



TECHPOINT

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TECHNOLOGY WORKFORCE REPORT #2

Defining the Demand - the Tech Skills
Central Indiana Companies Need to Grow

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Introduction

In March of 2014, TechPoint released the first in a series of technology workforce reports, *Employment Trends and the Demand for Computer-Related Talent in Central Indiana*. The purpose of the report series is to investigate, quantify and qualify the common claim that there is high, and continually growing, demand for computer-related talent in Central Indiana. Through the analysis of employment data from the Bureau of Labor Statistics and the Indiana Department of Workforce Development and Burning Glass, a job postings aggregator, the first report concluded that there has been significant employment growth and demand for computer-related talent in Central Indiana over a nearly five-year period of time. The report resulted in five key findings:

- Forty-eight percent of computer-related jobs in the state of Indiana are located in the Indianapolis-Carmel MSA. The next highest concentration is Fort Wayne with eight percent of total computer-related jobs.
- From 2009-2012 computer-related jobs grew by 7.3 percent in the Indianapolis-Carmel MSA – more than three times the growth across all occupations in that period, which grew at two percent.
- There were nearly 9,000 computer-related job postings in the Indianapolis-Carmel MSA in 2013.
- Eighty-five percent of surveyed companies report the level of competition for tech talent to be at a high level.
- Of the computer-related occupations, software developers were the most in demand and command a median salary of \$77,700, more than twice the median salary for all occupations in the Indianapolis-Carmel MSA (\$34,750), according to the Bureau of Labor Statistics, 2012.

To access the full report, please visit TechPoint.org and click on the ‘Research’ tab.

The second report, *Defining the Demand – the Tech Skills Central Indiana Companies Need to Grow*, supplements the quantitative demand data from the first report with qualitative survey data collected from hiring managers at 26 area tech product and service companies. The managers answered questions on a variety of topics including:

1. Technical skills in demand and experience levels required to fill open positions
2. Level and sources of competition for talent
3. Trends in intern hiring
4. International student hiring

Methodology and Definitions

Methodology

The core of this study can be segmented into two clearly defined analysis strategies: quantitative and qualitative. The quantitative analysis, featured in the first report, was conducted with support from Morris, Lloyd & Associates, LLC and uses sources like the Bureau of Labor Statistics (BLS), the Indiana Department of Workforce Development (DWD) - Hoosiers by the Numbers, and O*Net.

The qualitative analysis featured in this report is anchored around a workforce survey completed by hiring managers from 26 companies in Central Indiana who hire computer-skilled talent. The Loyalty Research Center executed the survey and aggregated the results. Together, the employment data analysis and survey results will ultimately aid in identifying the challenges and opportunities for attracting, retaining, and developing tech talent in Central Indiana.

Tech Workforce Survey

The questions in the Tech Workforce Survey focused on skills in demand, hiring opportunities and challenges, and university preparation of computer-related talent. Surveys were sent electronically by Loyalty Research Center on September 11, 2013 to 44 companies, of those companies, 26 completed the survey by the October 18, 2013 deadline. Companies selected to participate were Central Indiana-based firms that fall in one of three industry categories: tech product (companies which create/sell a computer hardware and/or software-based product or subscription); tech service (companies which provide outsourced technology services); and tech-enabled (companies where computer/technology is a critical component of their business and thus requires computer-related employees). Surveys were sent to an equal distribution of the three categories, but the majority of respondents were from tech product firms [Figure 1].

Figure 1: Tech Workforce Survey Participants by Industry Category

Tech Product Participants:



Tech Service Participants:



Tech-Enabled Participants:



Central Indiana Companies: Defining and Meeting the Demand

Defining the Demand: Examining the Technology Trends in Central Indiana

In the fall of 2013, Loyalty Research Center and TechPoint surveyed 26 companies in order to better understand which computer-related skills and job functions were most important to their growth. In order to set the foundation and examine hiring trends, companies were asked to share what technologies they are currently running and look to run over the next twelve months. This data provides insight into the current tech stacks of Central Indiana companies, as well as provides a forecast of future technologies companies plan to implement.

The two most used technologies among surveyed companies are SQL and JavaScript. When looking at the kinds of technologies companies are moving toward over the next year, CSS3, HTML5 and PHP outpaced other technologies.

Surveyed companies indicated that development talent with SQL, JavaScript, CSS3, HTML5 and .NET skills are of the highest recruitment priority. The design skills of highest recruitment priority are JavaScript, HTML, CSS3, XML User Interface XUI and Adobe Photoshop.

