0
Systems Tester	2.0	1.0	3.0	0.0	0.0	0.0	4.0	1.0	0.0	6.0	2.0	1.0
Graphic Arts Technician	2.0	0.0	1.0	6.0	3.0	4.0	9.0	1.0	3.0	17.0	4.0	2.7
Computer Programmer	12.0	5.0	4.7	16.0	4.0	3.0	35.0	9.0	4.0	63.0	18.0	3.9
Info Systems Quality Assurance Analyst	4.0	2.0	3.7	0.0	1.0	3.0	8.0	0.0	0.0	12.0	3.0	2.2
Interactive Media Developer	1.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0	0.0	5.0	0.0	0.3
Database Administrator	7.0	2.0	4.3	4.0	1.0	2.5	12.0	4.0	2.3	23.0	7.0	3.0
Webmaster	10.0	2.0	3.7	4.0	1.0	2.0	1.0	0.0	0.0	15.0	3.0	1.9
Broadcast Maintenance Tech	3.0	1.0	3.0	3.0	1.0	5.0	0.0	0.0	0.0	6.0	2.0	2.7
Automated Systems Tech	1.0	0.0	3.0	3.0	1.0	2.0	0.0	0.0	0.0	4.0	1.0	1.7
Graphic Designer /Illustrator	4.0	0.0	3.0	1.0	3.0	3.5	5.0	0.0	3.0	10.0	3.0	3.2
Health Info Management Prof	6.0	0.0	1.0	4.0	4.0	4.0	0.0	0.0	0.0	10.0	4.0	1.7
Computer Equipment Tech	30.0	11.0	3.3	16.0	7.0	2.5	29.0	1.0	3.5	75.0	19.0	3.1
Data Entry Clerk	2.0	5.0	3.0	4.0	0.0	0.0	1.0	0.0	0.0	7.0	5.0	1.0
Desktop Publishing Operator	5.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0	0.0	9.0	0.0	0.3
Systems Auditor	3.0	0.0	4.0	2.0	1.0	5.0	1.0	1.0	3.0	6.0	2.0	3.5
Systems Security Specialist	12.0	2.0	4.3	5.0	3.0	4.7	3.0	1.0	0.0	20.0	6.0	3.0
Database Analyst	6.0	1.0	3.0	1.0	1.0	4.0	9.0	6.0	5.0	16.0	8.0	4.0
Software Engineer	8.0	4.0	3.5	1.0	0.0	0.0	25.0	0.0	5.0	34.0	4.0	2.8
Computer and Info Sys Mgr	11.0	2.0	4.3	7.0	5.0	4.0	17.0	0.0	3.5	35.0	7.0	3.9
Systems Analyst	5.0	2.0	4.0				9.0	5.0	4.5	14.0	7.0	4.5
Account Manager	1.0	1.0	4.0				8.0	4.0	4.0	9.0	5.0	4.0
GIS Technicians	4.0	1.0	2.0				4.0	7.0	4.5	8.0	8.0	3.3
Business Analyst				2.0	0.0	5.0				2.0		5.0
Senior Analyst				1.0	2.0	3.0				1.0	2.0	3.0
VOIP Network Engineer				0.0	1.0	5.0				0.0	1.0	5.0
Admin Support				0.0	6.0	4.5				0.0	6.0	4.5
IT Project Coordinator				1.0	2.0	4.0				1.0	2.0	4.0
Technology Analyst							1.0	1.0	5.0	1.0	1.0	5.0
IT Project Manager							4.0	7.0	4.5	4.0	7.0	4.5
<b>Total / Average</b>	<b>201.0</b>	<b>67.0</b>	<b>3.2</b>	<b>123.5</b>	<b>67.0</b>	<b>3.1</b>	<b>315.0</b>	<b>60.0</b>	<b>3.7</b>	<b>639.5</b>	<b>194.0</b>	<b>3.1</b>

## **IX. Other Trends and Issues**

Participants were asked to comment on “Other” (up to three) trends or issues that, in their opinion, would influence the need for Information Technology related skills and training over the next three years.

### **Key Findings**

- 1. While there is a significant range in the topics considered to be the “top issue”, themes that occurred more frequently related to: the rapid growth and difficulty finding workers in the very competitive and expensive market; the growth of wireless and RFID technology (including VOIP); problems associated with security; opportunities for more remote use of I.T.; the rapid pace of technological change; trends in the development of new servers; potential for “off-shore” computing; IT governance; greater band-width, and the growing convergence of healthcare and IT.**

The following table provides a prioritized summary of all responses received organized according to the three Regions of the survey. Some of the issues and trends are discussed at greater length in Chapter 4.

**SUMMARY OF RESPONSES REGARDING TOP THREE "OTHER" TRENDS OR ISSUES**

	Northeast		Northwest		Central	
Rank	Trend or Issue	Impact	Trend or Issue	Impact	Trend or Issue	Impact
1	Wireless/mobile (2) and other new technologies	Issues regarding MS Access, security and cost to install/support	Overall proliferation of IT	All positions will need to have some level of IT skills	More PDA and Wireless	MS Access and security issues
	Strong economy (4)	Greater competition for IT workers; exacerbated housing shortages	Rate of growth in Grande Prairie	Increased for IT workers; exacerbated housing shortages	RFID	Field collection and more real time data
	Recognition of ITIL best practices	More need for project management and monitoring	Negative perceptions of the north	Continued difficulty attracting single people	Increased wages	Higher costs
	Growth in public's use of IT	Identification and management, of cyber attacks, virus protection etc.	Health-care growth and electrification	Need to better align IT with the business of health care	Staff turn-over is high, documentation tends to be poor and knowledge is lost	Need for training for new systems
	Colleges going private	Need to be flexible and nimble in meeting demand	Fast pace of new platform development	Requires paradigm shift in thinking	Trend to move to an outsourced or hosted model	Requirement for business analysts and architects versus programmers and support staff
	Increased work with external oil sands and diamond companies	Need to be more "IT savvy"	Virtualization of servers (2)	Lower hardware costs; greater training need	Integration of instrumentation into office networks	More real time connection
	Database storage, and Security management	Increased volume and complexity	Oil and gas industry activity increase	Continued pressures for qualified personnel	Increased outsource (example: desktop support services)	Traditional skill acquisition/need diminishing
	Knowledge-base of employees tends to be underestimated	Need for better succession planning	More off-shore servers	Will free-up local resources		
2	General expectation for more and faster information	Pressure to meet demands	New accounting program	Need for additional training for Pomeroy		
	Increased project management	More "control" activities ("report cards", responding to inquiries etc.)	New systems such as VISTA	Pressures to stay technologically current		
	Wireless communications (3)	Greater flexibility with trade-off of security issues	Competitive nature of current job market	More pressures to attract and retain IT workers	Greater use of technology in the field.	Need for more rugged field support
	More remote partners	Issues connecting third party networks	Growth in number of hackers	More security compliance issues	Implementation of electronic document system	U of A will need for more staff training and IT skills
	Increased level of "in source" to central organization	Traditional skill acquisition/need diminishing	New hospital in Grande Prairie	Will be IT state-of-the-art	Integration of instrumentation with Internet	Greater ability to monitor (by public, if desirable)
	Increase in client usage		Server capacity	Restricts number of users		
3	Athabasca University's vision to be totally web-based	Need for more JAVA and PHP skills	Continued centralization of systems in paper industry	May reduce demand for IT positions		
	IT governance changes (2)	More SOX implementation and automated audit reports	Rapid pace of IT change	Pressure keeping IT skills current		
	More IT Security at CFB Cold Lake	Requires more trained professionals; and need to make users more aware of importance	Greater bandwidth	More and faster flow of data		
	Ever increasing service expectations	Increased demand on IT departments	Growth in healthcare based applications (biomedical technologies etc.)	People will expect "more and faster" service		
			VOIP/wireless and video conferencing	More options and reduced cost for communications.		

## **X. Project and Questionnaire Feedback**

Participants were provided with the opportunity to provide any additional comments pertaining to the project or the questionnaire. In total, 16 comments were made and are summarized below according to Region.

### **Northeast Region**

- Good project (2)
- Need to invest more money in certification to ensure quality of graduates.
- Training focus should be on network technologies, database technologies and IT security
- Excellent questions.
- What are the chances of college level IT training being conducted in the Cold Lake/Bonnyville Region?
- Any survey that leads to meeting needs is useful.
- We have been fortunate this year to hire two Co-Op students from NAIT. Normally, we have difficulty attracting someone to come to a rural Region because of rent and travel distances. However, we are very pleased with the knowledge base of these students and their eagerness to learn. A lot of what we are introducing these students to is new to them but because they have the basics from their NAIT program, they grasp the knowledge presented and are able to successfully perform the tasks given to them.

### **Northwest Region**

- Valid project
- Wireless will become very important.
- Seems to be aimed at business, so why did it come to me?
- It's encouraging to see consideration being given to addressing the need for skilled workers in the I.T. field in smaller Regions such as ours.
- Very good. Should occur on a more regular basis (every year but at least every three years). Would like to see results; a summit might be the appropriate forum.

### **“Central” Region**

- Good for colleges to be looking at demands, although it may be difficult to react in time.
- Our main office is in Lacombe (not in Northern Alberta), however we do have remote offices in 52 locations across the province.
- Biggest benefit was learning of the Northern IT programs.
- Given the nature of technology direction within Gov. of Alberta, many aspects of the survey cannot be directly answered. Although my Dept has presence in Northern Alberta, a number of the IT jobs are actually within Edmonton and new recruits sought from education institutions in Edmonton, Calgary, Lethbridge or other significant centers.

## **XI. Classification Data**

Participants were requested to provide responses with respect to revenues and number of employees that would help in terms of the classification of organizations. Classification data was received from 47 of 50 organizations (David Aplin and Associates, Harcourt and Metis Nation were not asked to respond in this regard). The responses received are as summarized below.

### **Revenues**

Organizations of a public sector nature (21 out of 47 responses) followed by those with revenues of more than \$5 million (18 out of 47) were the two largest groupings according to revenues. The following table summarizes the revenues of the participating organizations and also provides a grouping according to the three Regions used for the study.

**FREQUENCY OF RESPONSE ACCORDING TO REVENUES**

		Northeast	Northwest	Central	Total
A	Less Than \$100,000				
B	\$100,000 to \$499,999		1	2	3
C	\$500,000 to \$999,999	1	1	1	3
D	\$1 million to \$4,999,999	2	1		3
E	Over \$5 million	3	4	11	18
F	Declined		1		1
G	Public sector (Not Applicable)	8	8	5	21
	Total	<b>14</b>	<b>16</b>	<b>17 *</b>	<b>47 *</b>

\* Matter not discussed with Metis Nation, David Aplin and Associates and Harcourt.

### **Number of Employees in Northern Alberta**

Organizations with more than 100 employees (27 out of 47) comprised the largest category. The following table summarizes the participating organizations according to number of employees and also provides a grouping according to the three Regions used for the study.

**FREQUENCY OF RESPONSE ACCORDING TO NUMBER OF EMPLOYEES**

		Northeast	Northwest	Central	Total
A	Less Than 5	1	1	3	5
B	5 to 9		3		3
C	10 to 25	4	1	2	7
D	25 to 99	1	4		5
E	Over 100	8	7	12	27
F	Declined				
	Total	<b>14</b>	<b>16</b>	<b>17 *</b>	<b>47 *</b>

\* Matter not discussed with Metis Nation, David Aplin and Associates and Harcourt.

