



# Sizing the Middle Skills Employment Gap

## Significant Opportunities in Data, Information & Computing

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BATEC  
*National Center of Excellence for Computing and Information Technologies*

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**EXECUTIVE SUMMARY**  
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# FORWARD

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Industry and Academia are mutually incentivized to fix the middle skills employment gap that presently exists in fields of Computing and Information Technology

- Employers are struggling to find proficiently skilled, affordable talent.
- Educators are attempting to anticipate areas of growing demand, but don't always receive clear guidance and consistent answers.

The fields of Computing and Information Technology are fast changing, and therefore, inherently difficult to “keep up with”. The employment gap exists because industry and academia, unless their working in close collaboration, can drift apart in their understanding of the requirements for proficiency with advanced tools, new programming languages, and emerging skill standards. High growth economic cycles followed by deep corrections have only served to accentuate the challenge.

Many different solutions have been proposed and experimented with in order to address the need to find a skilled and affordable workforce.

- Many companies have outsourced jobs and responsibilities to third-party organizations in their attempt to be more responsive to changes in either expertise or level of demand.
- Some industries have increased their reliance on an immigrant workforce through the expansion of H1-B visa programs in order to gain skills in emerging disciplines.
- Many academic institutions have developed certificate programs and stackable credentials designed to retool an existing workforce.
- Some schools have increased their experiential education to improve the relevancy and effectiveness of their degree programs.

The motivation for *Sizing the Middle Skills Employment Gap* is to uncover and analyze the underlying principles of middle skills employment. Middle skills employment, in the context of this report, are those entry-level jobs which serve as the gateway, or first employment step, of a career in computing and information technology.

We can use the findings of this report to redefine how we source talent. Business and education need to collaborate in new and different ways to link curriculum with employability requirements in order to address the current shortfalls. The time to act is now!

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# RESEARCH SOURCES

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Data sources and techniques used for this report have been validated by numerous national research organizations including the Council for Community and Economic Research and Jobs for the Future. The following is a brief description of these data sources. A complete discussion is provided in the *Research Methodology* section.

Monster Government Solutions (MGS) has served as the lead researcher on this project since its start in 2012. For this report, MGS developed the research approach and methodology, selected and coordinated the various project contributors, analyzed job postings data, and provided analysis and writing for the narrative.

Chmura Economics and Analytics used their proprietary labor analytics tool, JobsEQ®, and modeled economic data on current and projected employment to help determine the feasibility increasing the number of graduates for each of the occupations and geographies in this report. The average mid-skills wage data was also estimated by Chmura’s team of economists.

WANTED Technologies data mined a national set of job postings aligned with the occupations of interest from a 12 month period and were filtered with an inferred level of work experience of five years or less.

Peoplebrite used its multi-tenant SaaS Business Intelligence tool to translate unstructured job descriptions into detailed employer requirements inventories. The nearly 80,000 job postings from WANTED were run through Peoplebrite’s analytic engine, resulting in the lists of high-level Skills, Knowledge and Competencies and mid-level Detailed Work Activities.

Additionally, the nearly 80,000 job postings were analyzed using Monster’s 6Sense (™) Intelligent Search and SeeMore ® Talent Dashboard. The list of skills produced by the Talent Dashboard were then coded to yield the group of Technical and Specialized skills that are found in the report.

Finally, Morris, Lloyd & Associates analyzed data from the U.S. Department of Labor and literature reviews to provide macro-level data and context to the occupation-specific data from the other research sources.

*Monster Government Systems*

*Chmura Economics and Analysis.*

*Wanted Technologies*

*PeopleBrite*

*Morris, Lloyd & Associates*

# EXECUTIVE SUMMARY

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The prevalence and importance of information technology jobs has grown substantially in the new millennium, even during times of economic recession. There are now more than 5.6 million IT workers nationally (BLS, 2013a).

IT job growth is expected to continue to outpace the average job growth, for all jobs, through 2020. IT job growth and skill requirements are so robust that there is a significant need to expand the number of workers with appropriate skills for these positions. Many employers agree that a “skills gap” exists and they expect this “skills gap” will widen in the short-term.

This report investigates and documents the dimensions of this gap in the areas of data, information and computing. We explored the legitimacy of the common assumption that job seekers need to possess a bachelor’s degree in order to satisfy the skill requirements of jobs in the IT profession. Using modeled economic data, we sized the employment opportunity available for skilled community college graduates. The data suggests that there are specific opportunities on both a national and a regional level for job seekers to obtain middle skill entry points into IT careers.

The occupations studied included:

- Computer Systems Analysts
- Medical Records and Health Information Technicians
- Web Developers
- Big Data Cluster

Nationally, more than 296,000 persons are employed in mid-skill jobs in the occupations studied – or about 32% of total employment for this group of occupations as a whole. The mid-skill employment components are highest for Computer Systems Analysts and Medical Records and Health Information Technicians (132,978 and 96,120 persons respectively). The mid-skill portion of employment in all of the occupations studied is expected to grow nearly as fast as all jobs in these occupations over the next five years.