Complete information on the kinds of technologies the surveyed companies are currently running, technologies that they are looking to run and their respective recruitment priorities, can be found below in Figure 2:

Figure 2: Technologies Used and Their Recruitment Priority

Software Development Technologies			
Development Skill	Companies Currently Running This Technology	Companies Looking to Run This Technology in the Next 12 Months	High Recruitment Priority
C++	24%	22%	9%
C	16%	22%	0%
Objective-C	12%	22%	14%
Python	24%	22%	18%
Defect Tracking Software	8%	11%	9%
HTML5	68%	78%	41%
CSS3	60%	78%	45%
JavaScript	76%	56%	59%
Ruby	32%	56%	59%
SQL	92%	89%	68%
Java	44%	11%	32%
.NET	44%	44%	36%
.NET (C#)	32%	22%	23%
.NET (VB)	12%	22%	9%
PHP	20%	33%	23%
TDD	4%	22%	5%
IBM Rational Rose XDE	4%	Did not complete	0%
Ruby on Rails	16%	Did not complete	18%
JEE	12%	Did not complete	14%
	(n=25)	(n=9)	(n=23)

Design Technologies			
Design Skill	Companies Currently Running This Technology	Companies Looking to Run This Technology in the Next 12 Months	High Recruitment Priority
Adobe Illustrator	62%	50%	44%
Adobe AIR	31%	0%	11%
Adobe Dreamweaver	31%	10%	11%
Adobe Flash Player	38%	10%	11%
Adobe Photoshop	69%	50%	56%
HTML	85%	80%	78%
Corel CorelDraw Graphics Suite	15%	10%	0%
CSS3	62%	60%	67%
JavaScript	77%	90%	89%
XML User Interface XUI	54%	50%	56%
	(n=13)	(n=10)	(n=9)

Network Architecture Technologies			
Network Architecture Skill	Companies Currently Running This Technology	Companies Looking to Run This Technology in the Next 12 Months	High Recruitment Priority
Microsoft	50%	80%	50%
Cisco	28%	20%	25%
Barracuda	25%	40%	13%
Palo Alto Networks	0%	0%	0%
F5	0%	20%	13%
Juniper	0%	0%	0%
CheckPoint	0%	0%	0%
Network & System Vulnerability Assessment Software	38%	Did not complete	38%
Honeypot	0%	Did not complete	0%
Ping Identity Software	0%	Did not complete	0%
Intrusion Detection	25%	Did not complete	25%
Network Concept - Routing	38%	Did not complete	25%
Network Concept - Switching	38%	Did not complete	25%
Network Concept - MLPS	0%	Did not complete	0%
Network Concept - OoS	0%	Did not complete	0%
	(n=8)	(n=5)	(n=8)

Development Operations Technologies			
Development Operations Skill	Companies Currently Running This Technology	Companies Looking to Run This Technology in the Next 12 Months	High Recruitment Priority
IIS	100%	100%	100%
Nginx	0%	0%	0%
HAProxy	33%	50%	0%
Apache	67%	50%	50%
Puppet/Chef/OpenStack/Bosh	0%	0%	0%
PostgreSQL	0%	0%	0%
MySQL	33%	0%	0%
SQL Server	100%	100%	100%
DB2	33%	0%	0%
Oracle DB	0%	0%	0%
SQL	100%	100%	50%
Linux	33%	0%	50%
Unix	0%	0%	0%
AIX	0%	0%	0%
Windows Administration	100%	100%	50%
NoSQL (Couch, Mongo, ElasticSearch, etc.)	0%	50%	50%
	(n=3)	(n=2)	(n=2)

TechPoint Workforce Survey, 2013

Defining the Demand: A Look at the Skills Central Indiana Companies are Looking to Hire

The qualitative analysis found that software developers were most in demand across the surveyed companies. Eighty-eight percent of the companies attempted to hire software developers in 2013 and/or are looking to hire them in 2014 [A-1]. The 26 surveyed companies reported 138 total openings for software developers in 2013 and 261 anticipated hires in 2014, a 47 percent increase in a single year [A-1].

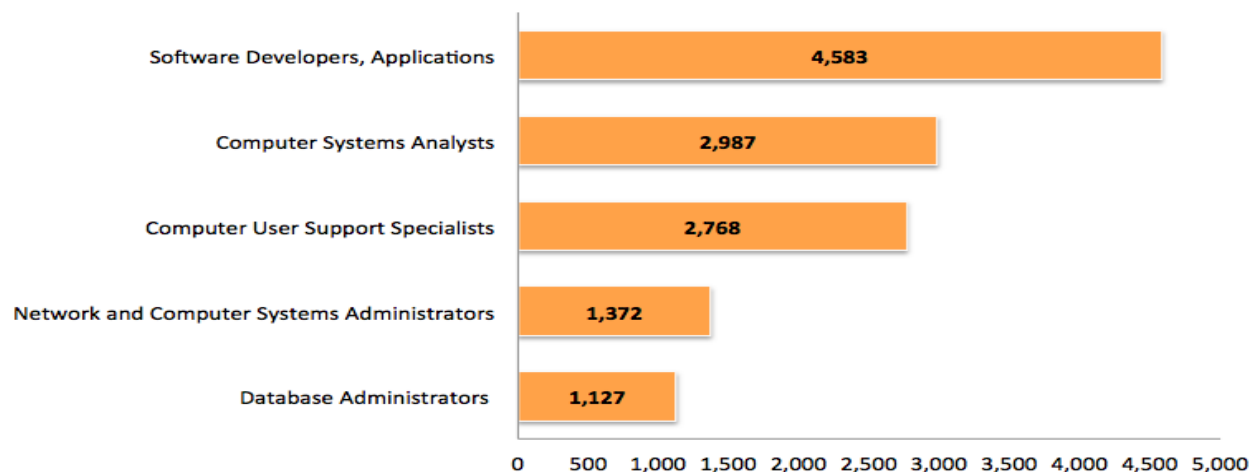
Figure 3: Computer-Related Demand Data, 2013 and 2014, by Occupation Code