**ADDENDUM TABLE 1 – DETAILS OF WORK STATIONS AND DEVICES: NORTHEAST REGION**

<b>Respondent</b>	<b>Current Situation</b>	<b>Estimated Situation in Three Years</b>
<b>Fort McMurray School Division</b>	1,400 PC (100%)	1,400 PC Beginning of possible introduction of up to 5,000 PDA/smart phones for students
<b>Alberta Employment, Immigration and Investment</b>	100% PC	No change
<b>MCSNet</b>	100% PC	100% PC
<b>Holt Group</b>	10 PC (100%)	No change
<b>KTC Admin</b>	28 PC (100%)	No change
<b>Corporate Networks</b>	100% PC	No change
<b>Athabasca University</b>	1,100 work stations; approximately 95% PC and 5% Apple/Mac Approximately 100 PDA (unsupported)	Numbers expected to grow by about 10% per year
<b>MicroAge</b>	15 PC (100%) Some BlackBerry	No change
<b>ALPAC</b>	100% PC	No change
<b>MD Wood Buffalo</b>	650 to 700 PC Testing Apples Some PDA	Growth of about 15% to 20% per year
<b>Synchrude</b>	3,200 PC (80%)	3,300 PC (80%)
<b>Portage College</b>	250 PC 3 Mac Approximately 40% of staff have MS Access to a computer	275 PC 3 Mac Approximately 40% of staff have MS Access to a computer
<b>Athabasca Tribal Council</b>	25 PC 1 BlackBerry	30 PC 1 BlackBerry
<b>CFB Cold Lake</b>	Approximately 2,200 PC and 2 Mac	Growth of about 3% to 5%
<b>Northern Lights School Division</b>	700 (staff) 1700 (students) All PC	No change. (Evergreen program in place for replacement)

**ADDENDUM TABLE 2 – DETAILS OF WORK STATIONS AND DEVICES: NORTHWEST REGION**

<b>Respondent</b>	<b>Current Situation</b>	<b>Estimated Situation in Three Years</b>
<b>City of Grande Prairie</b>	350 PC (100%)	No significant change in PCs Possible increase in palms and other wireless PDA devices (subject to decisions on the role of government for wireless)
<b>Acklands – Granger (High Level)</b>	6 PC (100%)	No change
<b>Aspen Health Region</b>	1200 PC 80 BlackBerries	Expected to increase by about 20% to 1,440 and 100 BlackBerries
<b>Digital Blues</b>	7 PC	20 PC Large format printers
<b>Internet Concepts</b>	100% PC	Introduction of PDA and BlackBerries
<b>Northlands School Division</b>	1,000 PC (100%)	Increase by several hundred
<b>Holy Family School Division</b>	1,100 workstations: about 90% PC and 10% Mac. About 10% of the total is wireless	Increase to about 1,200
<b>Fort Vermillion School Division</b>	100% PC (number unknown)	No significant change
<b>Pembina Hills School Division</b>	2,000 work stations of which about 60% are Pc and 40% are Mac	Macs likely to increase in proportion to about 45%
<b>Weyerhaeuser</b>	250 PC (100%)	May be slight decline as IT functions gravitate to head office in USA
<b>Roy Northern Environmental</b>	40PC (100%) 1 NT Server	50 PC (100%) 1 NT Server
<b>Woodlands County</b>	25 PC	25 PC (no change)
<b>Peace Country Health</b>	1,834 desktop PC 408 lap top 43% of all staff have MS Access to a computer	2,500 desktop PC 750 lap top 60% of staff will have MS Access to a computer
<b>Pomeroy Group</b>	200 PC	200 PC

**ADDENDUM TABLE 3 – DETAILS OF WORK STATIONS AND DEVICES: CENTRAL REGION**

<b>Respondent</b>	<b>Current Situation</b>	<b>Estimated Situation in Three Years</b>
<b>Fountain Tire</b>	800 PC	1,600 PC Double in size over next five years Introduction of RFID to scan incoming vehicles and “tablets” for shop workers.
<b>Finning</b>	800 PC	1,500 (75% laptop and 25% desktop of which 90% will be dedicated to individuals, including service staff).
<b>Lilydale Foods</b>	395 licensed PC users 30 BlackBerry 250 mobile phones	About a 10% increase.
<b>University of Alberta</b>	At least 10,000 workstations associated with 8,000 employees of which about 80% are PC, 10% are Mac and 10% (in computing services) are Linux	A slight increase in numbers and greater use of BlackBerries
<b>Britec Computer Systems</b>	30 PC	40 PC
<b>PCL Construction</b>	Approximately 3,000 PC	Moving toward portable BlackBerry and PDA and tablets as part of strategy to be able to capture data in the field.
<b>Northlands (Edmonton)</b>	300 PC and 15 Mac	320 PC and 15 Mac
<b>Flint Energy</b>	About 1,000 PC, of which about 700 are in Northern Alberta Some BlackBerry, although very expensive to support	Expected to stay about the same.
<b>Agricultural Financial Services Corp</b>	700 PC	Increase by about 10%
<b>ATCO I-Tek</b>	650 PC	Increase by about 10%
<b>The Brick</b>	Approximately 500 PC and 10 Mac	No change
<b>North American Construction Group</b>	Approximately 375 PC consisting of desktop and laptop Approximately 33% of staff have access to a computer	Numbers will increase by about 20% with more laptops.  More PDA and BlackBerry with greater emphasis on field collection of data.  I.T. department has also recently taken over responsibility for records management
<b>EPCOR</b>	About 3,300 PC, 200 laptops, 600 thin devices (deployed in 2006) and 300 BlackBerry/PDA devices	Growth of about 3% per year
<b>City of Edmonton</b>	7,000 PC	8,000 PC
<b>Alberta Environment</b>	100% PC	100% PC



**ADDENDUM TABLE 4 - SOFTWARE UTILIZED BY NORTHEAST RESPONDENTS**

Type of Application	Frequency	Explanation/Comments
<b>Word Processing</b>		
MS Word	13	<ul style="list-style-type: none"> <li>ATC staff members have generally only a basic understanding.</li> <li>CFB staff mostly self-taught with minimal formal training.</li> </ul>
WordPerfect	1	<ul style="list-style-type: none"> <li>KTC also uses WordPerfect to be in keeping with software used by Indian and Northern Affairs</li> </ul>
Open Office	2	<ul style="list-style-type: none"> <li>Linux product used by MCSNet for 90% of word processing and Athabasca University for about 5% of word processing</li> </ul>
<b>Financial</b>		
Excel	6	Advanced knowledge lacking
Quick Books	2	
ACPAC, Custom, New Views, CODA OAS, HAGEN Version 8, COGNOS Budgeting, Simply Accounting, Infinium, Aggresso Business World, LIMS, FMAS, MYOB and Bellamy	1 each (13 total)	<ul style="list-style-type: none"> <li>Hagen Version 8 being phased out by MD Wood Buffalo due to no geographic interface.</li> <li>Infinium and LIMS used by ALPAC for 65% and 15% of applications, respectively.</li> <li>Aggresso Business World used by Portage College.</li> <li>FMAS (Federal Government custom) used by CFB Cold Lake</li> <li>Bellamy used by MD Wood Buffalo</li> </ul>
<b>Records Management</b>		
MS ACCESS	2	<ul style="list-style-type: none"> <li>ATC, CFB Cold Lake</li> </ul>
Oracle V 8 and 9	2	
MS One Note, Tiger Paw, MySQL, Post Graph, BOSS, TRIM, Liberty, Maplewood SIS, PeopleSoft, Xerox DocuShare	1 each (10 total)	<ul style="list-style-type: none"> <li>BOSS is in-house software used by MicroAge.</li> <li>TRIM used by ALPAC for all records management</li> <li>PeopleSoft used by CFB Cold Lake</li> </ul>
<b>Design/Estimating</b>		
CAAD	4	
Excel, Softplan, MS Project, Corel Draw and Photoshop	1 each (5 total)	
<b>GPS</b>		
In-house custom, TRIMBLE, ESRI, GeoMedia Pro	1 each (4 total)	<ul style="list-style-type: none"> <li>MCSNet has custom system</li> <li>TRIMBLE and ESRI used by ALPAC</li> </ul>
<b>Desk Top Publishing</b>		
MS Publisher	7	
Adobe	3	<ul style="list-style-type: none"> <li>ALPAC for about 15%, Adobe CS3 Design Premium at Portage College</li> </ul>
Dream Weaver, Interleaf, In-Design, PowerPoint, Typing Tutor, FrontPage	1 each (6 total)	<ul style="list-style-type: none"> <li>In-Design used by ALPAC for about 45%</li> <li>FrontPage used by CFB Cold Lake</li> </ul>
<b>Other</b>		
CAIS, Outlook, Excel, MS Access, HUGH, Vista Business, XP Professional, Lotus Notes, Acrobat, Flowpoint and FrontPage	1 each (11 total)	<ul style="list-style-type: none"> <li>CAIS is a client management software used by AEII</li> <li>HUGH used by AEII in conjunction with Students Finance Board</li> <li>IVARA used by ALPAC for maintenance and purchasing.</li> <li>ESRI is ALPAC's GIS</li> </ul>

**ADDENDUM TABLE 5 - SUMMARY OF SOFTWARE UTILIZED BY NORTHWEST RESPONDENTS**

Type of Application	Frequency	Explanation/Comments
<b>Word Processing</b>		
MS Word <sup>1</sup>	12	<ul style="list-style-type: none"> <li>Perceived need to improve staff's basic skills in MS Office at Peace Country and Aspen Health Regions</li> </ul>
WordPerfect	1	<ul style="list-style-type: none"> <li>Used by Acklands - Granger</li> </ul>
Adobe Acrobat	1	
<b>Financial</b>		
Excel	4	<ul style="list-style-type: none"> <li>In the opinion of the Weyerhaeuser contact, there could be benefits from greater knowledge of V-Basic and Macros associated with Excel.</li> </ul>
MEDITECH	2	<ul style="list-style-type: none"> <li>Aspen Health Region, Peace Country Health</li> </ul>
Simply Accounting	2	
EREB, QuickBooks, CA\$H, MS Money, IBM AS/400 Custom, Vision Enterprise-wide	1 each (6 total)	<ul style="list-style-type: none"> <li>IBM AS/400 used by Holy Family SD</li> </ul>
<b>Records Management</b>		
MS ACCESS	3	
Xerox Docushare	2	
MS SharePoint	2	
On-line MYSQL	2	
I Manage, Muni-metrics, MEDITECH (a complete suite of software used in health care settings), MIT SIRS, Filemaker Pro, ISIS, Filenet, Documentum, Century File, Outlook, GeoMedia (custom software used by Woodlands County)	1 each (13 total)	<ul style="list-style-type: none"> <li>MIT SIRS used by Holy Family SD</li> <li>Filemaker Pro used by Roy Northern but considered obsolescent</li> <li>ISIS used by Fort Vermillion SAD</li> <li>Filenet and Documentum used by Weyerhaeuser</li> </ul>
<b>Design/Estimating</b>		
CAAD	2	
Visio	2	
Micro-media studio, Adobe Photoshop, Adobe Illustrator	1 each (3 total)	
<b>GPS</b>		
Ground station on top of Grande Prairie City Hall (All layers of data interwoven with GIS), AutoDesk Map Guide, AccuMap, GeoMedia	1 each (4 total)	<ul style="list-style-type: none"> <li>AccuMap used by Roy Northern</li> <li>Geomedia used by Woodlands County (custom software)</li> </ul>
<b>Desk Top Publishing</b>		
MS Publisher	4	
Adobe Acrobat	2	
Corel Draw	2	<ul style="list-style-type: none"> <li>Roy Northern and Pomeroy</li> </ul>
Adobe Suite, ADOBE Photoshop Illustrator, PageMaker, Corel Draw, Corel Photopaint	1 each (5 total)	<ul style="list-style-type: none"> <li>Photopaint used by Roy Northern Environmental</li> </ul>
<b>Other</b>		
CRISIS 911, Bud Mack, Business Revitalization, Camelot, Hansen, PACS, Visual Studio Developer, Acrobat, CISCO 50 Security, MS Activity, Win PM (property management used by Pomeroy) Maitr'd, Web Trans	1 each (13 total)	<ul style="list-style-type: none"> <li>Camelot is municipal assessment software.</li> <li>Hansen helps to manage municipalities.</li> <li>CISCO 50 Security and MS Activity used by Holy Family SD</li> <li>Pembina Hills SD uses web-based Acrobat; however, staff not accustomed to the time-out limitations and automatic savings.</li> <li>Aspen Health Region uses PACS for x-rays</li> <li>Maitr'd (Point of Sale System used by Pomeroy)</li> </ul>

<sup>1</sup> Holy Family School Division switching from MS Office 2003 to MS Office 2007 in September 2007.

**ADDENDUM TABLE 6 - SUMMARY OF SOFTWARE USED BY CENTRAL RESPONDENTS**

Type of Application	Frequency	Explanation/Comments
<b>Word Processing</b>		
MS Word	12	<ul style="list-style-type: none"> <li>Finning field staff have very limited knowledge of features and functionality.</li> </ul>
MS Office	6	
WordPerfect	1	<ul style="list-style-type: none"> <li>Used by legal staff of Alberta Environment</li> </ul>
Mac Open Office	1	<ul style="list-style-type: none"> <li>U of A</li> </ul>
Linux Tec	1	<ul style="list-style-type: none"> <li>U of A</li> </ul>
<b>Financial</b>		
Excel	4	<ul style="list-style-type: none"> <li>Lilydale staff struggle with understanding of capabilities and how to get help</li> </ul>
IBM mainframe with Oracle and JD Edwards	4	<ul style="list-style-type: none"> <li>PCL, ATCO and Flint Energy and North American Construction Group</li> </ul>
Oracle	2	<ul style="list-style-type: none"> <li>The Brick, Epcor</li> </ul>
PeopleSoft	2	<ul style="list-style-type: none"> <li>AFCS and Alberta Environment</li> </ul>
SAP, Great Plains Tier 1, CODA Version 4, AccPac ERP	1 (6 total)	<ul style="list-style-type: none"> <li>Great Plains used by Fountain Tire</li> <li>CODA Version 4 used by Finning</li> <li>AccPac ERP used by Britec</li> <li>SAP used by City of Edmonton</li> </ul>
<b>Records Management</b>		
MS Share Point	3	<ul style="list-style-type: none"> <li>City of Edmonton, North American Construction Group; Emerging with Flint Energy</li> </ul>
Oracle	2	<ul style="list-style-type: none"> <li>PCL and The Brick</li> </ul>
Replacing MS Access with a tier 1 software	1	<ul style="list-style-type: none"> <li>Fountain Tire – losing too much data with MS ACCESS</li> </ul>
Content on Demand, MS Access, Oracle and PeopleSoft, TRIM, Bentley, Project Wise, OpenText	1 each (8 total)	<ul style="list-style-type: none"> <li>Content on Demand used by Finning</li> <li>MS ACCESS used by Lilydale although not adequate</li> <li>Oracle and PeopleSoft used by U of A</li> <li>TRIM, Project Wise and Bentley used by ATCO.</li> <li>Epcor currently has no formal records management software. Issue under review.</li> <li>OpenText Used by Alberta Environment – new initiative</li> </ul>
<b>Design/Estimating</b>		
AutoCAD	3	<ul style="list-style-type: none"> <li>Northlands (Edmonton), NACG, Epcor</li> </ul>
OLAV (Business intelligence tool), Surtax Prima Vera, AutoCAD LT, Meeting Matrix, Hard Dollar, Micro Position, custom (2)	1 each (8 total)	<ul style="list-style-type: none"> <li>Lilydale uses OLAV</li> <li>Northlands uses AutoCAD LT, and Meeting Matrix.</li> <li>Hard Dollar used by NACG</li> <li>Micro Position used by Epcor</li> <li>Custom software used by PCL and Flint Energy</li> </ul>
<b>GPS</b>		
		<ul style="list-style-type: none"> <li>Emerging with Fountain Tire, Lilydale, Epcor and Flint Energy</li> </ul>
<b>Desk Top Publishing</b>		
PowerPoint	3	<ul style="list-style-type: none"> <li>Finning staff need to make greater use of Publisher</li> </ul>
Publisher	3	<ul style="list-style-type: none"> <li>Lilydale, U of A, Epcor</li> </ul>
Adobe	3	<ul style="list-style-type: none"> <li>Northlands (Edmonton), Flint Energy, ATCO</li> </ul>
Visio, Word	1 each (2 total)	<ul style="list-style-type: none"> <li>Both used by Epcor</li> </ul>
<b>Other</b>		
Dream weaver	2	<ul style="list-style-type: none"> <li>U of A, Britec</li> </ul>
Envoy/Omni Oracle application, Near real time performance management, Balanced Score Card (custom), Workflow Management (custom), Laser leveling, COGNOS, MS Access	1 each (7 total)	<ul style="list-style-type: none"> <li>AFSC uses Envoy/Omni.</li> <li>Fountain Tire has custom balanced scorecard and workflow management.</li> <li>PCL uses laser leveling.</li> <li>COGNOS and MS ACCESS used by Epcor for data mining</li> <li>City of Edmonton has over 1,000 software applications</li> </ul>

