

COLORADO TECH TALENT FORUM SUMMARY REPORT

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Colorado Workforce
Development Council



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COLORADO TECH TALENT FORUM SUMMARY REPORT JULY 2016

Introduction

Colorado's technology economy is one of the strongest in the nation. Information Technology industries employ approximately 136,000 workers. There are over 105,000 professionals employed in IT occupations that span many industries, with just over half of these workers actually employed within the IT industry (EMSI, 2016.3). IT occupations account for about 5 percent of all jobs in the state, and are among the fastest growing, good-paying jobs. Colorado is focused on building a pipeline of talent equipped with the knowledge, skills, abilities, and experiences needed to meet the demand of Colorado's information and technology jobs. The passage of House Bill 15-1274 provided the opportunity for state, regional, and local partners across Colorado to align around the development of regional industry-driven career pathway systems.

Colorado State legislation HB15- 1274 established the need for development of career pathways in high demand industries. A career pathway is defined as a well-articulated sequence of quality education and training programs, work-based learning experiences, and supportive services that develop youth and adults' core academic, technical and employability skills; provide them with continuous education, training; place them in high-demand, high-opportunity jobs; and enable advancement to successively higher levels of education and employment in a given industry sector or occupation.

Essential to this work is cross- agency collaboration information gathering activities, employer engagement, and establishing a framework for implementation of expanded public and private partnerships towards career awareness, career readiness and training, work-based learning opportunities, career placement, and access to regional support services available in a given career pathway. In Colorado, developing and supporting regional industry-driven career pathway system is a proven strategy for ensuring that students and jobseekers find meaningful employment, and employers find local talent they need for their businesses to thrive.

This report is delimited to our findings from the regional tech talent forums and is not intended to be an exhaustive report on HB15-1274 or Colorado's talent development system. For additional details about Tech Talent in Colorado and context, please read the "[Information Technology in Colorado](#)" section of the 2016 Colorado Talent Pipeline Report.

Regional Tech Talent Forums

In the spring and summer of 2016 a series of conversations dubbed “Tech Talent Forums” were held across the state. The purpose of this report is to provide a summary of the Tech Talent Forums held across Colorado which will help guide the development of our regional industry-driven career pathways in Information Technology. The Forums were convened by the Colorado Technology Association and the Colorado Workforce Development Council in order for tech businesses across the state to identify and weigh in on and develop action plans around Colorado’s IT talent framework. Throughout the Forums businesses identified job families, how they relate to one another, pathways within the job families, and actions needed to develop talent. Community support partners from education, training, and workforce systems actively participated by understanding employer’s needs and developing responses.

The Purpose of the Regional Tech Talent Forums

The Tech Talent Forums provided a space for industry to lead conversations and devise action plans to collectively address their talent needs. Specifically, the Tech Talent Forums:

- a. Identified critical job functions in technology that most impact employers’ long-term competitiveness;
- b. Created a shared understanding of career pathways in technology, identifying typical job families and paths to progression within and across occupations;
- c. Began to uncover key competencies required to perform effectively in critical occupations;
- d. Identified potential actions that would address priority talent gaps; informing the development of a regional career pathways action plan;
- e. Called for industry champions to continue developing career pathways actions in collaboration with regional education, training and workforce development partners;
- f. Identified where deeper discussion is warranted. Set up businesses to have ongoing conversations with one another and with education in their region to address talent issues (using a sector partnership model where appropriate).

Format of the Regional Tech Talent Forums

The Regional Tech Talent Forums were designed to be reflective of the sector partnership model. Regional industry led the round table discussion whereby select public partners from Workforce, Economic Development, and Education were present as listeners. Professional facilitators were brought on to ensure respectful and optimal usage of time. Consultations with the Colorado Technology Association and Information Technology subject matter experts informed the decision to focus on an intimate representation of local industry, ensuring higher quality data collection and the ability to delve deeper into complexities where necessary.

Tech Talent Forums were conducted throughout Colorado in areas of the state that have high concentrations of Information Technology (IT) employers. Altogether, forty employers offered their knowledge and insight during the Forums, with fifty-eight public partners actively involved to develop responses to employer needs. Forums covered the following locations:

- El Paso County and Pueblo County (hosted in Colorado Springs);
- Summit County, Eagle County and Park County (hosted in Frisco);
- Mesa County (hosted in Grand Junction);
- Boulder County and Broomfield County (hosted in Boulder);
- Larimer County and Weld County (hosted in Fort Collins);
- La Plata County (hosted in Durango).

These locations also coincide with those included in the Colorado Technology Association’s (CTA) Tech Talent Tour 2016. Denver was omitted as a location for the IT Forums due to the large number of employers that contributed to the in-depth occupational analysis that resulted in the 10 occupation profiles for the Skillful Initiative through the Markle Foundation.

Cross-Cutting Themes from Regional Tech Talent Forums

While each region has distinct technology workforce needs and challenges, several cross-cutting themes emerged across all six Forums:

- **Companies in the IT industry as well as IT divisions of companies in other industries share similar talent needs.** The Forums brought together leaders from IT companies that produce and sell IT products and services (both startup and more established firms) as well as leaders of IT departments or divisions in companies in a range of industries including health care, education, banking and finance and public sector agencies. While there were differences in specialized talent needs across these employers, there was general agreement that, at an entry level, IT companies and IT divisions of companies in other industries look for employees with similar skill sets. For instance, businesses noted a need for foundational or generalized IT skills for entry level positions in the IT industry and businesses are willing to invest and train individuals to meet this demand.
- **Better information about required skills and aptitudes will help students and jobseekers find the right fit within the IT industry.** Several employers discussed a misperception that careers in technology are limited to technical, backend development roles when, in fact, many of the most critical job functions require a combination of technical skills as well as communication skills, customer-facing abilities, and broader business knowledge. By making it clearer that “it’s not all about coding,” employers would be able to attract a broader group of students and jobseekers to careers in technology. In addition, developing better assessment mechanisms tailored to the IT industry would help students understand how their interests and aptitudes align with opportunities in the industry.
- **Cybersecurity is a critical and growing need across the industry.** Cybersecurity is both a cross-cutting function that applies to nearly all aspects of IT as well as its own specialized occupational family. Employers reported a need for foundational cybersecurity skills to be integrated in all IT programs as well as to increase the number of students and jobseekers pursuing specialized cybersecurity skills.