Occupation Title	Attempted and/or Looking to Hire	Est. Total # of Attempted Hires	Est. Total # of Current Openings	Est. Total # Hoped to Hire in 2014
Software Developers (Applications)	88%	138	31	261
Web Developers	56%	41	17	70
Network and Computer Systems	48%	37	14	45
Database Administrators	60%	21	7	25
Graphic Designers	60%	24	2	21

TechPoint Workforce Survey, 2013

These demand trends among surveyed companies are consistent with the statewide demand found in Burning Glass Labor/Insight job postings data for the same period of time:

Figure 4: Job Postings by Occupation, Indiana, 2013

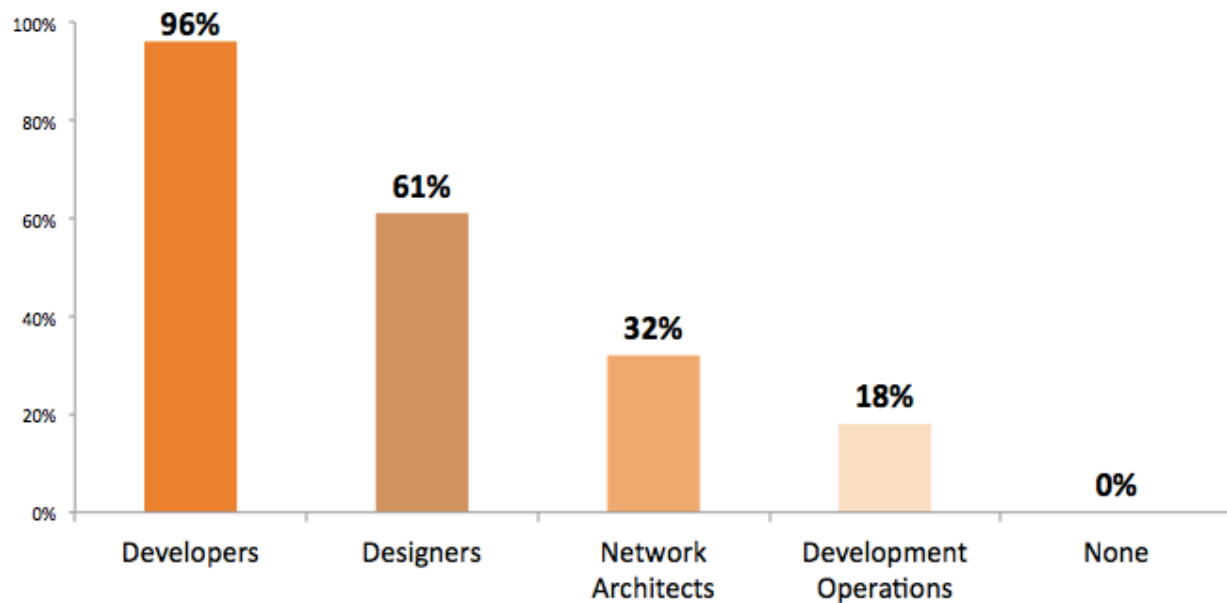


Burning Glass - Labor/Insight, 2014

In total, the surveyed companies hope to hire 617 computer-related employees in 2014, an increase of 22 percent from the 480 computer-related positions they had hoped to hire in the first ten months of 2013 [A-1].

Of those they hope to hire in 2014, they expect them to be a part of the following skills groups:

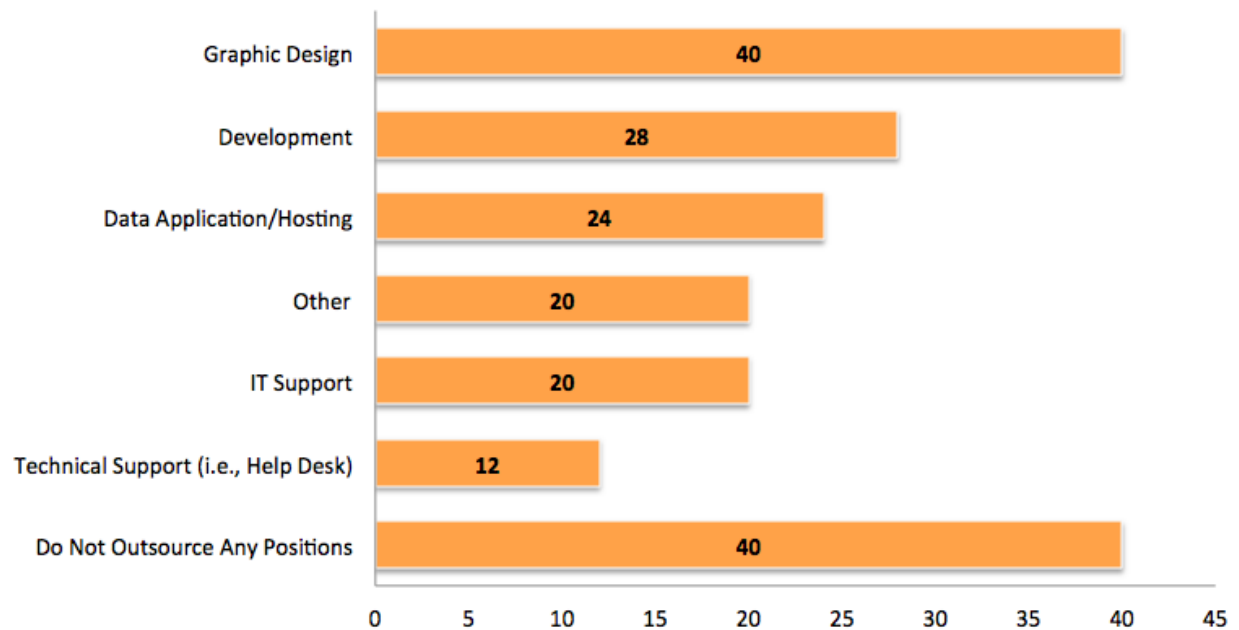
Figure 5: Skills Groups in Demand by Percentage of Surveyed Companies Hoping to Hire



TechPoint Workforce Survey, 2013

The survey found that graphic designers and developers, the two highest recruitment priorities, are also the two most outsourced positions. In some respondents' opinion, the high level of talent demand has a correlative effect on outsourcing, as talented people realize that they can command higher pay and flexibility from doing freelance work.

Figure 6: Positions Outsourced

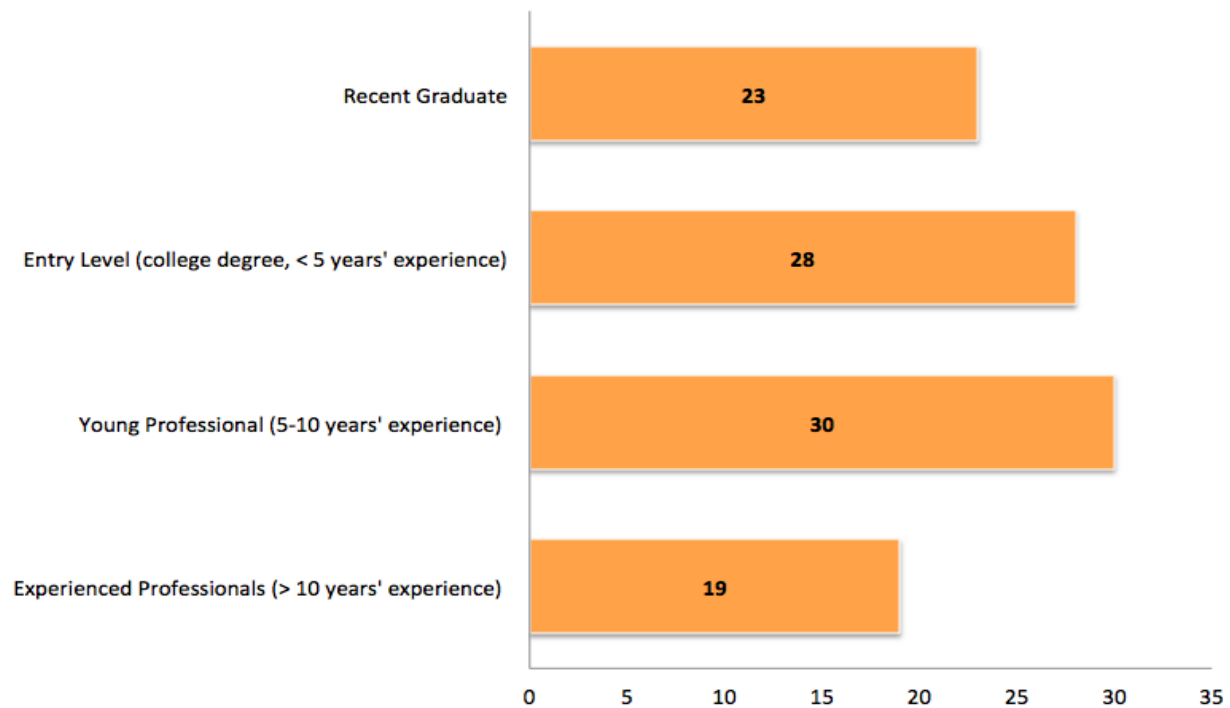


TechPoint Workforce Survey, 2013

Meeting the Demand: Supply of College Talent and Job Readiness

Central Indiana companies are looking to hire college graduates with computer-related degrees, including recent graduates, creating significant job opportunities for graduates of in-state institutions. Sixty-two percent of companies have a four-year degree requirement for all computer-related candidates. Further, when asked about what level of experience they are hiring, companies said that 51 percent of positions available are for college graduates with five or fewer years of experience.