## **Chapter 3**

### **Analysis of Demand and Supply for Information Technology Occupations**

The purpose of this Chapter is to provide additional context as to the demand and supply for Information Technology positions. Two perspectives are presented. The first is a higher level, province-wide analysis that provides projections of demand and supply through to the year 2016. The second perspective has a more regional perspective and provides indicators of demand and supply from the perspective of hiring difficulties experienced by employers and estimated vacancy rates for a number of Occupational Categories.

#### **I. Province-wide Supply and Demand Projections**

This section makes use of the projections contained in the Alberta Employment, Industry and Immigration document entitled “*Occupational Supply/Demand Outlook 2006 to 2016 (November, 2006)*”<sup>1</sup> to complete an analysis at the provincial level for Information Technology Occupational Categories and to make comparisons with other types of occupations.

#### **Key Findings**

- 1. The demand for Information Technology related occupations is expected to begin to exceed supply beginning in 2007 and will be proportionally more serious for Technical occupations**

The Occupational/Supply demand Outlook model uses the Statistics Canada occupational codes. Professional Information Technology positions (normally requiring a four year university degree) are “C07” and Technical positions (normally requiring a technical institute or two year college diploma) are “C18”.

The annual demand for Professional positions is forecast to grow from 32,182 in 2006 to over 37,887 by 2016. The annual supply of Professional positions is forecast to grow from 32,393 in 2006 to 36,706 by 2016. Supply exceeds demand by a small margin during 2006, 2007 and 2008; however, shortages are forecast from 2009 and beyond and will exceed 3,800 over the period. The projected period-wide shortage for Northern Alberta is approximately 400, if Northern Alberta’s requirements are roughly in keeping with it’s 10.5% of Alberta’s population. The demand/supply ratio over the period, a measure of the intensity of the shortage or surplus is 1.09.

The demand/supply outlook for Technical positions is proportionally more serious. The annual demand for Technical positions is forecast to grow from 8,344 in 2006 to over 10,769 by 2016. The annual supply of Technical positions is forecast to grow from 8,387 in 2006 to 9,160 by 2016. Supply exceeds demand by a small margin during 2006; however, shortages are forecast from 2007 and beyond (the shortage is 208 in 2007 and grows to over 1,600 by 2016) and will exceed 9,000 over the period. The projected period-wide shortage for Northern Alberta, is approximately 1,000, if Northern Alberta’s requirements are roughly in keeping with it’s 10.5% of Alberta’s population. The demand/supply ratio over the period, a measure of the intensity of the shortage or surplus is approximately 1.098.

The following table provides more detail of the demand and supply for Information Technology positions on a province-wide basis.

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<sup>1</sup> [www.hre.gov.ab.ca/documents/LMI/LMI-LMF\\_occ\\_demand\\_supply.pdf](http://www.hre.gov.ab.ca/documents/LMI/LMI-LMF_occ_demand_supply.pdf) - 462.2KB

**DEMAND/SUPPLY ANALYSIS FOR INFORMATION TECHNOLOGY RELATED POSITIONS (2006 TO 2016)**

<b>C07 (Professional Positions) <sup>1</sup></b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>Period Total</b>
Demand Projection	32,182	32,811	33,339	33,995	34,615	35,145	35,660	36,241	36,821	37,345	37,887	386,041
Supply Projection	32,395	32,966	33,488	33,983	34,424	34,870	35,290	35,687	36,060	36,339	36,706	382,208
Surplus (Shortage)	213	155	149	-12	-191	-275	-370	-554	-761	-1,006	-1,181	-3,833
Demand/Supply Ratio	0.993	0.995	0.996	1	1.006	1.008	1.01	1.016	1.021	1.028	1.032	1.01
Northern Surplus (Shortage) <sup>3</sup>	22	16	16	-1	-20	-29	-39	-58	-80	-106	-124	-402
<b>C18 (Technical Positions) <sup>4</sup></b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>Period Total</b>
Demand Projection	8,344	8,598	8,838	9,124	9,390	9,618	9,836	10,092	10,329	10,539	10,769	105,477
Supply Projection	8,387	8,390	8,420	8,568	8,640	8,696	8,742	8,878	8,988	9,065	9,160	95,934
Surplus (Shortage)	43	-208	-418	-556	-750	-922	-1,094	-1,214	-1,341	-1,474	-1,609	-9,543
Demand/Supply Ratio	0.995	1.025	1.05	1.065	1.087	1.106	1.125	1.137	1.149	1.163	1.176	1.099
Northern Surplus (Shortage) <sup>3</sup>	5	-22	-44	-58	-79	-97	-115	-127	-141	-155	-169	-1,002
<b>Total</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>Period Total</b>
Demand Projection	40,526	41,409	42,177	43,119	44,005	44,763	45,496	46,333	47,150	47,884	48,656	491,518
Supply Projection	40,782	41,356	41,908	42,551	43,064	43,566	44,032	44,565	45,048	45,404	45,866	478,142
Surplus (Shortage)	256	-53	-269	-568	-941	-1,197	-1,464	-1,768	-2,102	-2,480	-2,790	-13,376
Demand/Supply Ratio	0.994	1.01	1.023	1.0325	1.0465	1.057	1.0675	1.0765	1.085	1.0955	1.104	1.0545
Northern Surplus (Shortage) <sup>3</sup>	27	-6	-28	-59	-99	-126	-154	-185	-221	-261	-293	-1,404

Source: Alberta Employment, Immigration and Industry - Occupational Supply/Demand Outlook 2006 to 2016 (November, 2006)

- Notes:
1. Positions that normally require a two-year technical diploma, or less.
  2. Northern Share of Population estimated to be 10.5%, based upon Alberta Bureau of Statistics population projections.
  3. Northern Surplus (Shortage) figures for illustrative purposes only and based upon allocation of approximately 10.5% of overall provincial figure.
  4. Positions that normally require at least a four-year university degree.

**2. For context, the projected shortfall of Professional and Technical Information Technology workers, while serious, is not the most severe faced by the Province.**

Skills shortages may be viewed from two perspectives. The first is on the basis of proportionality whereby the shortage is viewed as a percentage or ratio of the supply. On the basis of proportionality, with demand/supply ratios of 1.01 for Professional positions and approximately 1.1 for Technical positions, the shortages are not the most severe. The 10 occupation types with the most severe demand/supply ratios, along with comparisons for IT Occupational Categories, are summarized in the following table.

**OCCUPATIONS WITH THE MOST SEVERE DEMAND SUPPLY RATIOS**

NOC Code	Description	Average
J16	Machine Operators and Related Workers in Textile Processing	3.305
A34	Managers in Art, Culture, Recreation and Sport	2.41
A14	Facility Operators and Maintenance Managers	1.976
C02	Life Sciences Professionals	1.906
G72	Tour and Resort Guides and Casino Operators	1.641
G98	Other Elemental Service Occupations	1.33
D02	Optometrists	1.255
D03	Pharmacists	1.249
D01	Physicians, Dentists and Veterinarians	1.232
C04	Other Engineers	1.18
C18	Technical Information Technology	1.10
C07	Professional Information Technology	1.01

The second approach is on the basis of absolute numbers. On such basis, the most occupational category with the most severe shortage is “D01 - Physicians, Dentists and Veterinarians” for which the annual shortfall is forecast to be close to 5,000 by 2016. By comparison, as noted earlier, the province-wide shortages for Professional and Technical Information Technology positions is expected to be close to 1,200 and 1,600 per year, respectively, in 2016. The following table provides an overview of the 10 occupational categories with the most severe shortages in absolute numbers, and provides comparisons with I.T. Occupational Categories.

**10 OCCUPATIONS WITH THE MOST SEVERE SHORTAGES IN ABSOLUTE NUMBERS**

NOC Code	Description	Annual Shortage by 2016
D01	Physicians, Dentists and Veterinarians	4,922
A14	Facility Operators and Maintenance Managers	3,908
C04	Other Engineers	3,280
H32	Metal Forging, Shaping and Erecting	3,134
G51	Occupations in Food and Beverage Service	2,835
D31	Assisting Occupations in Health Services	2,833
C03	Civil, Mechanical and Electrical Engineers	2,604
I13	Underground Miners, Oil and Gas Drillers	2,207
G98	Other Elemental Supply Occupations	2,073
B57	Recording, Distributing and Scheduling Occupations	2,049
B01	Finance and Insurance Administrative Occupations	1,985
C18	Technical Information Technology	1,690
C07	Professional Information Technology	1,181

## **II. Analysis of Select Occupations**

The section uses information contained in the ALIS web site <sup>2</sup> (indicators of “hiring difficulty” and estimated “vacancy rates”) for an assortment of Professional and Technical Information Technology related positions as alternate or additional indicators of demand and supply. When the data permit, comparisons are also made on a sub-regional (Athabasca-Grande Prairie and Wood Buffalo – Cold Lake) and province-wide basis.

### **Key Findings**

#### **1. Hiring Difficulty**

The following table provides a summary of the proportion of Alberta employers that experienced difficulty hiring select Information Technology Occupational Categories in 2005, the most recent year for which full data are available.

**PROPORTION OF COMPANIES EXPERIENCING HIRING DIFFICULTIES  
 FOR SELECT INFORMATION TECHNOLOGY RELATED OCCUPATIONAL CATEGORIES**

<b>NOC Code</b>	<b>Type of Position</b>	<b>Proportion of Companies Experiencing Hiring Difficulties</b>
2171.3	<i>Info Systems Quality Assurance Analyst</i>	50%
2232	Automated Systems Technologist	39%
5241	Graphic Arts Technician	36%
2242	Computer Equipment Technician	36%
2283	Systems Tester	33%
2174.2	<i>Interactive Media Developer</i>	25%
2172.2	<i>Database Administrator</i>	21%
2172.1	<i>Database Analyst</i>	19%
2172	Database Analysts and Administrators	19%
5224	Broadcast Maintenance Technician	17%
2175	<i>Webmaster</i>	16%
5223	Graphic Designer /Illustrator	16%
2171	Systems Auditor	14%
2173	Software Engineer	14%
2171.1	Systems Security Specialist	13%
2281.1	Computer and Network Operator	10%
1422	Data Entry Clerk	9%
2282	Customer Support Analyst	7%
0213	Computer and Info Systems Manager	7%
2281.2	Web Technician	4%
2174.1	<i>Computer Programmer</i>	3%
1413.3	Health Info Management Prof	0%
1423	Desktop Publishing Operator	0%

<sup>2</sup> [www.alis.gov.ab/workinfo](http://www.alis.gov.ab/workinfo)

Note: Educational requirements for Italicized positions vary: positions can be treated as “professional” or “technical”. For the purposes of this report, they have been included in the “technical” category.

## 2. Vacancy Rates

The following table provides a summary of vacancy rates within Alberta companies for select Information Technology Occupational Categories in 2005. Most of the data are province-wide; however, there is one entry for the Athabasca – Grande Prairie Region. Please reference page 55 for an explanation of the alphabetical notations accompanying the vacancy rate figures.