A Regional Lens on Technology Jobs

This section provides a summary of input gathered from the companies that participated in regional talent forums on pathways within and across job families in technology. The detail provided here is not meant to represent a comprehensive career map and competency definitions, but rather provide unique and important regional input to better understand tech talent needs across regions in Colorado. Please refer to the 2016 Colorado Talent Pipeline Report and the Skillful “Deep Dive” guides for more detailed information on IT job families and competencies. **The following sections provide detailed commentary and perspectives captured during the regional meetings and are grouped in relation to important elements of tech talent needs.**

The “Well-Rounded Technologist”

Employers across the regions consistently identified the need for what they called “well-rounded technologists”. This need is reflective of the complex and fluid nature of the Information Technology industry as well as the number of small IT companies that need technologists to fill a variety of roles. Employers identified broad skillsets and fundamentals as intrinsic to meeting this need.

This includes an understanding of:

- Databases
- The software development life cycle and complete development process
- Basic project management
- Agile software development
- Testing
- Design
- Code

Skilled well-rounded technologists are typically described as “certification junkies” and will stand out to potential employers in the application process.

Development and Integration

In nearly every Regional Tech Talent Forum, *Development and Integration* was identified as a critically important job function that is consistently difficult to fill. Colorado is not alone in struggling to produce the number of skilled developers that the industry demands. For example, national job openings for software developers are expected to increase 9%-13% by 2024. In Colorado, openings will increase by an astounding 38% by 2022.¹

¹ National Center for O*NET Development (2016). *Software Developers, Systems Software* (O*Net Report No. 15-1133.00). Retrieved from O*Net Online website: <http://www.onetonline.org/link/summary/15-1133.00>

Typical Job Titles in Development and Integration

This job family includes developers who are responsible for designing and building software at both the front end (design, user interface and user experience) and back end (coding). Typical job titles of critical occupations include:

- Application Developer
- Object-Oriented Programmer (OOP)
- Computer Systems Analyst
- Software Engineer Developer
- Web Developer
- Architect Developer
- Embedded Systems Engineers
- System Designers

Required Competencies in Development and Integration

While specific roles vary across companies, employers at the Forums agreed that there are a set of common required competencies for developers. These include:

- An understanding of how to program and test software;
- An ability to integrate different data sources;
- An understanding of the software development life cycle;
- Critical thinking; and
- An ability to work independently and devise solutions, problem solving.

Employers noted that while there are many developers in the workforce, it is uncommon to find those who embody the “developer mentality”. These are typically very logical people who see all parts of a problem and create smaller, sub-goals to solve a problem. These people tend to enjoy detail-oriented tasks.

Development and Integration Pathways

Developers come from a variety of different backgrounds, including directly from education and training programs that focus on coding and development skills. Employers agreed that the strongest candidates bring a combination of technical skills and an understanding of broader business functions of IT, including customer-facing sides of the business. For example, several employers described hiring developers from IT service roles such as IT Support, Help Desk, or other customer-facing roles that involve implementation of IT. In addition, several businesses identified Quality Assurance positions as a pathway into development and integration. Database administrators or data analysts can also successfully move into development roles.

Cybersecurity

Cybersecurity is a rapidly growing job function in IT companies as well as in IT divisions of companies in nearly every sector. Employers reported that cybersecurity is both a cross-cutting skill requirement across IT occupations as well as a specialized job family of its own. For example, professionals in development and network and systems administration need to have cybersecurity skills and expertise.

In addition, specialized cybersecurity roles such as security analysts, forensics, and security architects are in high demand.

Typical Job Titles in Cybersecurity

Typical job titles in cybersecurity include:

- Security Analyst
- Security Architect
- Forensic Analyst

Required Competencies in Cybersecurity

Particularly in Colorado Springs, where a large number of employers are government contractors, a security clearance is a critical prerequisite for careers in cybersecurity. Clean background checks are essential. In addition, employers described looking for candidates with the “mind of a hacker” or the ability to identify and diagnose system weaknesses and creatively develop solutions. More senior positions in cybersecurity require specialized knowledge such as forensics.

Cybersecurity Pathways

Similar to developers, cybersecurity professionals often come from service and support functions such as tech support or technician roles. A foundation in general IT skills, combined with some specialized training in cybersecurity through a training program, generally makes entry level candidates competitive. However, cybersecurity professionals are generally not hired at entry level, but rather start their career in IT in another job, such as a network or computer systems administrator, and receive additional cybersecurity training and certifications while performing that job. Some developers transition into cybersecurity roles, either as part of development teams or within more specialized cybersecurity divisions of the company. Typically, candidates are well-respected and have developed a strong trust level with a particular organization.

Business, Sales and Marketing

In a majority of the Tech Forums, employers agreed that business, sales and marketing are critical and under-recognized functions in IT. Employers described a need for professionals who combine a foundation in technical IT skills with an understanding of business principles, project management and ability to effectively sell and market products. That skill set is applicable in a range of roles from sales and marketing to finance, operations and project management.