Figure 7: Level of Experience for New Tech Hires



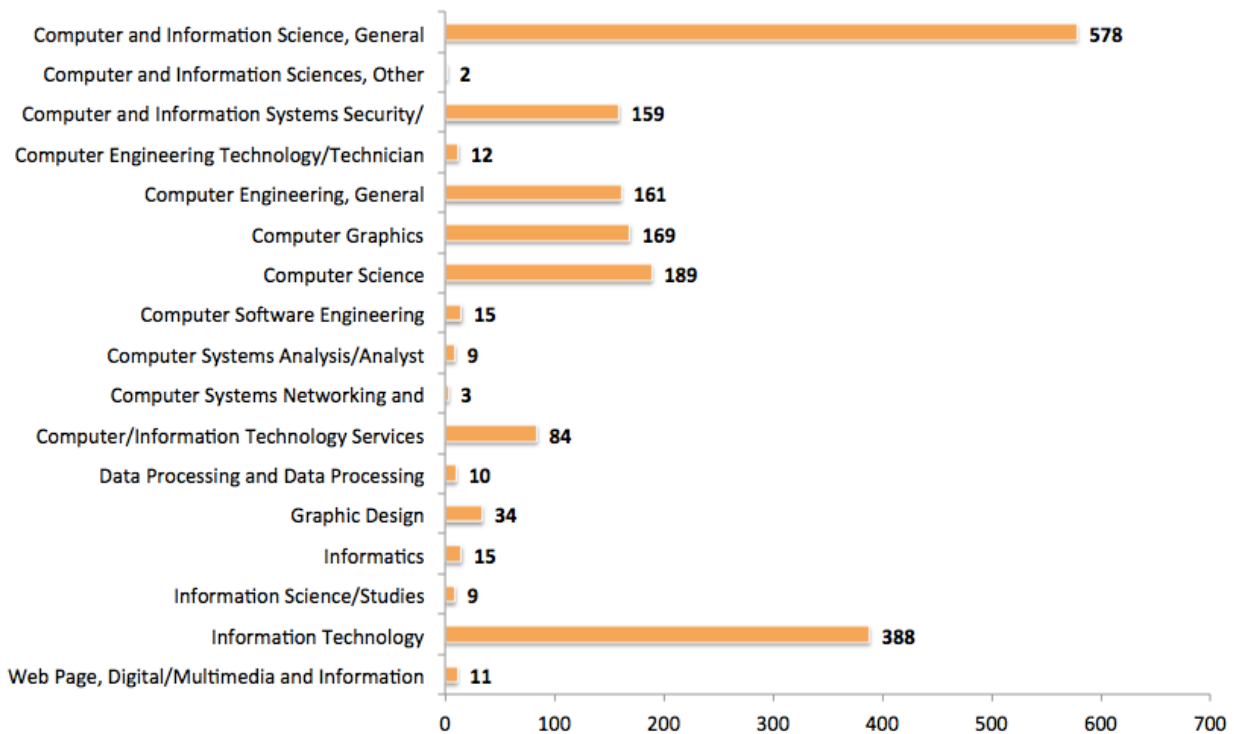
TechPoint Workforce Survey, 2013

When recruiting new talent, the companies participating in the survey said that they are looking for employees with computer science and software engineering degrees predominantly, followed by computer information technology, informatics and information systems degrees. In 2012, Indiana's in-state higher education institutions conferred 1,848 students with the computer-related bachelor's and master's degrees listed above.¹ With 33 in-state colleges and universities offering degrees in computer-related fields, the potential for a local talent pipeline is already in place. Surveyed employers, however, are finding that not all graduates are job ready.

¹ National Center for Education Statistics, Retrieved from <http://nces.ed.gov/collegenavigator/>.

² Hicks, M., (2014, May) *How Real Is the STEM Shortage in Indiana? Evidence from Workforce Data*, Economic Policy Brief, Ball State University Center for Business and Economic Research.

Figure 8: Degrees Conferred by Major from In-State Colleges and Universities, 2012



Sixty-five percent of employers surveyed said that they perceive a skills gap between currently available talent and what they were looking to hire. When asked what Indiana colleges and universities could do to improve the quality of their technical graduates, employers cited more practical experience as the most important success factor. Nearly two-thirds of respondents said more “real-world experience” and/or “internships” would improve the quality of graduating talent.

