PROMISING PRACTICES IN LEVERAGING TRADITIONAL AND REAL-TIME LABOR MARKET INFORMATION

Prepared by Maher & Maher in Collaboration with the New York City Labor Market Information Service and Jobs for the Future

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Promising Practices in Leveraging Real-Time Labor Market Information

About this Report

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I. **INTRODUCTION**

Over the last several years, there has been increasing interest among labor market analysts and other workforce development stakeholders in what has come to be called real-time labor market information (LMI). Real-time LMI is information gleaned from a large number of online job postings. Several private organizations have developed software that collects online job postings by “scraping” or “spidering” the listings from the Internet and organizing them into standardized data categories, especially the North American Industry Classification System (NAICS) and the Standard Occupational Classification (SOC) system. These vendors have also built tools that permit analysis by those looking for more current and detailed information on hiring trends and employer demand (including certifications and skill prerequisites). Diverse users — including state and local governments, workforce boards, educational institutions, and economic development and research organizations — license these real-time LMI tools to better understand state, regional, and local labor market conditions.

Many view real-time LMI as an important new supplemental data source, but are unfamiliar with how best to use it and place it within the context of traditional LMI. Although many states and localities already use real-time LMI, others have yet to do so.

The U.S. Department of Labor’s Employment and Training Administration (ETA) has for several years supported research on the use of real-time LMI. In fact, many of ETA’s Recovery Act State LMI Improvement grantees and consortia focused on using real-time LMI to meet a variety of needs and objectives. In 2013, ETA invested technical assistance funding in a one-year project designed to support four participating states – Arizona, Indiana, Minnesota, and Oregon – in building staff capacity to utilize real-time LMI, in combination with traditional labor market information, to enhance employment and reemployment decision-making, industry sector and career pathway strategies, program performance, and outcomes for customers. The project also sought to increase the broader workforce system’s familiarity with and use of real-time LMI through virtual learning events, development and dissemination of a real-time LMI environmental scan report, and other technical assistance tools and activities. ETA awarded the technical assistance contract to Maher & Maher, which collaborated with project partners Jobs for the Future (JFF) and the New York City Labor Market Information Service (NYCLMIS).

In 2014, ETA initiated Phase 2 of the real-time LMI technical assistance project, which engaged six additional states, Illinois, Louisiana, Nevada, New Hampshire, Utah, and Vermont. Phase 2 of the project came at an especially opportune time, as the Workforce Innovation and Opportunity Act (WIOA) places explicit emphasis on the development and implementation of education and training programs that are based on real-time labor market analysis and that are responsive to real-time labor market needs.
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Under Phase 1 of the real-time LMI technical assistance projects, project consulting team partners developed an environmental scan report on the most common uses, strengths, and limitations of real-time LMI. The report provides an overview of major real-time LMI vendors and their products and services, and also profiles how three states and three regional workforce development knowledge centers use real-time LMI to identify and address labor market issues. The Phase 1 environmental scan report is available for download at https://winwin.workforce3one.org/view/Real-Time%20LMI,%20RT%20LMI/info.

This Phase 2 report is designed to highlight promising practices in integrating real-time LMI in combination with traditional LMI in a variety of focus areas, from building occupational profiles, to addressing the workforce needs of target industry sectors, to enhancing frontline staff’s career counseling efforts with job seekers. The matrix in Part III provides a snapshot of these various practices by application type, and Part IV offers a more detailed discussion of each promising practice example.

It is important to emphasize that the examples described in this report are by no means exhaustive. They were selected to provide “snapshots” of the myriad ways real-time LMI can enhance products and services that are grounded in traditional LMI, and to profile a range and variety of uses. There are, of course, many more examples of states and regional/local areas that are leveraging LMI in valuable and innovative ways.

II. COMPARING REAL-TIME AND TRADITIONAL LMI

Real-time labor market information:

- Most often refers to job posting analytics, which is software that collects online job postings by “scraping” or “spidering” the listings from the Internet and organizing them into categories or data elements that can be used for analysis.