Typical Job Titles in Business, Sales and Marketing

Typical job titles include:

- Sales Manager
- Project Manager
- Product Manager
- Sales Engineer
- Business Analyst
- Business Process Analyst

Required Competencies in Business, Sales and Marketing

Employers described an interest in candidates who have an understanding of business as well as technology. This includes a strong sales aptitude; an ability to understand and explain what technology can do for companies and an understanding of finance and cash flow, as well as strong project management skills. Employers are looking for a person that is able to understand both development (learned either in school or on the job) and the business side of things (learned either in school or on the job). The IT industry has many business majors (or arts/music majors) that learned IT after they left school, but utilize their business (or arts/music) knowledge as well to fill these roles. The IT industry needs more people to understand they can be successful in the industry without a Computer Science degree or with dual majors such as accounting/information technology or business/development, which make a candidate extremely competitive in the eyes of potential IT employers.

Business, Sales and Marketing Pathways

Employers described looking for people with a technical, engineering background who have also had some experience in operational or project management roles. Several employers cited Engineering Management programs as a strong foundation for careers in this area, as the program combines both technical and business-related skills.

Service and Support

In a majority of Tech Forums, employers identified service and support roles as being critical to business operations as well as being important feeders into other, high-demand job families. Service and support roles are often more customer-facing and involve implementation of technology solutions.

Typical Job Titles in Service and Support

Typical job titles include:

- Help Desk Technician
- Desktop Support Technician

Required Competencies in Service and Support

Service and support roles require foundational IT knowledge as well as critical thinking and problem solving skills to help customers troubleshoot and address problems. These roles also require strong communication skills and ability to interface effectively with customers.

Service and Support Pathways

Service and support offers many entry-level positions and can be a starting place for careers in a range of technology jobs. Many roles are a fit for high school students interested in technology or other entry-level candidates interested in gaining foundational knowledge in technology.

Quality Assurance (QA)

Similar to cybersecurity, quality assurance is both a cross-cutting skill set that is required in a range of IT occupations as well as a specialized job family.

Typical Job Titles in Quality Assurance

Typical job titles include:

- Embedded Testing Quality Assurance
- Testing and Software Auditor

Required Competencies in Quality Assurance

Employers reported looking for candidates with understanding of and experience with regression testing and functional testing. For entry-level roles, embedded testing experience is important and for more senior roles, experience with testing and software audits is most critical.

Quality Assurance Pathways

Entry-level quality assurance roles can be jumping off points for careers in development or for further advancement into senior quality assurance positions. Technician or support roles can be a pathway into quality assurance.

Network and Systems Administration

Generally, this category did not come up as a top priority in the discussions, but was identified as a category that is important to consider in thinking about pathways across job families. An aptitude for this job family is demonstrated by efficiency, a love of troubleshooting problems and making things run more smoothly, and automation.

Typical Job Titles in Network and Systems Administration

Typical job titles in network and systems administration include:

- Systems Administrator
- Network Systems Administrator

Required Competencies in Network and Systems Administration

Important competencies noted in Forums include:

- Critical thinking
- Ability to maintain an overview of the system
- Virtualization
- Microsoft PowerShell
- Microsoft SQL
- Storage Area Network Management (SAN)

Network and Systems Administration Pathways

Employers cited Cisco or other networking certifications as an important foundational qualification for jobs in network and systems administration. They also reported that developers often advance to positions as network or systems administrators. Systems or network administrators often enter the IT industry as an entry-level network or computer systems administrator with the proper training and certifications or move from other IT pathways with years of IT experience before entering or being promoted into their occupation.

Actions to build career pathway systems and programs across the state

In addition to identifying critical talent needs in technology, employers at each Tech Talent Forum identified strategies for strengthening the talent pipeline, working in partnership with education, training and workforce development partners. In each region, business leaders committed to working with public support partners to refine and implement these strategies.

- Develop aptitude tests that help students and jobseekers assess their interests and capabilities in order to find the right path into technology (Boulder);
- Create a clearer description of various career paths in technology, helping students identify the most efficient way to build in-demand skills and prepare for jobs and careers (Boulder);
- Increase student exposure to careers in technology, starting at a K-12 level, helping students identify how their interests and capabilities prepare them for careers in technology (Boulder);
- Educate the public about careers in technology to make clear that it's not just about coding (Northern Colorado);
- Increase real world exposure in tech-related programs, creating simulations or cases such as software development life cycle simulations that can augment existing curriculum and provide students more practical, applied experiences (Boulder, Colorado Springs, Northern Colorado);
- Hold industry days with local high schools and community colleges, inviting in guest speakers from tech businesses and giving students hands-on opportunities to explore careers in technology (Colorado Springs);
- Bring industry leaders into the classroom, partnering with teachers to design and deliver programs that increase student exposure to technology and build their skills (Colorado Springs, Northern Colorado)
- Organize competitions for students developing technology innovations, offering money, scholarships or loan repayment as prizes (Colorado Springs)
- Create speakers bureau of industry professionals to speak to students about technology industry dynamics and career opportunities (Colorado Springs)
- Expand internships for students in IT-related fields at multiple levels (Northern Colorado, Colorado Springs, Boulder)

Conclusion

The Tech Talent Forums provided the opportunity for state, regional, and local partners across Colorado to align around the development of regional industry-driven career pathway systems. Moving forward, the Colorado Technology Association, the Colorado Workforce Development Association, The Colorado Community College System and our other private and public partners will continue to support regional business-driven technology partnerships and address talent development at the systemic level. Statewide and regional industry-driven career pathway development marks a transformation in how Colorado will train, educate, and prepare the IT workforce of today and in the future. This report was delimited to our findings from the regional tech talent forums and was not intended to be an exhaustive report on HB15-1274 or Colorado's talent development system. For additional details about Tech Talent in Colorado and context, please read the "Information Technology in Colorado" section of the 2016 Colorado Talent Pipeline Report.