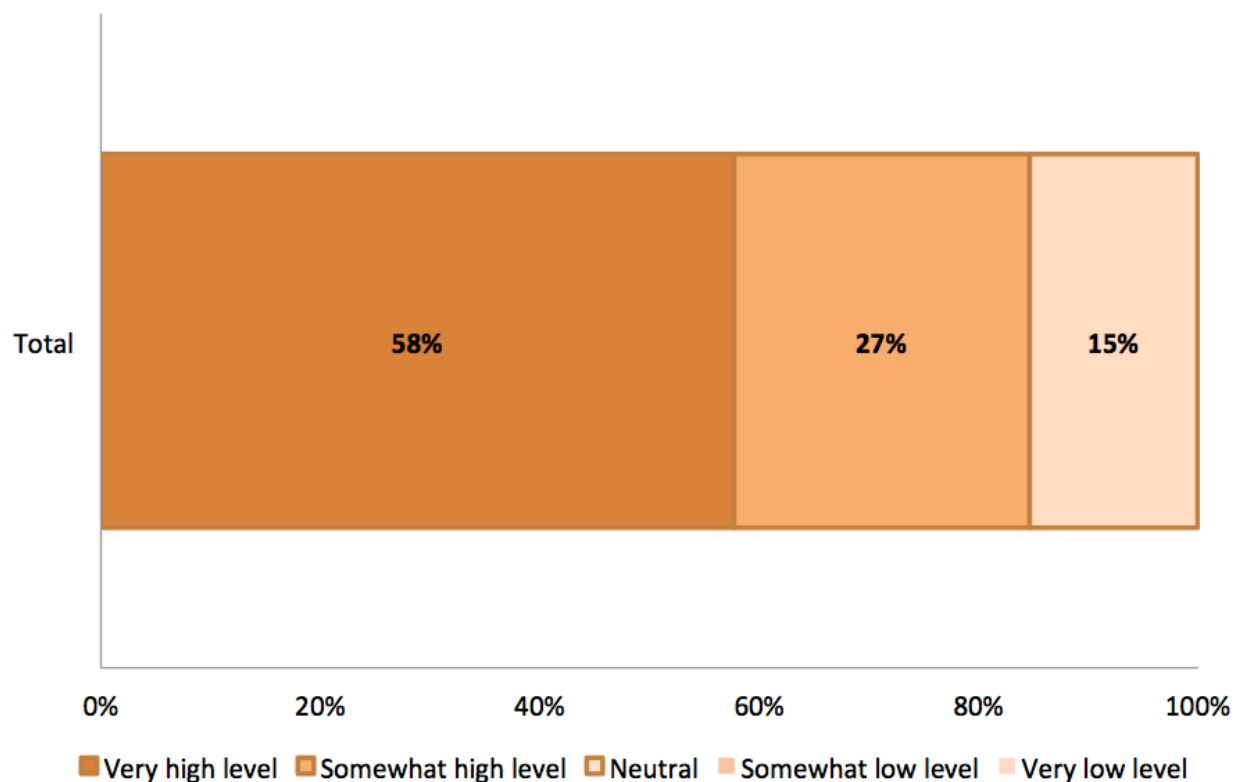
All surveyed companies hire computer-related interns, though only 12 percent of surveyed companies report hiring interns from non-Indiana colleges/universities, indicating that Central Indiana companies are relying on in-state universities for talent.

The Competition for Computer-Related Talent

Trends in Full-Time Employment Hiring

Industry and employment trends suggest that as information technology becomes increasingly critical in every business, the competition for talent is going to become even more challenging. In 2013, 85 percent of Central Indiana companies surveyed reported competition for talent to be at a high level, with 58 percent of them reporting a very high level of competition.

Figure 9: Perceived Level of Competition for Technical Talent, 2013



TechPoint Workforce Survey, 2013

When asked to speak on the reason for the perceived level of competition, one hiring manager asserted, “companies are all fighting for the same talent.” Another found that “companies poach from one another.” This trend is not unique to Indiana, as competition nationwide is fierce. A recent economic policy brief by the Ball State University Center for Business and Economic Research cited wage increases are a key indicator of this supply/demand mismatch. “If demand for workers rise, but supply does not, wages must rise.”² Wage trends among computer-related occupations in Central Indiana have increased 7.46 percent from 2009-2012, while wages across all occupations increased by 4.57 percent during that same time period, indicating that there is a demand for computer related talent.

² Hicks, M., (2014, May) *How Real Is the STEM Shortage in Indiana? Evidence from Workforce Data*, Economic Policy Brief, Ball State University Center for Business and Economic Research.

Figure 10: Wage Increase from 2009-2012, Indianapolis-Carmel MSA

	Median Salary - All Occupations in 2009	Median Salary - Computer-Related Occupations in 2009	Median Salary - All Occupations in 2012	Median Salary - Computer-Related Occupations in 2012
Indianapolis	\$ 33,230.00	\$ 67,660.00	\$ 34,750.00	\$ 72,710.00

Bureau of Labor Statistics, 2009 & 2012

Although the median salary for a computer-related occupation has been increasing and is more than double the median salary in the state, Indiana still pays below the national median within the same occupational group.