In this report, we used a variety of economic data to assess the quantitative alignment of workforce demand and educational readiness. We analyzed this alignment both nationally and in each of four metro areas (Boston, Chicago, Las Vegas, and

*There are more than 5.6 million IT workers in the U.S.*

*Growth in IT jobs is expected to remain strong through 2020.*

*Almost a third of all jobs for this group of occupations are mid-skill.*

*The skill requirements of these mid-skill jobs can often be satisfied by graduates of a two-year degree program.*

San Francisco). This analysis, along with additional employment and wage data, and written analysis, are included with a profile of each of the four metro areas.

We created profiles of each of the four IT occupations. We used advanced data mining techniques and two analytics engines to yield rich, multi-level competency profiles that produced data aligned to current nationwide employer job requirements of the occupations studied.

There are clear patterns that emerge from our analysis:

1. Our analysis indicates that economic modeling, at the national level, is not by itself sufficient.
2. Modeling at the regional level suggests that there is wide variance among opportunities for colleges to add graduates to the workforce for specific occupations.
3. The data suggest that educational institutions are already doing an adequate job of keeping pace with the demand for Medical Records and Health Information Technicians nationally and in each of the four metropolitan areas studied.
4. The data suggest that there are significant opportunities for colleges to increase the number of graduates for Computer Systems Analysts, Web Developers, and each of the three occupations in the Big Data Cluster. Computer Systems Analysts presents the largest overall opportunity. (Occupational profiles begin on page 5.)
5. The data suggest that there is a significant opportunity for colleges to increase the number of graduates for the occupation of Computer Systems Analysts in Boston, Chicago and San Francisco.
6. The data suggest that there is a significant opportunity for colleges to increase the number of graduates for the occupation of Web Developers in Boston and Las Vegas; and a moderate opportunity in San Francisco.
7. San Francisco and Boston present the largest number of occupations with opportunities for an increased number of graduates (Metro-specific profiles begin on page 39.)

*National research is insufficient to understand the dynamics of these workforce segments.*

*There is wide variance between metro areas with regard to the supply/demand issues.*

Use of the data in this study can help identify and address state and regional market needs, test the feasibility of new academic programs and prepare students for high-paying, high-demand jobs in IT and other sectors. Additionally, this report can serve as the basis for convening key employers, discussing their entry level hiring needs and building the case for community colleges as a viable and ongoing talent pipeline for mid-skills talent. Finally, there are other occupations, such as Computer Programmer, and Data Analyst, that exhibit a mid-skills employment base that suggests value in exploring future opportunities with the approach, data and analysis used in this study.

# INDUSTRY BACKGROUND

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## **The Importance and Pervasiveness of IT**

For the purpose of this report, IT jobs are those that require Information and Computing Technology as the primary job function. This “technology occupational cluster,” as defined by The U.S. Department of Labor, is estimated at 25 occupations and 5,679,050 jobs in 2012. Many of these BLS job classifications did not exist ten years ago (BLS, 2013a).

The growth of these occupations stands in stark contrast to all jobs as a whole. Between 2001 and 2011, over 565,000 IT-related jobs were created in the United States, an increase of 22.2 percent (95 times faster than employment as a whole, which grew by only 0.2 percent). Even during the Great Recession, when overall jobs were declining, IT jobs grew. Between May 2007 and May 2011, IT jobs grew by 6.8 percent, contributing \$37 billion to an economy that was otherwise stagnant (Atkinson, R. and Stewart, L., 2013).

The future pace of IT job openings is also expected to exceed the norm. The U.S. Bureau of Labor Statistics projects that computer and math jobs will be one of the top ten fastest growing occupational groups from 2010 to 2020.

## **The IT Skills Gap**

The growth in computer occupations, and the rapid pace of new skill requirements in IT is so robust in fact, that the supply of skilled workers does not appear to be keeping pace with employer demand. This skills gap takes on two forms – lack of appropriate skill levels among existing workers, and a shortage in the number of new graduates with appropriate IT skills.

A 2012 study conducted by CompTIA found that 93% of business managers involved in oversight of IT functions believe there is an IT skills gap. This translates to over 15 million U.S. businesses that rate the aggregate level of their IT staff skills as less than optimal. Additionally, 42% of managers reported that IT skills gaps are on the rise, compared to 29% reporting that the gap is declining. Finally, 30% of managers report that skills gaps are more prevalent in IT than in other functional areas such as marketing, finance and operations (CompTIA, 2012).

If current graduation rates continue, only 61% of IT jobs through 2018 could be filled by U.S. computing degree-earners. When including only computing bachelor’s degrees, this percentage drops to 29% of projected job openings that could be filled (NCWIT, 2013).

## **An Emerging Career Pathway**

In this report, we set out to challenge the popular assumption that a four year college degree is needed to enter a defined set of IT occupations. We examine an emerging career pathway – middle skill IT jobs - represented by the entry-level portion of what are typically thought of as high-skill IT occupations. We then explore the skill requirements and opportunities for the community college to be a strategic partner in the development of a workforce capable of participating in four additional career pathways, and assess the employment economics of this scenario.



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