### VACANCY RATES FOR SELECT INFORMATION TECHNOLOGY OCCUPATIONAL CATEGORIES

<b>Occupational Category</b>	<b>Vacancy Rate</b>
<b>Province-wide</b>	
Info Systems Quality Ass Analyst	20% C
Webmaster	8% B
Database Administrator	7% B
Software Engineer	6% B
Computer Equipment Technician	6% A
Database Analysts and Administrators	4% B
Automated Systems Technologist	4% A
Systems Tester	3% C
Computer Programmer	3% B
Graphic Designer /Illustrator	3% B
Computer and Info Systems Manager	3% B
Graphic Arts Technician	2% C
Customer Support Analyst	2% A
Systems Auditor	2% A
Engineering Manager	2% A
Computer and Network Operator	2% B
Interactive Media Developer	1% B
Systems Security Specialist	1% B
Data Entry Clerk	1% A
Broadcast Maintenance Technician	0% C
Health Info Management Prof	0% C
Desktop Publishing Operator	0% C
Database Analyst	0% C
Web Technician	0% B
<b>Athabasca – Grande Prairie</b>	
Computer Equipment Technician	7% C

The following table provides an overview and summary of the preceding discussion of the hiring difficulties and vacancy rates for Information Technology Occupational Categories as of 2005 and makes comparisons with a number of other Occupational Categories for context.



**SUMMARY OF HIRING DIFFICULTY AND VACANCY RATES FOR INFORMATION TECHNOLOGY RELATED POSITIONS**

	Description	Athabasca/GP		Wood Buffalo/CL		Province-wide	
		Hiring Difficulty	Vacancy Rate	Hiring Difficulty	Vacancy Rate	Hiring Difficulty	Vacancy Rate
<b>Technical</b>							
2281.1	Computer and Network Operator	0% C	0% C	<b>25% C</b>	0% C	<b>10% B</b>	2% B
2281.2	Web Technician	NA	NA	NA	NA	4% B	0% B
2282	Customer Support Analyst	0% C	0% C	NA	NA	<b>7% A</b>	2% A
2283	Systems Tester	NA	NA	NA	NA	<b>33% C</b>	3% C
5223	Graphic Arts Technician	NA	NA	NA	NA	<b>36% C</b>	2% C
2174.1	<i>Computer Programmer</i>	NA	NA	NA	NA	3% B	3% B
2171.3	<i>Info Systems Quality Ass Analyst</i>	NA	NA	NA	NA	<b>50% C</b>	<b>20% C</b>
2174.2	<i>Interactive Media Developer</i>	NA	NA	NA	NA	<b>25% B</b>	1% B
2172.2	<i>Database Administrator</i>	NA	NA	NA	NA	<b>21% B</b>	<b>7% B</b>
2175	<i>Webmaster</i>	NA	NA	NA	NA	<b>16% B</b>	<b>8% B</b>
5224	Broadcast Maintenance Technician	NA	NA	NA	NA	<b>17% C</b>	0% C
2232	Automated Systems Technologist	NA	NA	NA	NA	<b>39% A</b>	4% A
5241	Graphic Designer /Illustrator	NA	NA	NA	NA	<b>16% B</b>	3% B
1413.3	Health Info Management Prof	NA	NA	NA	NA	0% C	0% C
8232.2	Oil and Gas Well Loggers and Tester	<b>53% C</b>	<b>4% C</b>	NA	NA	<b>41% A</b>	4% A
2242	Computer Equipment Technician	<b>29% C</b>	<b>7% C</b>	NA	NA	<b>36% A</b>	<b>6% A</b>
1422	Data Entry Clerk	0% A	0% A	NA	NA	<b>9% A</b>	1% A
1423	Desktop Publishing Operator	NA	NA	NA	NA	0% C	0% C
<b>Professional</b>							
2171	Systems Auditor	NA	NA	NA	NA	<b>14% A</b>	2% A
2171.1	Systems Security Specialist	NA	NA	NA	NA	<b>13% B</b>	1% B
2172	Database Analysts and Administrators	NA	NA	NA	NA	<b>19% B</b>	4% B
2172.1	Database Analyst	NA	NA	NA	NA	<b>19% C</b>	0% C
2173	Software Engineer	NA	NA	NA	NA	<b>14% B</b>	<b>6% B</b>
0213	Computer and Info Systems Manager	NA	NA	NA	NA	7% B	3% B
0211	Engineering Manager	NA	NA	NA	NA	<b>24% A</b>	2% A
1111.2	Accountants	6% B	0% B	<b>13% C</b>	0% C	<b>13% B</b>	0% B

Source: [www.alis.gov.ab/workinfo](http://www.alis.gov.ab/workinfo)

Note 1: Accompanying the "Hiring Difficulty" and "Vacancy Rate" figures for many of the occupations is an alphabetical code ("A", "B" or "C"). The code is representative of the statistical sample error, largely based upon sample size and error for the population contacted:

- A represents a sample error of less than or equal to ± 5% (19 times out of 20);
- B represents a sample error of between ± 5.01% and ± 10% (19 times out of 20); and
- C represents a sample error of more than ± 10% (19 times out of 20).

Caution must be used when referencing results with Sample Error Code "C" due to the higher sampling error.

Note 2: Italicized positions are treated as both "technical" and "Professional". For this report, they are treated as "Technical".

## **Chapter 4** **Trends in the Use and Adoption of IT Within Key Industries**

The purpose of this Chapter is to provide additional information pertaining to recent developments and trends in the use and adoption of Information Technology in some of the key industries in Northern Alberta. In some instances, the discussion will augment that contained in Chapter 2. There are two Sections to this Chapter. Section A discusses some of the key technological developments. Section B provides additional context to how the technology is used. It is hoped that the discussion will help the Clearinghouse colleges to be in a better position for planning Information Technology courses and programs.

### **A. Key Technological and Other Developments**

This Section discusses some of the key technological developments that can be expected to have a bearing on the future use of Information Technology in Northern Alberta.

#### **1. RFID**

RFID stands for Radio Frequency Identification. It is a generic term that is used to describe a system that transmits the identity (in the form of a unique serial number) of an object or person wirelessly, using radio waves. It's grouped under the broad category automatic identification technologies. Auto-ID technologies include bar codes, optical character readers and some biometric technologies, such as retinal scans. The auto-ID technologies have been used to reduce the amount of time and labor needed to input data manually and to improve data accuracy. Some auto-ID technologies, such as bar code systems, often require a person to manually scan a label or "tag" to capture the data. RFID is designed to enable readers to capture data on tags and transmit it to a computer system—without needing a person to be involved. RFID technology has been used by thousands of companies for a decade or more. They also allow organizations to know the precise location and status of any item in supply chains; however, until recently, the cost of RFID has limited its use. Today, "tags" typically cost between \$.20 and \$.40, depending upon features, and are disposed of (rather than recycled) once used. The Internet allows organizations to share information with ease.<sup>1</sup>

#### **2. Wireless**

Wireless technology is a term used to describe the electromagnetic waves (and not wire) that carry the signals over the air. Morse code, which uses the wireless transmitters radiotelegraphy was the first wireless technology in the early of the 20<sup>th</sup> century. Later in the same century, modulators which adds information or the signal to an electronic signal carrier made it possible to transmit voice via wireless medium coined as "radio." The word radio was used in the early fifties of the 20<sup>th</sup> century. Wireless has made the following tools, applications and associated technologies viable": wireless mobile; Bluetooth; WiFi Hotspots' GPS; Satellite; GPRS; and 3G. Such applications have improved communications and navigation in remote areas (such as Northern Alberta)

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<sup>1</sup> <http://www.rfidjournal.com/article/articleview/1339/1/129/>

greatly and are a major factor in the high level of mineral exploration currently underway. In concert with RFID, a very effective method of transmitting information is created.<sup>2</sup>

### **3. PACS**

PACS stands for “picture archiving and communication system”. In medical imaging, such as , such as ultrasonography, magnetic resonance imaging, positron emission tomography, computed tomography, endoscopy, mammography and radiography) PACS are computers or networks dedicated to the storage, retrieval, distribution and presentation of images. PACS replaces hard-copy based means of managing medical images, such as film archives. It expands on the possibilities of such conventional systems by providing capabilities of off-site viewing and reporting (distance education, tele-diagnosis). Additionally, it enables practitioners at various physical locations to access the same information simultaneously, (teleradiology). With the decreasing price of digital storage, PACS systems provide a growing cost and space advantage over film archives.<sup>3</sup> The new hospital to be built in Grande Prairie will make extensive use of PACS technology.

### **4. Grid Computing**

While there are a number of differing technical definitions of Grid Computing, a common theme may be thought of as the harnessing a group, or grid, of computers (using a Local area network or Ethernet) to increase computational powers. A key advantage is that with advances in computing power, a group of generic computers may be connected to often create computing power once associated with highly specialized and expensive super computers. Grid computing has had substantial implications for the mineral exploration industry. Vast amounts of seismic and geological data can be processed locally and faster resulting in quicker decisions at the local level. One of the implications is that ever increasingly, occupations that were once thought of as “blue collar or back breaking” (seismic and some drilling, for example) are increasingly requiring individuals who are “computer literate”. Grid computing can also make use of “down time” of computers used for business applications to process technical matters and thus result in savings.

### **5. GPS**

GPS stands for Global Positioning System, which uses a constellation of medium orbit Earth satellites that transmit precise radio signals enabling a GPS receiver to determine its location, speed and direction. GPS has become a widely used aid to navigation worldwide, and a useful tool for map-making, land surveying, commerce, and scientific uses. GPS also provides a precise time reference used in many applications including scientific study of earthquakes, and synchronization of telecommunications networks.<sup>4</sup> In conjunction with other sensors and software applications, GPS can be used to monitor the speed travelled and location of equipment and individuals.<sup>5</sup>

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<sup>2</sup> <http://www.4wirelessideas.com/>

<sup>3</sup> [http://en.wikipedia.org/wiki/Picture\\_archiving\\_and\\_communication\\_system](http://en.wikipedia.org/wiki/Picture_archiving_and_communication_system)

<sup>4</sup> [http://en.wikipedia.org/wiki/Global\\_Positioning\\_System](http://en.wikipedia.org/wiki/Global_Positioning_System)

<sup>5</sup> [http://en.wikipedia.org/wiki/Global\\_Positioning\\_System](http://en.wikipedia.org/wiki/Global_Positioning_System)

## **6. Virtualization of Servers**

Server virtualization is the masking of server resources, including the number and identity of individual physical servers, processors, and operating systems, from server users. The server administrator uses a software application to divide one physical server into multiple isolated virtual environments. The virtual environments are sometimes called virtual private servers, but they are also known as [partitions](#), guests, instances, containers or emulations.

Server virtualization can be viewed as part of an overall virtualization trend in enterprise IT that includes [storage virtualization](#), [network virtualization](#), and workload management. This trend is one component in the development of [autonomic computing](#), in which the server environment will be able to manage itself based on perceived activity. Server virtualization can be used to eliminate [server sprawl](#), to make more efficient use of server resources, to improve server availability, to assist in [disaster recovery](#), testing and development, and to centralize server administration.<sup>6</sup>

## **7. Thin Devices and PDAs**

Thin – or lean – devices form part of a client-server architecture in which computing activities are processed on a central server, and not the individual client unit. "There are fewer moving parts on a [traditional] PC, so there is less of a possibility the machines will break down, and if something does go wrong, the IT department can deal with it on the server end with little trouble to the user. Thin clients can also help a corporation better manage its data because information is stored securely on the server and not on a user's computer or laptop. In addition, users don't need to be concerned about having the right files on their system, because information can be centrally accessed. A user can get to a file from any location by linking through a server. This access to data also increases user mobility in that an employee, with Internet access, can work from virtually any location. The use of thin clients is becoming increasingly common, especially in environments such as large businesses, as well as among organizations in the education, health care and finance sector.

PDA stands for Personal Data Assistant. PDAs are handheld computing devices also called Palm Tops; they can also encompass the Pocket PC category of handheld device. The basic features included in any PDA device are: Personal Organizer; Clock; Date Book; Calculator; Address Book; Tasklist; Memo Pad; and in some, rudimentary games. Some of the most common or popular PDA devices are: the BlackBerry; Palm OS and Windows Mobile. There is an increasing convergence between PDAs and cellular phones, as is the case with the BlackBerry.

## **8. IT Governance**

A fairly recent measure, which is expected to have significant implications for IT governance is the passage of the Sarbanes – Oxley (or SOX) Act in the United States in 2002. The Act, while somewhat controversial, was passed quickly in response to a number of major corporate scandals in the United States (Enron, WorldCom, and Tyco

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<sup>6</sup> [http://searchservervirtualization.techtarget.com/sDefinition/0,,sid94\\_gci1032820,00.html](http://searchservervirtualization.techtarget.com/sDefinition/0,,sid94_gci1032820,00.html)

International to name a few). The Act includes a number of major provisions for improving corporate reporting, control and accountability. In the context of auditing standards, and the responsibilities of external auditors, the Act has two major requirements that have implications for corporate I.T. departments and managers:

- Understand the flow of transactions, including IT aspects, sufficiently to identify points at which a misstatement could arise; and
- Evaluate company-level (entity-level) controls, which correspond to the components of the Committee of Sponsoring Organizations of the Treadway Commission (or COSO) framework.