Appendix: Summaries on each Tech Talent Forum

Eagle, Grand, and Summit Counties Regional (Frisco, CO) Tech Talent Forum

May 11, 2016

Labor Market Information Jobs Data

Based on EMSI labor market projections from 2015-2025, the total number of IT occupations in Summit, Eagle, and Grand Counties is expected to grow from 525 to 628. Current annual openings for IT related occupations are approximately 20, although economic modeling was not available for several of the region's current occupations due to insufficient data; Current annual number of graduates from regional colleges and universities in IT related programs is 21. (This number represents all certifications and degrees earned and are not a non-duplicative single-student count.)

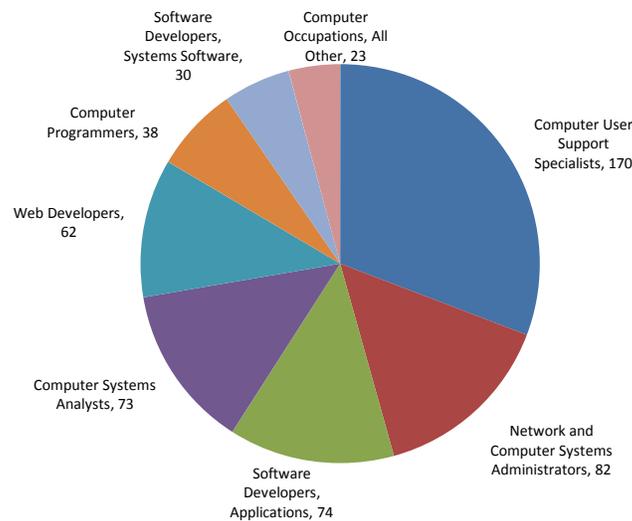


Figure 1. 2025 Projected top 8 IT Occupations for Eagle, Grand, and Summit Counties

Business Feedback on IT Job Skills and Occupations

- There is a need for well-rounded business process skills in this smaller community including both object oriented programming and the understanding of the business life cycle of process and development.
- Full Stack Developers are needed
- Coders and engineers are critically needed.
- Data Science
- Web digitalization and mobile. Sixteen week Regis (Mountain) Full Stack+ program offered locally autumn 2016.
- There are not enough internships or apprenticeships in these areas. Need for more local opportunities for students coming into the industry.
- Project Management - especially for developers if they want to move into management. CTO track (these tend to come and go quickly - have opportunity to grow these locally)
- IT skills and opportunities can also be found in local hospitality, property management, and health care companies.

Unique Regional Workforce Needs

Employers identified four critical job families in technology and started to map out career pathways within and across these categories. At a high-level the categories included: development, analysts, support, and technology sales.

Employers identified specific occupational needs for:

1. Developer Occupations - Front and Back End
2. Technical Sales
3. Project Management
4. Help Desk
5. Engineers
6. Programmers/Coders
7. Data Scientist/Analyst/Quality Assurance
8. IT Director level/Chief Technology Officer
9. Security (part-time)

Employers agreed that there is an opportunity to create a comprehensive talent development strategy into technology.

Overall Workforce Needs

- Consistent broadband.
- Better campaign for what mountain community is like year-round and better acclimation/support system for retaining talent.
- Qualitative improvement is very important to this community – not “bigger is better”.
- Affordable housing.
- Awareness of industry and talent awareness of existing companies in mountain communities, especially start-ups.
- Creation of higher paying jobs to support diversifying economic base and individuals’ professional growth.

Opportunities for Action and Next Steps

Employers identified four priorities for future collective action:

1. Build awareness that the technology community exists through networking.
2. Develop technology talent through increasing opportunities for technology education in the region’s schools.
3. Diversify the economy through technology.
4. Increase investor networking opportunities.

The next steps discussed include:

1. Individuals signed up to volunteer for one of the four priorities above;
2. Action teams will further flesh out the above priorities, especially building awareness and a technology talent pipeline.

3. Come back together as a group in July and August 2016 to identify opportunities to expand and launch a partnership.

Larimer and Weld Counties Tech Talent Forum (Fort Collins)

May 18, 2016

LMI Jobs Data

Based on EMSI labor market projects from 2015-2025, the total numbers of IT occupations in Larimer & Weld Counties are expected to grow from 8,187 to 9,462. Current annual openings for IT related occupations are 275; Current annual number of graduates from regional colleges and universities in IT related programs is 201. (This number represents all certifications and degrees earned and are not a non-duplicative single-student count.)