Figure 11: Median Salary, 2012

	Median Salary - All Occupations	Median Salary - Computer-Related Occupations
U.S.	\$ 34,750.00	\$ 79,680.00
Indiana	\$ 31,740.00	\$ 69,210.00
Indianapolis	\$ 34,750.00	\$ 72,710.00

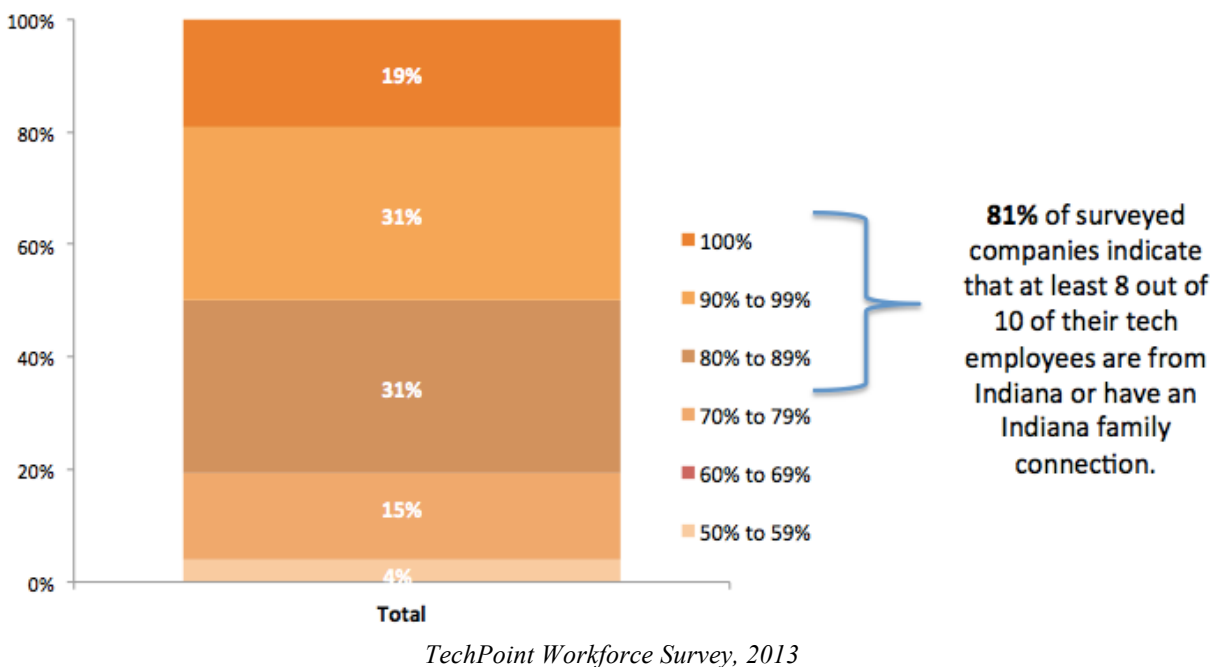
Bureau of Labor Statistics, 2012

This data is not filtered with cost of living information and therefore the implications of falling below national wage data cannot be fully realized. Further analysis that includes cost of living and buying power is necessary to get a complete picture of where Indianapolis computer-related wages stand nationally. This information is important to understand, as hiring managers ranked compensation as the factor most important to computer-related candidates when they are making employment decisions. Company culture and specific job description were also ranked highly by surveyed companies when asked to identify factors important to computer-related candidates making employment decisions.

Central Indiana companies find themselves competing not only locally for talent, but with companies like Microsoft, Google, IBM and Apple. Understanding the emphasis on compensation and competition with the nation's largest technology firms for talent, Central Indiana companies have been forced to attract talent by providing alternative opportunities to candidates. When talent chooses employment in Central Indiana, they do so most often for the following factors, according to survey participants: job opportunity, quality of life, cost of living and proximity to family.

Further, Central Indiana companies found that they “win” in the competition for talent by appealing to candidates with an Indiana connection. Whether they grew up in the state or have relatives in Indiana, 81 percent of companies surveyed indicated that at least 8 out of 10 of their tech employees are from Indiana or have an Indiana family connection.

Figure 12: Employees with an Indiana Connection



Trends in Intern Hiring

Students seeking computer-related degrees at Indiana's colleges and universities are also in high demand, and are being recruited to leave the state for internships. Local companies report competing with Microsoft, Google, Deloitte, and IBM for top interns. When asked why students forgo opportunities in Central Indiana, hiring managers cited "competition from bigger, out-of-state firms," "brand name," and "compensation." When interns choose to work for Central Indiana companies, they do so because of company culture and industry, over compensation.

Figure 13: Most Important Factors When Interns Convert to Full-Time Employees, as Reported by Companies

Factors	% of Respondents Ranking #1	Average Ranking
Company culture fit	57%	1.7
Business industry experience or interest	22%	3.5
Compensation	4%	3.8
Close proximity to family	4%	4.9
Particular skill set	4%	5.0
Place to live in Indianapolis	9%	5.6
Flexible work schedule	0%	5.6
Close proximity to friends	0%	5.6
Other	0%	8.6

(n=23)

- Growth opportunity

TechPoint Workforce Survey, 2013

For students who choose Central Indiana, surveyed companies extend full-time offers to 51 percent of interns, and of that, 59 percent on average, accept the employment offer. Of those who decline offers, it is most often because of “perceived better offers elsewhere (outside of Indiana),” or “a higher salary offer.”