The United States Securities Exchange Commission (SEC) identifies the COSO framework by name as a methodology for achieving compliance. The COSO framework defines five areas, which, when implemented, can help support the requirements as set forth in the Sarbanes-Oxley legislation. These five areas and their impacts for the IT Department are as follows:

- **Risk Assessment.** Before the necessary controls are implemented, IT management must assess and understand the areas of risk affecting the completeness and validity of the financial reports. They must examine how the company's systems are being used and the current level and accuracy of existing documentation. The areas of risk drive the definition of the other four components of the COSO framework.
- **Control Environment.** An environment in which the employees take ownership for the success of their projects will encourage them to escalate issues and concerns, and feel that their time and efforts contribute to the success of the organization. This is the foundation on which the IT organization will thrive. Employees should cross train with design, implementation, quality assurance and deployment teams to better understand the entire technology lifecycle.
- **Control Activities.** Design, implementation and quality assurance testing teams should be independent. ERP (Enterprise Resource Planning) and CRM (Customer Relationship Management) systems that collect data, but feed into manual spreadsheets are prone to human error. The organization will need to document usage rules and create an audit trail for each system that contributes financial information. Further, written policies should define the specifications, business requirements and other documentation expected for each project.
- **Monitoring.** Auditing processes and schedules should be developed to address the high-risk areas within the IT organization. IT personnel should perform frequent internal audits. In addition, personnel from outside the IT organization should perform audits on a schedule that is appropriate to the level of risk. Management should clearly understand and be held responsible for the outcome of these audits.
- **Information and Communication.** Without timely, accurate information, it will be difficult for IT management to proactively identify and address areas of risk. They will be unable to react to issues as they occur. IT management must demonstrate to

company management an understanding of what needs to be done to comply with Sarbanes-Oxley and how it is to be achieved.<sup>7</sup>

An institute has been created (Sarbanes–Oxley Institute) to help I.T. managers to understand and fulfill their obligations, and those who have complete an accreditation course are said to have CSOX, or Certified in Sarbanes-Oxley, training.

The fact that many Canadian companies are subsidiaries of US parents and the high levels of commerce between Canada and the United States will cause Canadian organizations to be affected by the Act. While it is unlikely that recent I.T. graduates will be faced with issues of compliance, it is likely that the nature of their jobs and duties will be so affected.

## **9. New Languages**

The rapid growth of the [Internet](#) in the mid-1990's created opportunities for new languages. [Perl](#), originally a Unix scripting tool first released in 1987, became common in dynamic [Web sites](#). [Java](#) came to be used for server-side programming. These developments were not fundamentally novel, rather they were refinements to existing languages and paradigms, and largely based on the C family of programming languages.

Programming language evolution continues, in both industry and research. Current directions include security and reliability verification, new kinds of modularity ([mixins](#), [delegates](#), [aspects](#)), and database integration.<sup>[citation needed]</sup>

The [4GLs](#) are examples of languages which are domain-specific, such as [SQL](#), which manipulates and returns [sets](#) of data rather than the scalar values which are canonical to most programming languages. [Perl](#), for example, with its ['here document'](#) can hold multiple 4GL programs, as well as multiple JavaScript programs, in part of its own perl code and use variable interpolation in the 'here document' to support multi-language programming<sup>8</sup>

## **B. Some Examples of Applications in Key Industries**

This Section provides examples of the use and adoption of Information Technology in industries of importance to Northern Alberta.

### **1. Oil sands and Surface Mining**

A new research program<sup>9</sup> to make oil sands mining methods safer and more efficient was launched in April of 2004 as a result of Dr. Hong Zhang of the University of Alberta being awarded an NSERC/iCORE Syncrude/Matrikon Industrial Research Chair in

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<sup>7</sup> [http://en.wikipedia.org/wiki/Sarbanes-Oxley\\_Act#Impact\\_of\\_SOX\\_on\\_the\\_Corporate\\_IT\\_Department](http://en.wikipedia.org/wiki/Sarbanes-Oxley_Act#Impact_of_SOX_on_the_Corporate_IT_Department)

<sup>8</sup> [http://en.wikipedia.org/wiki/Programming\\_language](http://en.wikipedia.org/wiki/Programming_language)

<sup>9</sup> [http://www.icore.ca/news/FINAL\\_Apr2\\_Release.pdf](http://www.icore.ca/news/FINAL_Apr2_Release.pdf)

Intelligent Sensing Systems, valued at \$4.9 million over five years. Several challenges in oil sands mining will be tackled by using information and communications technologies to remotely monitor and improve the performance of oils sands operations. A five megabits-per-second optical network will stream live video footage from the Syncrude mine in Fort McMurray into a lab on the third floor of Athabasca Hall at the University of Alberta. There, researchers will analyze oil sands fragments to develop accurate measurement of their sizes so that equipment can be improved to produce less waste. Modeling of other mining activities to improve efficiency are also planned. The remote monitoring of equipment will also identify problems before they occur. Jams in the equipment, caused by large fragments, can put someone's life at risk if they have to climb onto the massive machines.

Although traditionally viewed as a low-tech sunset industry, surface mining in Alberta has begun to embrace the potential benefits that information and communications technology has to offer. GPS and wireless communications are currently being used to gather data from mobile mining equipment. Wireless desktops for haul truck drivers have been examined in trial pilot studies. Fiber optic and ATM communication networks bring data and live video information from the pit floors in Fort McMurray mines to support research in laboratories in Edmonton, allowing researchers to measure the ore size of conveyed oil sands 500 kilometres away. It is with such communications technologies that ICT researchers in Edmonton can remotely investigate potential applications of machine vision and integrated sensing techniques to the problems of monitoring the health and performance of oil sand mining equipment. Advanced communication technologies have narrowed the gap between mine sites and the operation's decision makers as well as allowing researchers access to operational data with near real-time performance.

## **2. Underground Mining**

Satellite communications systems and information processing technologies are reducing costs and minimizing disruption associated with reserve characterization and production. Robotics wireless and global positioning systems will allow safer and more cost-effective development of some reserves as a result of remotely operated equipment. Advancements in information technology have made data processing more and more accurate with visualizations and simulations possible like never before. It is possible to simulate the ore body almost in its entirety in three dimensions for the proper assessment and planning. Sampling and analysis no longer delay the geological assessment.<sup>10</sup>

## **3. Tourism (and Eco-Tourism)**

The implications of Information Technology in relation to the Tourism are vast. The most important role of information technology is the development of competitive advantages by reducing cost and enhancing differentiation in four ways:

- The way in which information is transmitted and the way in which services are delivered by providing instant and interactive access to products or services;
- The management of tourism in that it allows real time management and optimization of pricing and supply;

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<sup>10</sup> [http://www.diversityworking.com/career/Metals\\_and\\_Mining/Alabama\\_jobs/story/39.html](http://www.diversityworking.com/career/Metals_and_Mining/Alabama_jobs/story/39.html)

The marketing of tourism in that previously, marketing campaigns were based on direct contact with the potential markets, through IT, a destination can enter a private household and sell its product directly to the consumer; and

- The relationship between producers and consumers in that it enables innovative practitioners to get closer to consumers in collection of research and feedback, while the consumer has never been more informed and faced with multiple options.

Web sites associated with the tourism industry are becoming increasingly sophisticated and the day may not be far away when “virtual reality” becomes an integral part of a travel or tourism experience without leaving home.

#### **4. Transportation**

Global Positioning Systems, cellular technology, and freight planning software allow truck dispatchers to communicate with drivers in real time to optimize hauling and backhauling arrangements. In-car and in-truck information panels warning of accidents or bad weather ahead will soon be standard equipment. Other technologies let dispatchers monitor individual truck engine conditions and average speed in order to improve vehicle performance and reduce operating costs. The transportation system is capable of doing multi-state permitting electronically to avoid delays and streamline delivery times. In the near future built-in collision-avoidance systems are likely to be installed equipment in some vehicles. In-car directional assistance and map capabilities are already available in some luxury cars. Smartcards, perhaps using fingerprints, are capable of identifying low-risk shippers or known passengers for faster, safer access at border crossings and freight terminals.

#### **5. Manufacturing**

Manufacturers will work in an environment where factory production processes will be based on intelligent information technology. Machines and tools will be interactive, but smarter machines will require smarter, bettertrained, higher-value operators. There will be shorter product and service life cycles, requiring constant innovation and adaptability of machinery and operators. Costs will rise little when variety expands. The B2B e-Commerce environment will be increasingly more integrated, with strong ties among e-Distribution, e-Marketplace and e-Procurement systems.

#### **6. Forestry (and Agriculture)**

While the forest industry is, at present, one of the slowest to embrace new technology, and current cost pressures may perpetuate this situation, it is one of the sectors with some of the largest potential gains. The January 1999 *International Journal of Forest Engineering* <sup>11</sup> discusses a number of ways in which emerging trends related to information technology may affect the industry. A excerpt from the article that discusses applications of relevance to this assignment follows:

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<sup>11</sup> <http://www.lib.unb.ca/Texts/JFE/bin/get5.cgi?directory=January99/&filename=guimier.html>



### **Machine-control systems**

The machines of the future will be equipped with “intelligent” control systems that let them adapt to the environment in which they are working; by using various sensors, the machine will “know” when it is on a slope, when it is on wet ground, or when its wheels are slipping. It can thus adapt to these conditions in such a manner as to optimize its performance and reduce its impact on its environment; for example, controlling wheel slip will reduce soil damage, cabs could automatically adjust themselves to account for slopes, an understanding of ground firmness would let a planting machine adjust the planting depth for seedlings, and a machine could even provide its operator with diagnostics on its operating condition, thus reducing downtime due to repairs.

### **Operator aids and robotics**

As a result of automating a machine’s functions, operators could concentrate their energy and resources on making strategic decisions rather than on routine operating tasks. After an initial learning phase, the machine would manage systematic and repetitive actions by itself; these could include placing logs in piles, grabbing a tree for delimiting, or moving in a straight line. Current efforts in this area focus largely on the development of a boom-control system based on coordinated motion control; this system lets the operator control the implement (e.g., a felling head) by using a mini-joystick, without having to worry about the operation of individual hydraulic cylinders. In such a system, the operator simply points the control lever in the desired direction and the onboard computer controls the necessary hydraulic valves. Moving from this point to fully autonomous robots in the forest represents an unlikely step; even if certain activities will be highly automated, the operator will retain an important role for the foreseeable future.

### **Computerized decision-support systems**

With increasingly strict standards and the consideration of alternative values, the industry must face an increasingly complex planning process for its forest interventions. In addition, a considerable quantity of biophysical, ecological and social data will have to be available for integration in the planning process.

This data is ruled by complex interrelations that will be better understood and better integrated within more precise, but not yet perfect, models. Geographic information systems (GIS) have already become operational tools that greatly facilitate the management of large quantities of information. In contrast, managers have relatively few decision-support tools available to help them select an optimum harvesting and silviculture scenario. FERIC is currently working to develop a computerized model called “Interface” that will let managers simulate various harvesting and regeneration scenarios and estimate their total cost.

Similar decision-support tools will be available in the future for optimizing forestry operations in terms of environmental, ecological, social, wildlife, and other parameters. Forestry managers will still make the final decisions, but formulating the elements of a solution will be greatly simplified by the use of such computerized tools.

### **Training simulators**

The need to train machine operators will only increase with the increasing constraints and operational demands in the forest, and with the increasing complexity of forestry equipment. Because of the high cost of such equipment, the risks involved in using an inexperienced operator in the field, and the complexity of the concepts to be taught, training will rely more and more on simulators. FERIC, along with our partners in the ATREF (application of robotics technologies to forestry machines) project, has already developed a first-generation simulator that helps operators learn to use a harvester's boom.

### **Machine vision**

Most future equipment will incorporate some form of machine vision that will let it evaluate the objects it must handle (trees, logs, chips, etc.) and respond appropriately. For example, FERIC foresees the development of a camera system for measuring logs handled by delimiters or processors. Analyzing these materials will help to optimize processing, as in the case of accurately determining stem diameters and lengths to improve slashing. The same technology will be developed for measuring logs (while accounting for various deductions for rot etc.), as well as for the analysis and sorting of pulp chips. Finally, if we hope to automate certain forestry operations (e.g., through robotics), the machine must be able to “visualize” its environment, for example, a harvester must be capable of “seeing” a tree before it can grab it. Such machine vision systems are already well implemented in facilities such as sawmills, but will have to be adapted to the constraints of the forest environment.

## **Chapter 5** **Conclusions and Recommendations**

The major findings, conclusions and recommendations arising out of this study are presented in this Chapter.

### **I. Findings and Conclusions**

The major findings and conclusions are summarized below.

#### **Computer Hardware**

**1. IBM PCs are by far the most widely utilized type of workstation.**

The total number of computers currently utilized was estimated to be approximately 47,000. Of these, approximately 43,500 or 92% were IBM PCs. The number of Apple/Mac (approximately 2,000) and Linux (approximately 1,000) computers represented about 6.7% of the total. PDA devices such as the BlackBerry are used in small quantities at present, primarily due to high support costs. Participants represented a wide variety of private and public sector stakeholders, with the number of computers per organization ranging from a low of seven to approximately 10,000 each for organizations such as the University of Alberta and the City of Edmonton.

**2. The number of computers used by the study participants may increase by approximately 9% over the next three years.**

By 2010, the estimated number of computers will be closer to 51,000 and may approach 56,000, if an initiative of the Fort McMurray School to equip each student with a PDA/smart phone device is enacted. The largest growth will be in laptop computers and PDA devices.

#### **Computer Software**

**1. There are dominant software products in the areas of Word Processing, and to a lesser extent financial applications.**

MS Word is by far the most widely used Word Processing software used by study participants. MS Excel is also used extensively; however, “enterprise scale” products such as Oracle, SAP, JD Edwards, Bellamy, Meditech and PeopleSoft are also used as are a wide array of other financial software products according to the more specific requirements of individual users such as medical, municipal management etc. There is no “dominant” Records Management software product; however, MS Access and MS Sharepoint were used the most frequently; and products such as Oracle, Xerox DocuShare and MySQL had significant use. There is a wide array of products focused on individual market/sector needs. AutoCAD is the most used Design and Estimating

product; however, less than half of participants use such software. Global Positioning/ Information Systems software is expected to grow significantly in use. At the present time, there are several products in use by companies such as ESRI, TRIMBLE, GeoMedia as well as custom applications. MS Publisher is the most frequently used software product for Desktop Publishing, followed by Adobe Acrobat and MS PowerPoint. Finally, there are also many “other” software products designed for a multitude of specific needs.