Traditional labor market information:

- Is mostly produced from government-administered censuses and surveys. It produces comprehensive and highly accurate information about the labor market.
- Is the “bedrock” of LMI and is very useful for both strategic planning activities and ongoing tracking of employment and unemployment.
### Promising Practices in Leveraging Real-Time Labor Market Information

<table>
<thead>
<tr>
<th>REAL-TIME</th>
<th>TRADITIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WHO</strong></td>
<td>Gathered from thousands of websites and organized by private companies who store, aggregate, and organize</td>
</tr>
<tr>
<td><strong>COST</strong></td>
<td>Paid licenses or subscriptions to access information</td>
</tr>
<tr>
<td><strong>SOURCE</strong></td>
<td>Based only on online job postings (or potentially other online information, such as resumes or profiles)</td>
</tr>
<tr>
<td><strong>TIMING</strong></td>
<td>Updated at least once a day</td>
</tr>
<tr>
<td><strong>DETAIL</strong></td>
<td>Provides detail on existing and emerging demand for skills, tools or technologies, and certifications</td>
</tr>
<tr>
<td><strong>GEOGRAPHY</strong></td>
<td>Job openings for the nation, by state, region, or local area; may provide employer addresses</td>
</tr>
<tr>
<td><strong>QUERY</strong></td>
<td>Can search by job title, keyword, certification, or other attribute</td>
</tr>
</tbody>
</table>
### III. Leveraging Real-Time LMI: Matrix of Uses and Profiled Examples

<table>
<thead>
<tr>
<th>Use</th>
<th>Profiled Examples</th>
</tr>
</thead>
</table>
| Expanding State Job Banks                                           | - Oregon Employment Department Quality Info website  
- Commonwealth of Kentucky Focus/Career website  
- Mott Community College (Flint, Michigan) Career Coach tool         |
| Developing Labor Market Reports and LMI Online Dashboards            | - Monthly real-time LMI reports: Ohio and Michigan  
- Monthly real-time and traditional LMI reports: Florida, Idaho, and Pennsylvania  
- Other reports: California and Missouri  
- Online dashboard reports: Kansas                                      |
| Identifying In-Demand Occupations                                   | - New Jersey Demand Occupations list  
- Minnesota Department of Employment and Economic Development Occupations in Demand interactive list  
- Texas Occupational Evaluation interactive analysis tool              |
| Developing Occupational Profiles                                   | - New York State Department of Labor/New York City Labor Market Information Service “green” jobs occupational profiles  
- New York City Labor Market Information Service occupational profiles  
- California Employment Development Department interactive occupational profiles  
- Kansas Labor Information Center interactive occupational profiles     |
| Supporting Industry Sector Strategies                               | - Lancaster, Pennsylvania Workforce Investment Board  
- KentuckianaWorks Workforce Investment Board (Louisville, Kentucky)  
- JP Morgan Chase New Skills at Work Project                            |
| Aligning Education and Training Investments and Programs            | - O*NET  
- Competency Model Clearinghouse  
- Association for Computing Machinery  
- The Manufacturing Institute  
- Washington County Community College – Calais, Maine                  |
### Promising Practices in Leveraging Real-Time Labor Market Information

<table>
<thead>
<tr>
<th>Use</th>
<th>Profiled Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing Career Maps and Career Pathways</td>
<td>- City University of New York career maps</td>
</tr>
<tr>
<td></td>
<td>- The Solar Foundation®</td>
</tr>
<tr>
<td></td>
<td>- Burning Glass Technologies, Harvard Business School, and Accenture</td>
</tr>
<tr>
<td>Enhancing Career Advising and Service Delivery for Job Seekers</td>
<td>- CareerOneStop tools</td>
</tr>
<tr>
<td></td>
<td>- Kentucky Workforce Academy LMI training modules for frontline staff</td>
</tr>
<tr>
<td></td>
<td>- New York City College of Technology career profiles</td>
</tr>
</tbody>
</table>
IV. PROMISING PRACTICES IN LEVERAGING REAL-TIME LMI

1. Expanding State Job Banks

Real-time LMI, in its most basic form, aggregates job listings, making it possible for state job banks to expose job seekers to a wide selection of advertised jobs. All of the major real-time LMI vendors offer user-friendly interfaces that allow job seekers to directly explore job postings. Some real-time LMI vendors also offer a career exploration interface that can be embedded in a job board or other career exploration materials.