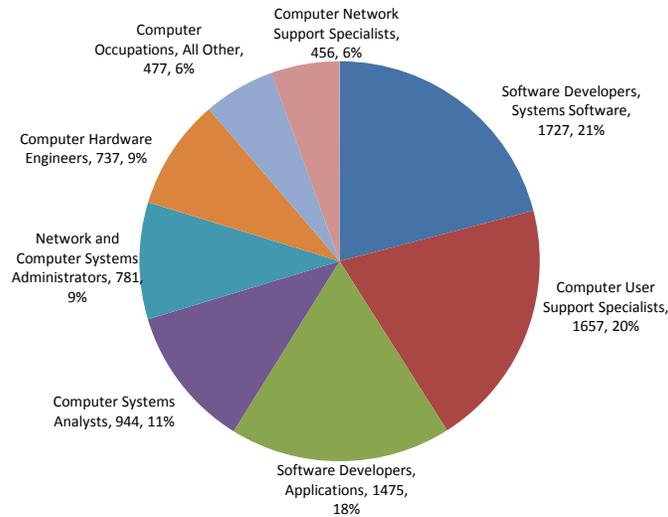


Figure 2. Projected 2025 top 8 IT Occupations for Larimer & Weld Counties

Business Feedback on IT Job Skills and Occupations

- Information Technology programs need connection and discussion with business programs or communications programs to showcase IT. Need to develop talent to be prepared to connect with IT context. Need the hardware/software people, but also need the person that can help with the data and value add to the business.
- Software Development and Cybersecurity are prime occupations for a two year focus.
- Need integration skills from various systems, programming bent with Business Analysis.
- Currently, 72 hour window for job placement - employment seekers are being placed very quickly. Local employers are recruiting directly to school and training programs – not at career fairs.
- Project Coordinator - companies have difficulty in hiring this position; need Project Managers with tech oriented background.
- Difficult to find a good DBA [Database Administrator] that doesn't have high salary expectation.
- Disconnect between Full Stack programs and actually finding jobs which are not start-up jobs.
- Connections between tech start-ups and IT divisions in other industries. Up-swing in software development and security – opportunities for certification rather than four year degrees.

- Startup incubators are developing curriculum and teaching structure. More comprehensive talent strategy. Companies are starving for talent and training is happening in piecemeal fashion.

Unique Regional Workforce Needs

Employers have occupational needs for:

1. Data Systems Technical Sales
2. Software Development and Integration
3. Database Administration
4. Network/Systems Administration
5. Security
6. Project Management
7. Data Analyst
8. Call Center occupations (Weld)

Overall Workforce Needs

- Businesses noted that full-stack training programs seem to be disconnected from long term employment needs.
- Industry feels technology has been sensationalized to the point of unrealistic expectations.
- Employers are worried we are pushing youth down a career path which will not make them happy long term. There is a need to educate the public on not pushing children to become computer scientists. Biggest problem = unrealistic expectations. If students are not fostered along a career pathway, then they are reduced to salary chasing. Industry really feels business needs to influence kids in schools and define clear pathways and expectations. Manufacturing does this very well in the region. GE and county governments (who are some of the region's more stable employers) need to be connected to the grass roots training, where employees are certified in a broad spectrum of technology, CCNA, CCIE are just a few examples, and there are opportunities for BOCES and Community colleges to capture these programs. Change pathway towards immediate certification to job whether this is a HS, 2, or 4 year degree.
- Mentoring component is very important and should be a priority to transition workers.

Opportunities for Action and Next Steps

- Employers identified a need for more research and to find the businesses which are the big hirers and ask the questions of the languages and the missing skills; then it will be the education innovators that will be the best able to respond. Could be MOOCS, grass roots, start-ups, CTE programs.
- Business to business mentoring to increase expectation of new hires. Weld has internal mentoring program, but has limited capacity to reach all of the interests with current staff.
- The Colorado Technology Association could be a conduit for software companies to sponsor the (K12 school) program, could even have a digital badge associated with the training (opportunity for CISCO training). Opportunity to involve the reseller level - World Wide technologies, GTRI, Longview Systems (1300 people in Colorado).

- San Francisco has an IT maker competition as a hiring experience, and this could be a model for Colorado. Example, JobZology has linked to CSU program to work on a company project and has connections to students that they would hire.
- Identification of local initiatives.

El Paso, Park, Teller, and Pueblo Counties IT Talent Forum (Colorado Springs)

May 19, 2016

LMI Jobs Data

Based on EMSI labor market projections from 2015-2025, the total number of IT occupations in El Paso, Park, Teller, and Pueblo Counties is expected to grow from 14,903 to 16,977. Current annual openings for IT related occupations are 450; Current annual number of graduates from regional colleges and universities in IT related programs is 1,247. (This number represents all certifications and degrees earned and is not a non-duplicative single-student count.)

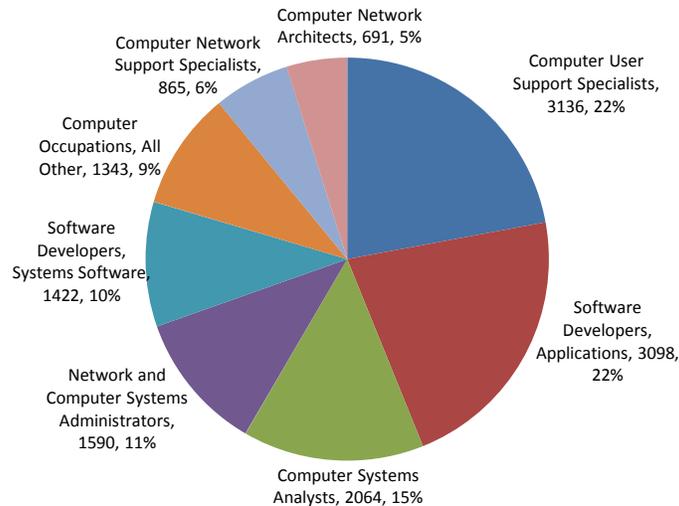


Figure 3. Projected 2025 top 8 IT Occupations for El Paso, Park, Teller, and Pueblo Counties

Business Feedback on IT Job Skills and Occupations

- Object-oriented programming should be taught under development.
- Software Development skills and Cybersecurity skills are lacking; some systems that are old, and training needs to address the stability of the system, every single character is important. (COBALT is sexy!) ZOS classes.
- Project Management positions are mainly cross-cutting. Talent needs to have solid understanding of systems. Would be a good dual degree. Companies are not using project management to implement for long term, and have transitioned from PMP to Agile PM.
- In general, the data are not reflective of how IT is employed in the real world with specialized processes and jobs. Rapid software development - open source and stacked software is untested so creating additional risk. Need better code testing, Developers are not getting this training.
- Many DOD systems are legacy, a lot of reverse engineering toward maintaining quality and increasing technical function. High turnover in these roles, lack of experience.
- The developer pathway starts with testers, then quality assurance, then development, then front end architect. Currently we are hiring “happy meal” developers - all labs and no practical development experience. This requires six+ months of up-training post-education before employee is productive.