**2. The opportunities for providing training in relation to use of software are likely best in relation to MS Word and MS Excel.**

The growing use of Information Technology in the “field” is making it necessary for many occupations such as mechanics with companies like Finning be computer literate. Increased at-source data capture made possible by wireless and RFID technologies are also contributing to this trend. There is also a perception that there is a place for more advanced Excel training covering topics such as V-Basic and macros. Availability on a 24/7 e-learning basis would increase access and reduce training costs for companies. Periodic access to instructors and informal “support groups” would help to increase the appeal and allay concerns of many potential students who are not comfortable with the technology.

**Desirable “Core” Information Technology Skills**

**1. Based upon the input of study participants, “core” Information Technology skills and “Knowledge Areas” can be grouped into three “segments.**

The segments, and their importance score on a scale of “1” to “5” with “1” being of very low importance and “5” being of “very high importance, along with key concepts and skills are summarized below.

**SUMMARY OF THE IMPORTANCE OF “CORE” INFORMATION TECHNOLOGY KNOWLEDGE AREAS AND CONCEPTS**

<b>High Area and Score</b>	<b>Important Concepts</b>	<b>Medium Area and Score</b>	<b>Important Concepts</b>	<b>Lower Area and Score</b>	<b>Important Concepts</b>
Internet (4.3)	Security, Privacy Issues, E-learning, PCI Compliance, Browser plug-ins, and Collaboration tools	Personal Use Software (3.9)	MS Suites, WordPerfect Suites, Teleworking, and PDA use	Electronic Publishing (2.9)	XML , Front Page, Portal/Plumbtree, EXB, XSLD, Desktop Publishing, Forms Processing, STML, HTML
Systems and Computer Security (4.2)	Anti-virus Software, Data Encryption, Anti-hacking, Data recovery , Spy ware, Citrix-based EPN, and Firewalls	Networks – Hardware and Software (3.7)	Fibre Optics, LAN, DSL, VPN, V Laning, CISCO, Wireless LANS, Field Buses (in relation to instrumentation), Converged networking	Data Capture (2.7)	Voice recognition, <b>RFID</b> *, Libraries Bar Codes, Optical Character Recognition, Automatic Identification
Document Management and Groupware (4.0)	Lotus Notes and Domino, MS Exchange and Outlook, Search Engines, MS Share Point (4), and Xerox Docushare	Servers – Hardware and Software (3.6)	Server Types (IBM, Linux , Sun Servers, Intel Virtual, Microsoft, Blade, HP and CISCO), associated Satellite VOIP technologies	CAD, Computer Design, Graphics (2.2)	AutoCAD, Computer Aided Manufacturing, Remote Sensing, Global Positioning, AutoDesk, Map Guide, Mapping, <b>GPS</b> , Visio, Micro Station
Operating Systems (4.0)	Linux, Apple Mac, MS XP, MS NT, MS Vista Mainframe Systems, Real Time, IBM O/S 400, UNIX, XMS, Virtualization, Vware, MS Vista, MS CE, Clustering, and Back-up Sites	Telephony, Mobile and Wireless (3.6)	Blue tooth (3), VOIP, Fax, Text to Speech, Voice Recognition, Unified Communication, Wireless tablets, SOX, CSOX	Microprocessors, Semiconductors and Embedded Systems (1.9)	Chip Technology, Microprocessors, Nanotechnology, Virtualization and grid computing
		Applications and Systems – Languages for Development and Management (3.5)	NET (5), MySQL (2), Oracle, C/C++, Java, Perl, Visual Basic and Studio,. ASP, HTML, XML, InfoPath, Basic COBOL, Software Engineering Concepts	Artificial Intelligence and Robotics (1.3)	Computer Vision, Expert Systems, Industrial Control Systems, AutoCAD
		Storage (3.4)	RAID, Data Recovery, Storage Devices, SAN (2), NAS, Near Line Storage		
		Enterprise Systems (3.3)	People Soft, SAP, Data Mining, Supply Chain, Intranets, Business Process Re-engineering, Visual Financials, Hansen, SharePoint Portal, Citizen access, Security, Web transactions, XML		
		Electronic Commerce (3.1)	Web-site Management, Smart Cards, E-mail Broadcast, Security, Product Catalogues		

\* The two exceptions to the “Lower Importance” grouping above are RFID and GPS. Both categories are expected to grow significantly in importance.

### **Desirable “Soft Skills”**

**1. “Soft skills are very important for Information Technology practitioners.**

The following table summarizes the perceived importance of “soft” skills listed in the questionnaire, in descending order.

**IMPORTANCE OF “SOFT” SKILLS**

<b>Soft Skill</b>	<b>Overall Average Score</b>
Dealing With Customers	4.6
Conflict Resolution and Problem Solving	4.5
Listening	4.5
Business Writing	3.9
Stress Management	3.8
Making Presentations	3.7
Cultural Sensitivity	3.7
Prior Experience	3.4
Basic Financial/Accounting	3.1
Average	4

Other “soft” skills mentioned and considered to be very important by study participants included:

- Using Money Wisely;
- Reasoning and Logical Thinking;
- Technical Writing;
- Business Process Skills;
- Time Management/Priority Setting;
- Ability to Work Alone and in Team;
- Project Management Skills;
- Decision Making; and
- Business Analysis.

### **Level of Training Required for Information Technology Occupations**

**1. For the majority of the 22 principal Information Technology Occupational Categories included in the questionnaire, a college level (as opposed to a university level) education is considered to be adequate.**

The following table provides a summary of the number of “votes” cast as to the most suitable level of education for the Occupational Category, and based on the numbers, assigns the following categories: C=College; U=University; C/U= College or University (typically College with other business or management training); and U/C=University, or College with significant experience.

### EDUCATION REQUIREMENTS FOR SELECT INFORMATION TECHNOLOGY OCCUPATIONS

Type of Position	Total		Outcome
	College	University	
Computer and Network Operator	37	3	C
Web Technician	39	2	C
Customer Support Analyst	39	1	C
Systems Tester	33	7	C
Graphic Arts Technician	36	3	C
Computer Programmer	24	15	C/U
Info Systems Quality Assurance Analyst	28	12	C/U
Interactive Media Developer	34	4	C
Database Administrator	27	14	C/U
Webmaster	33	4	C
Broadcast Maintenance Technician	28	2	C
Automated Systems Technologist	32	5	C
Graphic Designer /Illustrator	36	4	C
Health Info Management Prof	24	11	C/U
Computer Equipment Technician	37	2	C
Data Entry Clerk	38	2	C
Desktop Publishing Operator	37	1	C
Systems Auditor	17	20	U/C
Systems Security Specialist	19	21	U/C
Database Analyst	27	13	C/U
Software Engineer	10	28	U/C
Computer and Info Systems Manager	12	30	U/C

### **Familiarity With and Feedback Pertaining to Existing I.T. Programs**

- 1. The majority of participants had a very low level of awareness and familiarity with respect to the courses and programs offered by the Northern colleges.**

On a scale of “1” to “5” with “1” being “very low familiarity” and “5” being “very high familiarity”, the overall average score was 1.6. The level of awareness on a sub-regional basis (comparing Northwest Region participants and their score for Grande Prairie College programs and Northeast participants and their scores for Keyano College programs) was on average approximately .5 points higher but must also be considered low. The highest scores were assigned by Northwest participants in relation to the Continuing Education programs and Grande Prairie College (2.7), and Northeast participants regarding the Computer Information Systems Diploma program at Keyano College (2.3). The lowest scores were associated with Northern Lakes College and were generally below 1.6, with one exception (Northwest participants and the 10 month long Computer Technician program – 2.2).

- 2. Due to the low level of familiarity, few participants were able to provide feedback regarding the programs. While generally positive, a recurring theme (based upon findings from this section and others) was the need to impart graduates with skills and mindsets that will add value to organizations.**

Examples of the above include: a strong desire and ability for lifelong learning; project management (such as budget, scope, timelines and quality) concepts, logical thinking skills, as well as sufficient finance, accounting and organizational theory knowledge so as to be able to understand “how the technology fits and will address the organization’s needs”. The growing integration of Information Technology with all other aspects of the affairs of organizations will mandate the above in the future.

### **Comments Regarding Additional IT Related Training and Services**

1. **A wide range of comments were made, those that are considered to warrant further review, can be categorized as institution specific or “general” in nature as below:**

#### **Institution Specific**

- **NAIT – More project management, network administration, and “remote design and support tools;**
- **Grande Prairie – Up-to-date web design, network administration, project management and RFID,**
- **Keyano – A greater emphasis on systems and network administration; and**
- **Northern Lakes – More broadband/wireless content, video conferencing and disaster planning content.**

#### **General**

- **Integration of more strategy, economics and business skills in general and more emphasis on operations and adding value;**
- **Integration of ITIL best practices concepts;**
- **Standardization of shorter-term courses;**
- **Make greater use of and increase awareness of e-learning options; and**
- **Introduce MySQL and PHP training.**

The “institution specific” comments relate to specific opportunities and deficiencies typically identified by one person. It may be difficult to give credence to all of them. The general comments have a larger basis of support. In some cases (such as the first two) they relate to a theme identified in other sections of this report. It is considered that standardization of the short-term “workforce development courses, and possibly administration under one College with 24/7 e-learning opportunities may reduce costs and increase access. MySQL and PHP skills are rapidly growing in acceptance, and at present, there appears to be no local training available in Northern Alberta; students are required to go to Edmonton or Calgary.

### **Strategies to Attract and Retain Information Technology Workers**

1. **Upgrading the skills of current employees, improving succession planning and mentoring of younger workers by older workers are the three most important strategies associated with attracting and retaining I.T. workers.**

The following table provides a summary and overview of the relative importance of select strategies in regard to the above.



**IMPORTANCE OF SELECT STRATEGIES TO ATTRACT AND  
RETAIN INFORMATION TECHNOLOGY WORKERS**

Strategy or Measure	Average Score
Attracting workers from other organizations	3.3
Hiring recent university graduates	3.2
Hiring recent college graduates	3.4
Upgrading skills of current employees	4.3
Improving succession planning	4.0
Retaining workers beyond “traditional” retirement age	2.7
Mentoring of young workers by older workers	3.9
Changing job descriptions	3.2
Relocating work	2.1
Contracting out	2.6
<b>Average</b>	<b>3.6</b>

As additional context, to the state of affairs within the organizations participating in this survey, the following table provides a summary as to the extent to which participants agreed with certain statements (the values are on a scale of “1” to “5” with “1” indicating “very low agreement and “5” indicating “very high agreement”.

**SUMMARY OF RESPONSES IN RELATION TO STATEMENTS OF SITUATION**

Statement of Situation	Average Score
There is a strong internal priority on upgrading skills	4.1
There is a clear picture of what new skills are needed	3.9
There are increased efforts by other employers to hire our employees	3.3
There is strong competition from other employers for new workers	3.8
We have difficulties finding qualified workers	4.2
There is a lack of qualified new graduates	3.4
There is a lack of needed skills available internally	2.9
There is poor information on employees’ current skills	2.1
There is a lack of internal training/upgrading resources	2.3
There is a high priority on recruitment	3.7
There is a strong priority on succession planning	3.3
<b>Average</b>	<b>3.4</b>

**Staffing Levels and Hiring Plans of Participating Organizations**

- 1. The seven occupational categories with the largest number of positions accounted for 2/3 of the total.**

The following table provides an overview of the number of positions associated with the seven categories with the largest number of employees. The total number of employees for all participants was 639.5.

**NUMBER OF POSITIONS BY OCCUPATIONAL CATEGORY**

Occupational Category	Number	Percentage
Computer and Network Operator	107	16.7%
Customer Support Analyst	75.5	11.8%
Computer Equipment Technician	75	11.7%
Computer Programmer	63	9.9%
Web Technician	44	6.9%
Computer and Info Sys Mgr	35	5.5%
Software Engineer	34	5.3%
<b>Average</b>	<b>27.3</b>	

2. **The total number of positions to be added over the next three years is estimated to be 194 or an increase of approximately 30.3%.**

On a Regional basis, the number of positions to be added and the percentage increases are:

Region	Number to be Added	Percentage Increase
Northeast	67.0	33.3%
Northwest	67.0	54.5%
Central	60.0	19.9%

On an overall total basis, the following table shows a summary of the number of positions to be added according to Occupational Category. The table also shows the Occupational Categories for which the growth in numbers is expected to be above and below the average increase of 7.1

**POSITIONS TO BE ADDED ACCORDING TO OCCUPATIONAL CATEGORY**

Occupational Category	Positions to be Added
Customer Support Analyst	27
Computer and Network Operator	20
Computer Equipment Tech	19
Computer Programmer	18
Web Technician	10
GIS Technicians	8
Database Analyst	8
<b>Average</b>	<b>7.1</b>

3. **The overall average estimated degree of hiring difficulty is 2.6 on a scale of “1” (low end) and “5” (high end) with 14 Occupational Categories having a hiring difficulty greater than the average.**

The following table provides a summary of the Occupational Categories with an expected hiring difficulty greater than the average of 2.6, and also shows the number of positions to be added over the next three years, based upon the input of study participants.