The Oregon Employment Department’s (OED) Quality Info website\(^1\) displays job advertisements supplied directly to OED from employers, as well as current job openings pulled from Wanted Analytics, shown below as “External Job Board.” Users can refine their search by job title, region, and time period.

\(^1\) [https://www.qualityinfo.org/jc-jfind/?at=1&t1=~4101000000~false~false~30~1](https://www.qualityinfo.org/jc-jfind/?at=1&t1=~4101000000~false~false~30~1)
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The Kentucky Career Center’s Focus/Career website\(^2\) provides job-seekers a user-friendly interface to explore local job ads in the Burning Glass Technologies database. The Focus/Career platform allows users to refine their search criteria by industry, occupation, education level, salary range, and physical requirements.

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\(^2\) [https://focuscareer.ky.gov/career/JobSearch.aspx](https://focuscareer.ky.gov/career/JobSearch.aspx)
Promising Practices in Leveraging Real-Time Labor Market Information

Mott Community College’s (Flint, Michigan) Career Coach\(^3\) tool, powered by Economic Modeling Specialists Intl., allows students to browse jobs in conjunction with a suite of career exploration tools. The website contains a resume builder and online career assessment tool, and provides access to current job postings advertised on indeed.com.

![Career Coach screenshot](https://mcc.emsicareercoach.com/#action=loadOccupationSearchResults&WageLimit=0&OccSearchSort=&Search=&Featured=&EdLevel=all&Clusters=

2. Developing Labor Market Reports and LMI Online Dashboards

**Introduction**

State workforce agencies serve as clearinghouses for LMI because they routinely collect, analyze, and disseminate state and regional labor and economic data. Among their many activities, and normally in partnership with the Bureau of Labor Statistics, states survey businesses and residents to estimate employment, unemployment, labor force size, industry employment, hours, and earnings. This traditional LMI underlies most state-issued labor market reports.

Many states are now also gaining access to real-time LMI. Its compatibility with traditional sources and its ability to offer a measure of labor demand have encouraged a growing number of states to integrate this data into their repertoire of labor market reports. Real-time LMI most often refers to interactive web-based platforms that scrape and de-duplicate online job postings.

\(^3\) [https://mcc.emsicareercoach.com/#action=loadOccupationSearchResults&WageLimit=0&OccSearchSort=&Search=&Featured=&EdLevel=all&Clusters=](https://mcc.emsicareercoach.com/#action=loadOccupationSearchResults&WageLimit=0&OccSearchSort=&Search=&Featured=&EdLevel=all&Clusters=)
daily and then make them available in a database for analysis. Because online ads are an indication of hiring intent, they can serve as an indication of labor demand.

This section profiles the ways in which states are most commonly integrating real-time LMI in their labor market reports and online dashboards.

### Monthly Reports

Many states publish monthly reports that highlight notable changes in labor market supply and demand over-the-month and over-the-year. These monthly reports are grounded in traditional LMI and give a snapshot of state or regional labor market performance and progress. Some states integrate ad volume and ad distribution because they complement traditional measures of hiring demand. States that mention real-time findings in their monthly reports generally take one of two approaches:

1. **Issuing separate, standalone monthly real-time reports.** These separate monthly real-time LMI reports are usually issued in tandem with a monthly traditional labor market review. States may work with their real-time LMI vendors to design and source their monthly real-time reports. These reports typically run between 1-2 pages and may be available at the statewide and regional levels. They may highlight top advertised jobs, skills, and certifications and top advertising employers and regions. Prevailing education and credential requirements, and other attributes of real-time hiring demand, may also be featured. Some reports may also include time series ad volume data to help illustrate past and present trends in hiring demand. Ohio and Michigan each offer variations on these features in their monthly real-time LMI reports:
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Other examples of standalone monthly real-time reports include:

- Alabama: [http://www2.labor.alabama.gov/WORKFORCEDEV/HWOL/AL.pdf](http://www2.labor.alabama.gov/WORKFORCEDEV/HWOL/AL.pdf)
- California: [http://www.labormarketinfo.edd.ca.gov/hwol/help_wanted_online_%28HWOL%29_Data_Series.html](http://www.labormarketinfo.edd.ca.gov/hwol/help_wanted_online_%28HWOL%29_Data_Series.html)
- Idaho: [https://idaholabor.wordpress.com/2015/01/19/demand-rising-for-some-occupations-in-idaho/#more-3914](https://idaholabor.wordpress.com/2015/01/19/demand-rising-for-some-occupations-in-idaho/#more-3914)
- Illinois: [http://www.ides.illinois.gov/LMI/Pages/HWOL.aspx](http://www.ides.illinois.gov/LMI/Pages/HWOL.aspx)
- New York City: [http://www.gc.cuny.edu/lmis/information_tools/jobs_reports](http://www.gc.cuny.edu/lmis/information_tools/jobs_reports)
- Oregon: [https://www.qualityinfo.org/-/help-wanted-online-ads-on-the-rise-in-oregon⁴](https://www.qualityinfo.org/-/help-wanted-online-ads-on-the-rise-in-oregon⁴)

2. **Incorporating both traditional and real-time LMI into a single monthly report.** In this second approach, there may be:

- **Separate mentions of real-time LMI and traditional LMI in same report.** Traditional and real-time labor market indicators are featured in the same report, but they are discussed independently of one another. For example, a report may lead with a review of employment and unemployment trends and later transition to an analysis of online ad volume.

- **Mentions of real-time LMI and traditional LMI side-by-side.** Relevant, traditional measures lend context to ad volume totals, and vice versa for discussions of traditional LMI indicators. Reports present these measures side-by-side (either graphically or in a matrix) so that viewers can examine the distribution of hiring demand by skill level, pay range, field of work, and so on. These combined measures may also be used to draw a connection between ad volume trends and overall labor market performance.

⁴ Oregon blogs periodically about statewide and regional changes in online ad volume. This link directs readers to an example blog.
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Florida, Idaho, and Pennsylvania illustrate these practices:

### FLORIDA

**Est. Population: 19,893,297**  
**Product Type: Monthly Reports**

#### Real-Time LMI Used with Traditional LMI:
- Labor supply v. demand
- Employment v. demand

**Traditional measures:**
- Unemployment (LAUS)
- Employment (LAUS)

**Real-time measures:**
- Ad volume time series data.

#### Real-Time LMI Used Separately:
- Time series ad volume
- Ad volume changes over-the-month and over-the-year
- Top advertised occupations
- Top advertising employers
- Top advertising cities
- Most requested skills and certifications
- Ad volume distribution by ad type
- Comparison of statewide ad volume to other populous states


Link: [http://www.floridajobs.org/labor-market-information/products-and-services/help-wanted-online](http://www.floridajobs.org/labor-market-information/products-and-services/help-wanted-online)
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IDAHO
Est. Population: 1,634,464
Product Type: Monthly Reports

Real-Time LMI Used with Traditional LMI:
- Matrix of top advertised occupations by state, region, and occasionally, in the U.S.

Real-Time LMI Used Separately:
- Occasionally, will list top advertising employers by state, region

Traditional measures:
- Total annual openings (OES)
- Total employment (OES)
- Median wages and median wage rank (OES)