- Employees can transition from engineering to marketing pathways but not really the other way. Service and field application engineer is a central spot, possible to move from business sales to technical sales. Developers can move into sales.
- Need to be strategic with the personality/talent types to utilize people in the best capacity. Good for value of the conversation with educators to see value in matching personality with pathway.
- Cybersecurity needs to be embedded into development of software and is not just a network issue. It is part of systems, security person built based on foundational skills. (Example, Systems and Network security. Data center and physical security, etc.) Security has distinct functions within: threat intelligence, SCI, etc. Security clearance required to be a viable candidate. Takes a long time to get clearance. Forensics pathway - need to be creative - a lot of the break-ins are social engineering and hacking. Security pathway has a core foundation from the other pathways and is not entry level IT pathway. Strong IT background and high trust level within an organization are required- must have clean backgrounds and records-spotless! Not doing a good job of attracting people into the security pathway - social science background plays well in to the skillset of the position (Sociology + IT or Healthcare + IT).

Unique regional workforce needs

Employers have occupational needs for:

1. Storage/Cloud
2. Cyber/Security- all positions
3. Systems Engineer
4. App Developer
5. Network Architects
6. Tech Support
7. Software Testers/QA
8. Network Systems Technicians & Administrator
9. Project Managers
10. Call Center Support

Overall Workforce Needs

- Outreach of education to industry to keep schools current and holistic with software life cycle. Industry needs to step up and create more opportunities to upscale education. There is a need to focus more on developing new tech tools.
- Colorado Springs needs an infusion of capital to pay salaries. The region is low for the national average and 15% below Denver. Colorado Springs has a strong quality of life benefit but hard to beat the economic contrast with entry level talent (their demand versus what the company can pay - also need to take into consideration how this impacts your existing workforce.)
- Technology dollars being spent on the revenue generating software rather than company infrastructure. Employers have a difficult time with attitude and work ethic of younger employees. Personality types employers are looking for: Agility of learning (life-long learning).

- Employers are asking for way too much education, and there is a need to clearly articulate education levels needed along a career pathway.

What are the educational priorities for change?

- Training needs to be designed as shorter term.
- Local business needs to come in with real world problems as case studies for the classroom so new employees can be productive right away (i.e. SDLC simulation). Can it actually wait that long?
- University/schools can't work fast enough on the problem.

Opportunities for Action and Next Steps

- Define real educational requirements and the career path within IT in Colorado Springs
- Build talent pipeline starting in K-12
 - Increase exposure to technology opportunities
 - Get businesses in schools, supporting teachers in classrooms
 - Hold freshman seminars
 - Guest instructors from industry
 - Hold industry day to raise awareness and gives students hands-on opportunities
- Increase real-world experiences
 - Develop software development life cycle simulation
 - Educators and industry leaders partner in developing real world experiences for students
 - Businesses provide case studies based on real problems

Boulder County Regional IT Talent Forum (Boulder)

May 19, 2016

LMI Jobs Data

Based on EMSI labor market projections from 2015-2025, the total number of IT occupations in Boulder County is expected to grow from 16,094 to 18,730. Current annual openings for IT related occupations are 542; Current annual number of graduates from regional colleges and universities in IT related programs is 196. (This number represents all certifications and degrees earned and is not a non-duplicative single-student count.)

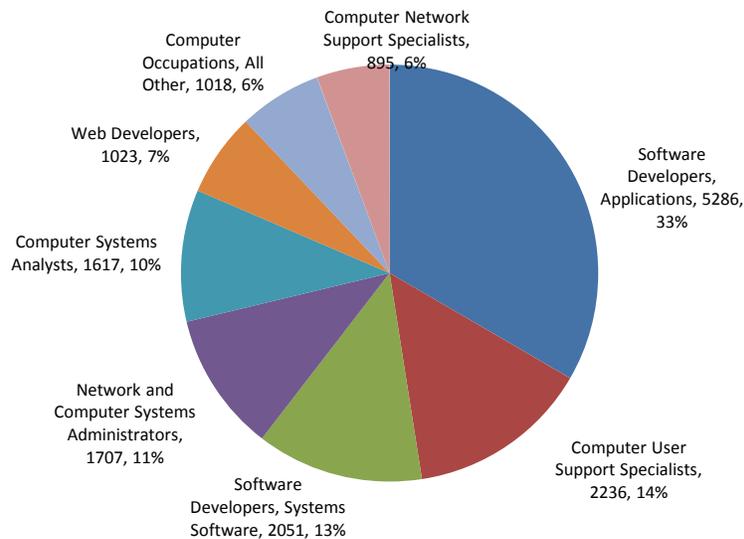


Figure 4. Projected 2025 top 8 IT Occupations for Boulder County

Business Feedback on IT Job Skills and Occupations

- Developers and Data Scientists
- Architects need to be able to understand system cooperation.
- Pathway for Architect Developer - Current practice is formal training program paid by employer, based on a contract to upskill the current employee.
- Integration is important as more stuff moves to the cloud. Good integrators based on toolset and APIs.
- QA = lots of turn over as people bored with position. It is both an entry point and exit point on a career pathway.
- Security - both entry level and higher level. Between ten and twenty percent of companies are actively seeking talent for these types of positions
- Business Sales and Marketing/other. Technologies change over time and the person who can manage the change and be able to broaden their skillsets is pretty rare.
- PMO needs to be a marriage of tech and business analyst skills.
- Technical Sales talent is tough to find due to the lack of being able to screen applicants to unique selling of business services within tech (value proposition skills of the company's service).
- Data Analytics and Business Analytics. User acceptance criteria and customer facing role.