**HIRING DIFFICULTY (WHEN GREATER THAN AVERAGE) AND  
NUMBER OF POSITIONS TO BE ADDED (2007-2010)**

<b>Occupational Category</b>	<b>Hiring Difficulty</b>	<b>New Positions</b>
Database Analyst	4.0	8.0
Computer and Network Operator	3.9	20.0
Computer Programmer	3.9	18.0
Computer and Info Sys Mgr	3.9	7.0
Systems Auditor	3.5	2.0
Web Technician	3.4	10.0
Graphic Designer /Illustrator	3.2	3.0
Computer Equipment Tech	3.1	19.0
Customer Support Analyst	3	27.0
Database Administrator	3.0	7.0
Systems Security Specialist	3	6.0
Software Engineer	2.8	4.0
Graphic Arts Technician	2.7	4.0
Broadcast Maintenance Tech	2.7	2.0
<b>Average</b>	<b>2.6</b>	

### **Project and Questionnaire Feedback**

- 1. The feedback to the project and the survey was strongly positive in nature.**

Participants considered the questions to be focused and helpful for their own planning and benefited from learning of the courses and programs offered by the Northern colleges. Others were pleased that the study was being undertaken and that their input was being taken into account.

### **Demand and Supply Outlook for Information Technology Occupations**

- 1. The demand for Information Technology related occupations is expected to begin to exceed supply beginning in 2007 and will be proportionally more serious for Technical occupations.**

The annual demand for Professional positions is forecast to grow from 32,182 in 2006 to over 37,887 by 2016. The annual supply of Professional positions is forecast to grow from 32,393 in 2006 to 36,706 by 2016. Supply exceeds demand by a small margin during 2006, 2007 and 2008; however, shortages are forecast from 2009 and beyond and will exceed 3,800 over the period. The projected period-wide shortage for Northern Alberta is approximately 400, if Northern Alberta's requirements are roughly in keeping with it's 10.5% of Alberta's population.

The demand/supply outlook for Technical positions is proportionally more serious. The annual demand for Technical positions is forecast to grow from 8,344 in 2006 to over 10,769 by 2016. The annual supply of Technical positions is forecast to grow from 8,387 in 2006 to 9,160 by 2016. Supply exceeds demand by a small margin during 2006; however, shortages are forecast from 2007 and beyond (the shortage is 208 in 2007 and grows to over 1,600 by 2016) and will exceed 9,000 over the period. The projected period-wide shortage for Northern Alberta, is approximately 1,000, if Northern Alberta's requirements are roughly in keeping with it's 10.5% of Alberta's population.

**2. The projected shortfall of Professional and Technical Information Technology workers, while serious, is not the most severe faced by the Province.**

The 10 occupation types with the most severe demand/supply ratios, along with comparisons for IT Occupational Categories, are summarized in the following table.

**OCCUPATIONS WITH THE MOST SEVERE DEMAND SUPPLY RATIOS**

NOC Code	Description	Average
J16	Machine Operators and Related Workers in Textile Processing	3.305
A34	Managers in Art, Culture, Recreation and Sport	2.41
A14	Facility Operators and Maintenance Managers	1.976
C02	Life Sciences Professionals	1.906
G72	Tour and Resort Guides and Casino Operators	1.641
G98	Other Elemental Service Occupations	1.33
D02	Optometrists	1.255
D03	Pharmacists	1.249
D01	Physicians, Dentists and Veterinarians	1.232
C04	Other Engineers	1.18
C18	Technical Information Technology	1.10
C07	Professional Information Technology	1.01

The 10 occupation types with the most severe shortages in absolute numbers, along with comparisons for IT Occupational Categories, are summarized in the following table.

**10 OCCUPATIONS WITH THE MOST SEVERE SHORTAGES IN ABSOLUTE NUMBERS**

NOC Code	Description	Annual Shortage by 2016
D01	Physicians, Dentists and Veterinarians	4,922
A14	Facility Operators and Maintenance Managers	3,908
C04	Other Engineers	3,280
H32	Metal Forging, Shaping and Erecting	3,134
G51	Occupations in Food and Beverage Service	2,835
D31	Assisting Occupations in Health Services	2,833
C03	Civil, Mechanical and Electrical Engineers	2,604
I13	Underground Miners, Oil and Gas Drillers	2,207
G98	Other Elemental Supply Occupations	2,073
B57	Recording, Distributing and Scheduling Occupations	2,049
B01	Finance and Insurance Administrative Occupations	1,985
C18	Technical Information Technology	1,690
C07	Professional Information Technology	1,181

## **II. Recommendations**

The recommendations arising from this study are presented in this section and are grouped into three “categories or stages”:

- Short-term (primarily between now and September 2007);
- Medium-term (September 2007 to September 2008); and
- Longer-term (September 2008).

### **A. Short-term Recommendations**

1. **Review the findings and conclusions of this report and begin to marshal the resources and structures, and develop action plans, to address some of the issues and opportunities arising from the study, if considered desirable or necessary.**

In particular, the issues and opportunities include:

- Increasing the overall awareness of the programs;
- Content, administration and delivery of shorter-term courses; and
- Ensuring that the programs address:
  - the “Hardware and Software” trends and configurations, priority “Knowledge Areas”, “Soft Skills”, and other “Business Skills and Attitudes”, identified by participants and discussed in Chapter 2, Sections I, II, III, and VI, respectively; and
  - the Occupational Categories identified in Chapter 2, Section VIII to ensure that the curriculums provide for the growth in demand for them.

Each of the above is discussed in greater length in the subsequent details of these recommendations.

2. **Provide study participants with additional information about the programs.**

As noted in Chapter 2, and re-capped in Chapter 5, awareness and familiarity regarding the Information Technology programs is very low, even in the context of programs in the same cities or locales as study participants. The names and contact details of all participants have been provided in a separate document (there are likely many others that could be added to a list based upon the relationships of individual colleges and their communities) and the provision of information, even links to program, “couched” from the perspective of thanking them for their valuable input will help to strengthen future relationships and will help to create a sense that actions are resulting from the study. It will also help to ensure the flow of communication and feedback in the future, if desirable. This act might also be used to lay the foundation for developing experience (co-op, internship or other) that could be incorporated into the program and also to further develop a channel for any sort of “student résumé booklet” or similar product that could be distributed to potential employers.

3. **Make contact with appropriate personnel in organizations such as, and similar to, Finning (having a high concentration of field personnel in trades or sectors where there is a strong need for upgrading the “computer literacy” of staff in more remote locations) to begin to explore opportunities for the provision of courses.**

The objective of such actions would be to begin to lay the ground work, and explore in more detail, the specifics of need, content and delivery of courses so that there would be a foundation for more specific discussions and planning in the mid-term future. Key considerations in this regard would include: the use of e-learning, ideally on a 24/7 basis, locations and venues where the e-learning might be augmented by an itinerate instructor and/or “support groups” for students who may have a high degree of discomfort with computers and associated technology.

## **B. Medium-term Recommendations**

1. **In considering the findings of this report as well as any feedback and direction received from the short-term recommendations outlined above, review the curriculums of the colleges to ensure that the needs of potential employers are met.**

These requirements are summarized as follows:

- Core Skills

In descending order of importance, with an indicator of importance on a “1” to “5” scale identified, the priority for “core skills” is:

- High Priority

- Internet (4.3)
- Systems and Computer Security (4.2)
- Document Management and Groupware (4.0)
- Operating Systems (4.0)
- RFID
- GPS

- Medium Priority

- Personal Use Software (3.9)
- Networks – Hardware and Software (3.7)
- Servers – Hardware and Software (3.6)
- Telephony, Mobile and Wireless (3.6)
- Applications and Systems – Languages for Development and Management (3.5)
- Storage (3.4)
- Enterprise Systems (3.3)
- Electronic Commerce (3.1)

- Lower Priority

- Electronic Publishing (2.9)
- Data Capture (2.7)
- CAD, Computer Design, Graphics (2.2)
- Microprocessors, Semiconductors and Embedded Systems (1.9)
- Artificial Intelligence and Robotics (1.3)

Additional, but not necessarily comprehensive, detail as to content pertaining to the preceding categories is presented in Chapter 2, Section II.

- “Soft Skills”

The nature and responsibilities of most Information Technology functions make it of vital importance for graduates to possess the appropriate “soft skills”. While some of the “soft skills” are related to the nature and characteristics of individuals, and cannot be learned in totality, the priority order of “soft skills” on a “1” to “5” scale, based upon the feedback of participants from this study is:

- Dealing With Customers (4.6)
- Conflict Resolution and Problem Solving (4.5)
- Listening (4.5)
- Business Writing (3.9)
- Stress Management (3.8)
- Making Presentations (3.7)
- Cultural Sensitivity (3.7)
- Prior Experience (3.4)
- Basic Financial/Accounting (3.1)
- Average (4)

- Other Skills

Study participants also expressed concerns that graduates “understood the technology” but were often lacking in terms of “why the technology might be considered. It was suggested that there is a place for addition of more training in relation to Integration of more strategy, economics and business skills in general and more emphasis on operations (and best practices) adding value and fostering life – long learning.

Other concepts that were mentioned included: more project management, network administration, and “remote design and support tools; up-to-date web design, network administration, project management, RFID and GPS.

Finally, the “Hardware and Software” Sections of Chapter 2 and parts of Chapter 4 discuss some of the trends and “configurations” of a wide array of organizations. Curriculums should be reviewed, if desirable, to ensure that such configurations and equipment are covered.

**2. The short-term, workforce development and customized programs and courses offered by the four colleges should be reviewed to help to ensure that the contents are current in terms of meeting the needs of Northern Alberta organizations and that the delivery is the most effective and efficient.**

There are considered to be two primary areas for growth or development. The first entails companies and organizations that have a high proportion of workers in more remote locations (such as Finning and heavy equipment technicians as well as those involved in oil and gas exploration ) who are grappling with how to ensure that their employees, many of whom are very uncomfortable with computers and Information Technology, are

prepared for the rapidly approaching convergence of computers in terms of the service and repair of equipment and the capture and transmission of data and reports “directly from the field”. The second potential area of opportunity entails helping to ensure that workers are more productive through having more knowledge of the advanced features of software applications, as well as “seeking help” and solving problems on their own. As this report identified an extremely wide range of software products in use and only a few used to a great extent by most, it is likely that this “model” would be most effective for MS Word, Ms Excel, MS Publisher (and possibly the MS Suite of personal software products). It will likely be necessary for “college business development staff” to continue to be proactive regarding other software training services.

The feedback of study participants suggest that it may be warranted to consider ways and means of delivering some short-term and workforce development programs under the jurisdiction of one common institution, or creating delivery mechanisms that would provide the greatest degree of flexibility in this regard.

Study participants expressed concern over the cost and practicality of “taking staff out of the field” to take software training in Edmonton and also some degree of “confusion” in terms of who to approach regarding such training. Other comments pertained to the high desirability of having the training available 24/7 but also the desirability of some “human contact”. Given the above, it might be desirable to give consideration to a “one-stop-shop” approach to some of the more common software training (MS Word and Excel). Standard courses could be developed or delivered (that would presumably free resources for other needs) with 24/7 access according to the needs of students. However, it might also be possible, (using in-person or video conferencing technology) to provide “remedial” services say once a week for an hour (with video-conferencing) at locations such as work camps, schools, community centers or Adult Learning Centres.

Finally, the study identifies a number of Occupational Categories that can be expected to experience above normal growth and hiring difficulty, as discussed on pages 35 to 39. It may be desirable to review curriculums to ensure that the skills requirements are met within the material included in courses.

### **C. Longer- term Recommendations**

#### **1. Continue to work towards improving products and services.**

The process needs to be of an evergreen nature. Events and activities for consideration in the future might be periodic (say every two or three years) surveys or summits of stakeholders, possibly in conjunction with other NADC activities, to collect input, and to share views and results.

#### **2. Develop criteria and mechanism to facilitate measurement of progress toward goals and objectives arising out of the preceding.**

The criteria might include factors such as enrolment, student satisfaction, employment, employer satisfaction, awareness etc., and should be of a nature so that they are meaningful, the data are easy to obtain, and that corrective actions can be implemented from the findings.



## **Appendix 1 – Covering Letter**

**Steven K. Lakey, MBA, CMC**

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E-mail: [slakey@telus.net](mailto:slakey@telus.net)

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April 2007

### **FOR THE ATTENTION OF:**

Phone:

E-mail:

Dear .

### **Re: Northern Alberta Development Council Information Technology Skills and Training Needs in Northern Alberta**

This letter and the accompanying questionnaire are further to the recent message or telephone call from Steven Lakey.

As previously mentioned, I have been retained to undertake a study that will examine Information Technology skills needs and training issues in Northern Alberta. The study is sponsored by the Northern Alberta Development Council and a consortium of colleges (Grande Prairie Regional College, Keyano College, Northern Lakes College and the Fairview, Peace River and High Level campuses of NAIT). The findings of the study will be of great value in ensuring that the Information Technology programs at the colleges are in keeping with the needs of Northern Alberta businesses and communities.

In the near future, I would like to make arrangements to schedule a telephone interview to obtain your important input on this topic. I know that your time is valuable, and there is a limited timeframe to complete the data-gathering phase of the study by May 18, 2007. As such, the questionnaire/list of topics have been sent to you in advance along with this letter so that you have an opportunity to reflect on some of the issues, and/or consult, if necessary, with others in your organization for possible details, research or input. We can also use it as an "agenda" for our discussions. Most of the interviews should take no longer than 30 to 35 minutes. You will be under no pressure to respond to issues that, in your view, are of a sensitive or confidential nature and your specific responses will **not** be shared with others beyond those sponsoring the project.