Trends in International Applicant Hiring

In 2013, Purdue University was ranked second in the nation for international student population among public schools and third overall.³ This, along with other anecdotal evidence, suggests that there is a high quantity of quality international candidates available for hire. Yet only 54 percent of surveyed companies hire non-U.S. citizens. Cost, visa requirements, and general complexity are reasons cited by companies who do not currently hire international applicants.

³ Patterson Neubert, A. (2013, November), *Purdue's international student population ranks 2nd for public schools, 3rd overall*, Purdue University, Retrieved from <http://www.purdue.edu/newsroom/releases/2013/Q4/purdues-international-student-population-ranks-2nd-for-public-schools,-3rd-overall.html>

Conclusion

As a result of the Technology Workforce Study findings, we have concluded the following:

Computer-related jobs are growing rapidly. Employment growth in computer-related occupations far outpaced the growth rates across the economy as a whole, adding 3,300 jobs and growing six times faster than overall employment in Indiana from 2009-2012.

Computer-related jobs are highly concentrated in Central Indiana. Forty-eight percent of computer-related jobs in the state of Indiana are located in the Indianapolis-Carmel MSA. The next highest concentration is the Ft. Wayne MSA with eight percent of total computer-related jobs.

Demand for computer-related jobs is high and outweighs supply of qualified talent. Eighty-five percent of surveyed companies report the level of competition for tech talent to be at a high level.

Computer-related jobs typically require college degrees and command significantly higher salaries than the all-occupation median. Of the job postings in the Indianapolis-Carmel MSA that included educational background, 88 percent required at least a bachelor's degree. The median salary for a computer-related occupation in the Indianapolis-Carmel MSA pays \$72,710, which is more than double the \$34,750 median salary across all occupations.

Disconnects exist between universities and companies, and internship and real-world experience is necessary. Sixty-five percent of surveyed companies perceive a skills gap between their computer-related job openings and the available workforce. The skills most in demand among surveyed companies are JavaScript, SQL, CSS/CSS3, and HTML. Nearly two-thirds of respondents said more “real-world experience” and/or “internships” would improve the quality of graduating talent.

People with Indiana ties are predominantly those most attracted to local tech companies. Eighty-one percent of surveyed companies indicated that at least eight out of ten of their computer-related employees are from Indiana or have an Indiana family connection.

Salary and location are the most common reasons for losing tech-skilled recruits. According to companies surveyed, 71 percent of college students who decline full-time employment offers following their internships do so because of compensation and/or location. When working to hire full-time candidates with professional experience, surveyed companies identified compensation as the most important factor in their employment decision. Although employees in computer-related jobs made significantly higher wages than the all-occupation median, Indiana wages are below the median salary for computer-related occupations across the United States. These findings beg deeper analysis to understand how we compete with peer markets and to examine if

the context provided by a cost of living and buying power analysis would lend insight into the discrepancy.

Skilled international students are available but visa sponsorship is a barrier. Universities in Indiana have large international student populations, yet only 54 percent of surveyed companies report hiring non-U.S. citizens. Those companies which do not hire non-U.S. citizens have made that decision primarily because of visa requirements and associated costs.

In summary, the results of both Technology Workforce Reports reinforce that the growth of tech companies and computer-related jobs present unique opportunities for Indiana to increase the quantity of its higher-skilled, degreed, higher-wage workforce.

A-1: Occupations Attempted/Will Attempt to Fill in 2013-2014

	Attempted and/or Looking to Hire	Est. Total # of Attempted Hires	Est. Total # of Current Openings	Est. Total # You Hope to Hire
Software Developers, Applications	88%	138	31	261
Database Administrators	60%	21	7	25
Graphic Designers	60%	24	2	21
Web Developers	56%	41	17	70
Network and Computer Systems Administrators	48%	37	14	45
Software Developers, Systems Software	40%	31	13	47
Computer Systems Analysts	36%	33	12	39
Computer Programmers	36%	36	9	27
Computer User Support Specialists	32%	40	11	24
Financial Specialists, All Other	28%	11	2	5
Computer Network Specialists	24%	14	7	16
Information Security Analysts	20%	8	4	9
Computer Network Architects	20%	5	1	5
Computer Occupations, All Other	20%	4	0	7
Computer and Information System Managers	20%	8	3	4
Computer Hardware Engineers	16%	11	5	5
Business Operations Specialists	16%	10	1	5
Multimedia Artists and Animators	8%	2	0	1
Architectural and Engineering Managers	4%	6	3	1
Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic	0%	0	0	0
Computer Operators	0%	0	0	0
Medical Records and Health Information Technicians	0%	0	0	0

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