- CISCO versus open source tools and how do we manage more of these tools with less resources.
- Math majors often pretty successful in moving into DBA.

Unique regional workforce needs

Local employers had a rich discussion about workforce needs in technology in Boulder, identifying eight job families and mapping out career pathways and skill requirements within and across those job families.

Employers have occupational needs for:

1. Developers
2. IT Directors
3. Developer Architect
4. Security/Cyber-all positions
5. Technical Sales
6. Cloud
7. Data Analyst
8. Business Analyst
9. Network/Systems Administration
10. Technical support

Overall Workforce Needs

Occupations locally are specialized (Web Development and Design - front end and back end), but still need a full stack concept. In website design there is sometimes the requirement to use the customer's platform. Nature of the Web Developers in Boulder have all levels entry to director, hardest is those with three to five years of experience. Security path will see increase in demand- positions tend to pay more- both incident and policy skill sets. Consultant background and understanding of best practices and willingness to do research with solution oriented tend to do well.

Opportunities for Action and Next Steps

Employers identified several areas of potential action to build a stronger talent pipeline into technology. These include:

- Developing aptitude tests to assess students' interests and capabilities and advise them on the most appropriate career path; increasing the real world exposure of students preparing for careers in technology; and, expanding internships for students and jobseekers. Exposure and training at a younger age.
- Internships and building capacity. Opportunity for clearinghouse and matching job seekers to employers.
- Mentoring students and exposure to coursework.

Mesa, Montrose and Delta Counties Regional IT Talent Forum (Grand Junction)

May 23, 2016

LMI Jobs Data

Based on EMSI labor market projections from 2015-2025, the total number of IT occupations in Mesa, Montrose and Delta Counties is expected to grow from 853 to 1,003. Current annual openings for IT related occupations are 30; Current annual number of graduates from regional colleges and universities in IT related programs is 53. (This number represents all certifications and degrees earned and is not a non-duplicative single-student count.)

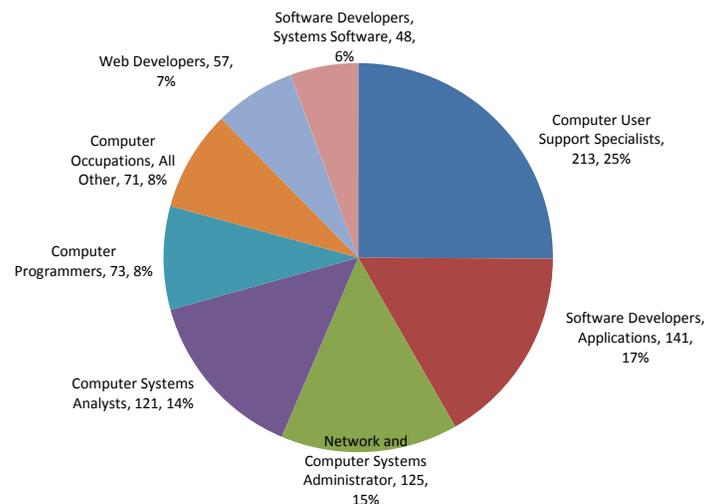


Figure 5. Projected 2025 Top 8 IT Job for Mesa, Montrose and Delta Counties

Business Feedback on IT Job Skills and Occupations

- Accessible, affordable tech is hard to find and is expensive (website development, etc.). Huge disconnect of local talent. Dual-sided market place. Need more talent density to drive down costs.
- Many freelancers and region is not retaining the students needed to create a density of talent and a long term job solution.
- More than eighty high tech companies in the region (>500 employees)
- Gap in what is available and knowledge of what kind of jobs are available. Grand Junction is not an early adopter of tech, but is becoming more entrepreneurial and tech-minded.
- Region does not teach STEM in grade schools so the tech is not pervasive in middle school education.
- Good talent is snatched up quickly. Tech classes are filling up. Education is looking at expanding the online coursework to capture students in outlying GJ areas.
- Also good opportunity for low-level, non-coding jobs here. The mastering of WordPress, paperclip, etc. which could allow a person to grow into an IT pathway:
 - Basic marketing
 - Basic computer - social media, word processing, how internet works.

- University transition and outreach not uniform. Loose partnerships of transition to workforce. Career services not very strong, struggle with getting interns and work-based learning experiences. There is a tendency to let kids do their own thing, rather than assist them with placement.
- Employers have trouble articulating the skillsets that they need. Farmers are pretty high tech with incentives towards drones, GPS, etc.
- School district retains talent as does the Healthcare system. Not one giant company for students to move into to learn culture. Healthcare not hiring students direct from school, standards are changing and companies are hiring more experienced talent from outside the region.

Unique regional workforce needs

Employers identified three critical job families in technology including Developers, Technical Support, and Coders.

Employers have occupational needs for:

1. Tech Support
2. Coders
3. Web Developers
4. Front End/Back End Developers
5. Senior level Developers
6. App Developers

Overall Workforce Needs

- Tech is more of a tool and function in Grand Junction rather than a separate industry. Overall employers identified a need for more high paying jobs; i.e. Database maintenance positions are not as high paying as Developer positions. Need more of IT workforce in general.
- More awareness of tech momentum and education regarding what tech could allow older companies to upgrade or update their company's business models - marketing, sales, etc. Every industry can use more tech influence.
- Region enjoys good healthcare comparatively, and it is very costly. Mesa County has high healthcare costs due to monopoly of health care system.
- Majority of corporations know what tech can do; small business is lagging in adoption and pervasiveness. Business Incubator is accomplishing copious outreach in this capacity. Small business can outsource this piece and incubator is helping to make these connections.
- Access to affordable fiber broadband is #1 on the list. It is very expensive to get access to reasonable speed. ED strategy is to grow small business in Grand Junction (Companies with ten employees).
- Launch WestCO working with the Business Incubator towards identifying and matching tech talent and professional development.