If it is not possible to schedule an interview, I would be pleased to make alternative arrangements for you to complete the questionnaire and return it to me via e-mail, fax or Canada Post.

Please contact me via any of the means above if you have any questions or concerns. Alternatively, Mr. Sam Warrior, of the Northern Alberta Development Council, may be contacted via the government of Alberta toll free access at 310-000 and then dialing (780) 624-6433.

In closing, I'll be in touch in the near future to schedule a convenient time for our discussion.

Yours sincerely,

Steven Lakey

Accompaniment: questionnaire (8 pages in total)

## Appendix 2 Questionnaire

This questionnaire is part of a study commissioned by the Northern Alberta Development Council and a consortium of colleges (Grande Prairie Regional College, Keyano College, Northern Lakes College and the Fairview, Peace River and High Level campuses of NAIT).

As discussed in the covering letter, you are being asked to participate in this survey, which is focused on Information Technology skills and training needs in Northern Alberta. The questionnaire has been sent to you in advance so that you have an opportunity to reflect on some of the issues, and/or consult with others in your organization for possible research or input before your scheduled discussion with Steven Lakey. Your responses will remain confidential and will not be distributed beyond those directly involved in the project.

If it is determined that an "in-person" discussion is not convenient, please complete the survey on your own. If you are working directly from your computer, the answer boxes will "grow" according to the amount of space you require. Please return the completed questionnaire to Steven Lakey **before May 18, 2007** via one of the methods on the final page of this questionnaire.

### I. Respondent's Details

Name	
Title	
Organization Name	
Address	
Telephone	
E-mail	
Type of Organization or Brief Description of Principal Activities or Market Focus	

### II. Short-term, On-line and Customized Training for Common Software

Several of the colleges have provided short-term, on-line and/or customized training in the use of a number of "popular" software products. To help us to plan better in this regard, we would like to acquire a better understanding of the information technology hardware currently used and any plans for changes that your organization might have. As such:

	1a. Within Northern Alberta operations, approximately what number or percentage of your organization's computers that are dedicated to individual staff members are?		1b. How do you expect these numbers and/or proportions to change over the next three years?	
Type	Number	%	Number	%
PC				
Apple/Mac				
Other				

2. Next, in order to plan better for the courses that will be in demand, we would like to know about: a) some of the specific software that you will be using over the next three years; b) if possible, their weighting in relation to overall use of the category of software; and c) if possible, any gaps or shortcomings that could be addressed in order for your employees (or clients) to make optimal use of the software. As such:

2a. Within the categories below, what are the <u>up to</u> three software products that will be most often used by your company?	2b. If possible, what would be the weighting of usage for the type of application?	2c. If possible, what gaps are there at present in terms of your staff's (or clients') ability to fully utilize the software?
<b>Word Processing</b>		
1		
2		
3		
<b>Financial</b>		
1		
2		
3		
<b>Records Management</b>		
1		
2		
3		
<b>Design/Estimating</b>		
1		
2		
3		
<b>Global Positioning</b>		
1		
2		
3		
<b>Desk Top Publishing</b>		
1		
2		
3		
<b>Other (_____)</b>		
1		
2		
3		
<b>Other (_____)</b>		
1		
2		
3		

### **III. College Certificate, Diploma and University Transfer Level Studies**

We are interested in gaining a better understanding of the types of skills and knowledge that our graduates will need to have in order to meet your future needs in Northern Alberta. As such:

1. On a scale of "1" to "5" with "1" being of "very low importance" and "5" being of "very high importance, in your view, over the next three years, for your organization in Northern Alberta, how important will it be for new information technology college or university level graduates to have a grounding in the following Knowledge Areas?
2. Please elaborate on any other software, hardware or skills or other requirements not listed in the examples that will be of importance to your organization over the next three years.

Knowledge Area	Some (But Far From All) Examples	1. Importance Score	2. Other Important Matters Not Listed
Applications and Systems – Languages for Development and Management	Oracle, SQL, C/C++, Java, Perl, Visual Basic,		
Artificial Intelligence and Robotics	Computer Vision, Expert Systems, Industrial Control Systems		
CAD, Computer Design, Graphics, modeling and Multimedia	AutoCAD, Computer Aided Manufacturing, Remote Sensing, Global Positioning		
Data Capture	Bar Codes, Optical Character Recognition, Automatic Identification		
Document Management and Groupware	Lotus Notes and Domino, MS Exchange and Outlook, Search Engines		
Electronic Publishing	Desktop Publishing, Forms Processing, STML, HTML		
Electronic Commerce	Web-site Management, Smart Cards, E-mail Broadcast		
Enterprise Systems	People Soft, SAP, Data Mining, Supply Chain, Intranets, Business Process Re-engineering		
Internet	Security, Privacy Issues, E-learning		
Microprocessors, Semiconductors and Embedded Systems	Chip Technology, Microprocessors, Nanotechnology		
Networks - Hardware and Software	Fibre Optics, LAN, DSL		
Operating Systems	Linux, AppleMac, MS XP, MS NT, MS Visita Mainframe Systems, Real Time		
Storage	RAID, Data Recovery, Storage Devices		
Servers - Hardware and Software	IBM Servers, Linux Servers, Sun Servers		
Personal Use Software	MS Suites, WordPerfect Suites, Teleworking		
Systems and Computer Security	Anti-virus Software, Data Encryption, Anti-hacking		
Telephony, Mobile and Wireless Computing	Bluetooth, VOIP, Fax, Text to Speech, Voice Recognition		

3. While Information Technology technical skills are very important, the softer business skills and experiences are equally important for sustaining a competitive advantage. As such:

On a scale of "1" to "5", with "1" "not at all important", and "5" "very important", in your opinion, how important is it for new graduates of Information Technology programs in Northern Alberta to have the following skills, knowledge or experience in order to meet the needs of your organization in Northern Alberta?

"Soft Skill", Knowledge or Experience Area	Importance Score
Business Writing	
Making Presentations	
Dealing With Customers	
Conflict Resolution and Problem Solving	
Cultural Sensitivity	
Listening	
Basic Financial/Accounting	
Stress Management	
Prior Experience (Co-op or Otherwise)	
Other	
Other	

4. The following table contains a listing of some of the most common Information Technology occupational classifications (plus room for others). In order to best meet the needs of your organization in the future, in your estimation, are the training needs for these occupations satisfied by college level education or is university level training required?

Type of Information Technology Position	College is Adequate	University Required	Please provide any comments
Computer and Network Operator			
Web Technician			
Customer Support Analyst			
Systems Tester			
Graphic Arts Technician			
Computer Programmer			
Info Systems Quality Assurance Analyst			
Interactive Media Developer			
Database Administrator			
Webmaster			
Broadcast Maintenance Technician			
Automated Systems Technologist			
Graphic Designer /Illustrator			
Health Info Management Prof			
Computer Equipment Technician			
Data Entry Clerk			
Desktop Publishing Operator			
Systems Auditor			
Systems Security Specialist			
Database Analyst			
Software Engineer			
Computer and Info Systems Manager			

#### IV. Awareness and Feedback on College Information Technology Courses

We would like to know how familiar you are with our Information Technology related courses and also obtain some feedback on them. As such:

1a. On a scale of "1" to "5", with "1" "not at all familiar", and "5" "very familiar", how familiar are you with the following programs?		1b. If your familiarity score was 4 or greater, to the best of your ability, on the basis of "1" for "very low" and "5" for "very high", how would you rate the colleges' programs against the following criteria?		
College/Course	Familiarity	Suitability of the Range of Content	Suitability of the Complexity of Content	Credential's "Marketability" to Gain Employment
<b>NAIT Northern Campuses</b>				
Under the Continuing Education "ed2go" program, online basic computer literacy and computer applications courses. <sup>1</sup>				
At the High Level and Peace River campuses, courses include the MS Office Suite of products, accounting software, and introductory courses in MS Windows, the Internet and web design. Classes are broken into varying levels of complexity and run in the evenings and weekends to provide flexibility for students. <sup>2</sup>				
<b>Grande Prairie Regional College</b>				
Various short-term ad hoc "upgrading" courses				
The first two years toward a Bachelor of Science in Computing Science or Computers and Information Technology				
Short-term, intensive and semester length one day per week in classroom courses under Continuing Education/Workforce Development <sup>3</sup>				
<b>Keyano College</b>				
Computer Information Systems Diploma				
Computer Information Systems Co-op Diploma				
Workforce Development in-class courses <sup>4</sup>				
Online delivery of applications such as MS Office				
Customized training developed specifically for your business or workforce location				
<b>Northern Lakes College</b>				
A 10 month long (September to June) Computer Technician program leads to a certificate that allows individuals to be service technicians.				
A 30- hour long "Computer Network" certificate				
A computer Operating and Maintenance "course, taught in 10 modules				

Notes:

- 1 Computer skills such as Introduction to Internet, Keyboarding Skills, Windows XP, Linux and iMac and Macintosh, and Computer Applications such as various levels of Word, Excel, Access, as well as PowerPoint, Project and Publisher.
- 2 Most of the offered courses may lead to NAIT certification upon successful completion.
- 3 Such as MSOffice suite of products, as well as Crystal Reports and Quick Books, among others
- 4 Such as Word, Excel, Access, PowerPoint, MS Project, AutoCad, ArcGIS, among others.

**2. What other new or additional Information Technology related courses, services or programs should be provided by:**

Service Provider	Description of Course or Service	Reason
NAIT - Fairview, High Level or Peace River Campuses		
Keyano College		
Grande Prairie Regional College		
Northern Lakes College		
Other (_____)		

**V. Strategic and Operating Environmental Issues**

We would like to gain a better understanding of how your organization’s strategy and the environment in which you operate may affect your Information Technology skills and training needs. As such:

**1. On a scale of “1” to “5” with “1” being of very low importance and “5” being very high importance, how important are the following strategies in meeting your organization’s information technology needs?**

	Issue	Score
a	Attracting workers from other organizations	
b	Hiring recent university graduates	
c	Hiring recent college graduates	
d	Upgrading skills of current employees	
e	Improving succession planning	
f	Retaining workers beyond the “traditional” retirement age	
g	Mentoring of young workers by older workers	
H	Changing job descriptions	
i	Relocating work	
j	Implement specific measures to retain current employees (_____)	
k	Contracting out	

2. On a scale of "1" to "5" with "1" being of "very low" and "5" being of "very high", to what extent are you in agreement with the following statements in terms of your organization's ability to attract and retain IT related workers?

	Issue	Score
a	There is a strong internal priority on upgrading skills	
b	There is a clear picture of what new skills are needed	
c	There are increased efforts by other employers to hire our employees	
d	There is strong competition from other employers for new workers	
e	We have difficulties finding qualified workers	
f	There is a lack of qualified new graduates	
g	There is a lack of needed skills available internally	
h	There is poor information on employees' current skills	
i	There is a lack of internal training/upgrading resources	
j	There is a high priority on recruitment	
k	There is a strong priority on succession planning	

3. In terms of staffing, according to the occupational classifications outlined in the table below, we would like to have a better understanding of: a) the number of positions of the type currently in Northern Alberta; b) if possible, the number of additional staff of the type you expect to hire over the next three years; and c) on a scale of "1" to "5", with "1" being "very low difficulty" and "5" being "very high difficulty", the difficulty that you expect to encounter in hiring the extra positions.

Type of Position	Current Number	Number to be Added	Anticipated Hiring Difficulty
Computer and Network Operator			
Web Technician			
Customer Support Analyst			
Systems Tester			
Graphic Arts Technician			
Computer Programmer			
Info Systems Quality Assurance Analyst			
Interactive Media Developer			
Database Administrator			
Webmaster			
Broadcast Maintenance Technician			
Automated Systems Technologist			
Graphic Designer /Illustrator			
Health Info Management Prof			
Computer Equipment Technician			
Data Entry Clerk			
Desktop Publishing Operator			
Systems Auditor			
Systems Security Specialist			
Database Analyst			
Software Engineer			
Computer and Info Systems Manager			



4. Please elaborate on any other trends or issues that will affect your organization's need for information technology skills and training and the impact that they will have over the next three years.

Ranking	Trend or Issue	Discussion of Impact
1		
2		
3		

## **VI. Concluding Issues**

Finally, an opportunity for you to provide any comments about the survey and project and a few questions for classification purposes, and we are finished.

1. What specific questions or comments do you have regarding this project?

2. If applicable, which of the following categories is representative of your organization's annual revenues?

A	Less Than \$100,000	
B	\$100,000 to \$499,999	
C	\$500,000 to \$999,999	
D	\$1 million to \$4,999,999	
E	Over \$5 million	
F	Declined	
G	Public sector (Not Applicable)	

3. Which of the following categories is representative of your organization's "regular, ongoing" staff complement in Northern Alberta?

A	Less Than 5	
B	5 to 9	
C	10 to 25	
D	25 to 99	
E	Over 100	
F	Declined	

**Thank you for your valuable time and interest!**

If you have completed the survey **without** a telephone meeting, please return your completed questionnaire **no later than May 18** to Steven Lakey at:

[slakey@telus.net](mailto:slakey@telus.net)

Or

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Edmonton, AB T5P 0G3