Opportunities for Action/Next Steps

- Marketing of Grand Junction as a great place to live.
- Economic Development is focused on recruitment of small tech businesses, meet-ups and events, etc. (Tech job correlation to additional job creation). Economic benefit to economy for IT has big potential in Grand Junction.
- Partner education with business to create targeted partnerships between both curriculum and work based learning opportunities.
- Co-working space being developed.
- Potential to offer local boot camp. Need (student enrollment) capacity for this.
- Regional partnership with Launch WestCO and CTA.
 - Hop-ti-coper created video with CAMA; launch would love to work with CTA on marketing and education outreach in western Colorado. Strategic articulation of messaging talent growth. Incorporating BASIC and SKILLFUL messaging towards associates and certificate level training available.
- There is a need for funding devoted to sparking interest in IT education. Tech perspective is we need to be able to attract the talent based on our schools.

Archuleta, Dolores, La Plata, Montezuma, and San Juan Counties Regional IT Talent Forum (Durango)

May 24, 2016

LMI Jobs Data

Based on EMSI labor market projections from 2015-2025, the total number of IT occupations in Archuleta, Dolores, La Plata, San Juan and Montezuma Counties is expected to grow from 467 to 542. Current annual openings for IT related occupations are 18; Current annual number of graduates from regional colleges and universities in IT related programs is 4. (This number represents all certifications and degrees earned and is not a non-duplicative single-student count.)

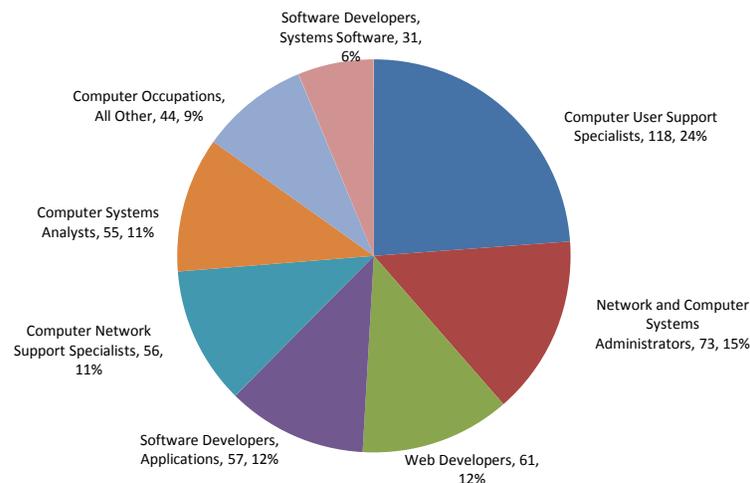


Figure 6. Projected 2025 Top 8 IT Occupations for Archuleta, Dolores, La Plata, Montezuma, and San Juan Counties

Business Feedback on IT Job Skills and Occupations

- Local talent pool (entry-level) very spotty. Soft skills are just as important as the technical skills – i.e. professionalism and communication.
- Software Engineers - high demand, lots of options, also looking at transferability of their job within the community. More people are working from home and it is harder to get people to move. Small tech community in Durango, relatively few ad hoc support groups, professional development limited. There is a Durango Coders Meetup group and a budding maker community.
- There is a general lack of salary awareness comparative to metro region and less ability to command dollars for services.
- Earth science/GIS program at Ft. Lewis turning out good graduates. One of the few certificates (GIS) that the college offers. This is not a fast path to a job, but a 4 year degree.
- Employers are willing to pay for employees to earn certifications.
- Interns usually turn out to be good employees, difficult to find those interested.
- In-demand certifications: CISCO, VMWare, Red HAT, CNCC, SQL, Oracle, iSQL.
- Software Infrastructure Specialists needed.
- Four year college degree not essential.

Unique regional workforce needs

Employers have occupational needs for:

1. Software Engineers
2. Desk/tech support (high level)
3. Database Administrators
4. Software developers
5. Senior level positions: Systems Administration, Analyst, Network

Overall Workforce Needs

- Hard to find talent, competing with local companies some larger ones can offer benefits.
- Relocation to Durango can be challenging: Housing, childcare, and other support services are needed to attract people into Durango. Community is focused on training locals and keeping them in area.
- Area has suffered from the CIS closer program at FT. Lewis College. Software engineers have many options and the pay scale does not compensate for high cost of living. Cost of living is a real factor in attracting talent.
- There are challenges regarding an aging workforce and planning for successions.

Opportunities for Action/Next Steps

- Workforce Center aptitude testing. Short term certificate programs based on federal workforce eligibility requirements; Participants need to be work ready with relatively few barriers.
- Need to find additional industry champions.
- Recruiting and incentivizing technology help with offering better benefits and specific things we can do to address these issues via a Sector Partnership conversation in Durango.
- Connect to the Colorado First and Existing Industry grant.
- Certification in software development area. Micro-certifications and badging. Home grown boot camp opportunity.
- Vantiv exploring increasing internship opportunities locally.
- Opportunity to link in to Launch WestCO.
- Potential to connect in to AIMS project towards IT.
- Jobsite for technical jobs in Colorado.
- DICE recruiting and better way to recruit and match Durango.