Real time measures:
- Ad volume by occupation

Top 50 Occupation Vacancy Rates in Idaho

<table>
<thead>
<tr>
<th>Job Listings</th>
<th>Vacancy Rate October 2014</th>
<th>OES Data</th>
<th>Total Openings October 2014</th>
<th>Total Openings October 2013</th>
<th>Make Total Employment (OES)</th>
<th>Idaho Median Wage (US)</th>
<th>State Median Wage Rank in US (US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total All Occupations</td>
<td>50.88%</td>
<td>329.947</td>
<td>24,363</td>
<td>132,995</td>
<td>78,347</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>1 Occupational Therapists</td>
<td>69%</td>
<td>260</td>
<td>282</td>
<td>70,337</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Marketing Managers</td>
<td>50%</td>
<td>200</td>
<td>121</td>
<td>84,286</td>
<td>65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Computer Occupations, All Other</td>
<td>36%</td>
<td>299</td>
<td>298</td>
<td>74,096</td>
<td>87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Insurance Sales Agents</td>
<td>36%</td>
<td>288</td>
<td>1,104</td>
<td>36,905</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Computer Systems Analysts</td>
<td>35%</td>
<td>224</td>
<td>124</td>
<td>72,187</td>
<td>124</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Web Developers</td>
<td>31%</td>
<td>185</td>
<td>157</td>
<td>65,994</td>
<td>150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Industrial Engineers</td>
<td>30%</td>
<td>242</td>
<td>205</td>
<td>83,443</td>
<td>150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Physical Therapists</td>
<td>21%</td>
<td>221</td>
<td>261</td>
<td>77,843</td>
<td>172</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Software Developers, Applications</td>
<td>18%</td>
<td>197</td>
<td>177</td>
<td>69,906</td>
<td>181</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Computer User Support Specialists</td>
<td>15%</td>
<td>253</td>
<td>247</td>
<td>56,506</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Securities, Commodities, and Financial Services Sales Agents</td>
<td>14%</td>
<td>255</td>
<td>237</td>
<td>53,067</td>
<td>210</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Management Analysts</td>
<td>14%</td>
<td>216</td>
<td>210</td>
<td>68,068</td>
<td>218</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Network and Computer Systems Administrators</td>
<td>14%</td>
<td>217</td>
<td>195</td>
<td>55,105</td>
<td>219</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Executive Secretaries and Executive Administrative Assistants</td>
<td>13%</td>
<td>230</td>
<td>211</td>
<td>41,824</td>
<td>226</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 Medical and Health Services Managers</td>
<td>13%</td>
<td>239</td>
<td>215</td>
<td>76,816</td>
<td>228</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products</td>
<td>13%</td>
<td>286</td>
<td>137</td>
<td>56,096</td>
<td>230</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Heavy and Tractor-Trailer Truck Drivers</td>
<td>13%</td>
<td>1,008</td>
<td>1,372</td>
<td>35,260</td>
<td>232</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 Sales Managers</td>
<td>12%</td>
<td>288</td>
<td>113</td>
<td>78,944</td>
<td>237</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 Registered Nurses</td>
<td>11%</td>
<td>249</td>
<td>122</td>
<td>58,989</td>
<td>240</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 Movers and Production Workers</td>
<td>11%</td>
<td>360</td>
<td>132</td>
<td>32,905</td>
<td>242</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Real-Time LMI Used with Traditional LMI:
- Supply/Demand Rate

Traditional measures
- Unemployment rate (LAUS)

Real-time measures
- Ad volume time series

Real-Time LMI Used Separately:
- Ad volume distribution by industry sector, with over-the-year comparison (shown at right)
- Top ten occupations
- Top skills and certifications
- Top occupational groups

Pennsylvania Help Wanted Online Active Ads by Industry Sector

<table>
<thead>
<tr>
<th>Industry Sector</th>
<th>January 2015</th>
<th>January 2014</th>
<th>Volume Change</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Ads by Industry Sector</td>
<td>202,062</td>
<td>192,077</td>
<td>9,985</td>
<td>5.2%</td>
</tr>
<tr>
<td>Goods-producing Industries</td>
<td>12,231</td>
<td>11,296</td>
<td>935</td>
<td>8.3%</td>
</tr>
<tr>
<td>Agriculture, Forestry, Fishing, Hunt</td>
<td>117</td>
<td>118</td>
<td>-1</td>
<td>-0.8%</td>
</tr>
<tr>
<td>Mining</td>
<td>596</td>
<td>567</td>
<td>29</td>
<td>10.9%</td>
</tr>
<tr>
<td>Construction</td>
<td>2,219</td>
<td>2,008</td>
<td>211</td>
<td>10.5%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>9,560</td>
<td>8,905</td>
<td>656</td>
<td>7.3%</td>
</tr>
<tr>
<td>Services Providing</td>
<td>100,343</td>
<td>91,774</td>
<td>8,569</td>
<td>9.3%</td>
</tr>
<tr>
<td>Trade, Transport, Utilities</td>
<td>23,552</td>
<td>23,121</td>
<td>-491</td>
<td>-2.6%</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>5,923</td>
<td>5,783</td>
<td>140</td>
<td>2.4%</td>
</tr>
<tr>
<td>Retail Trade</td>
<td>11,763</td>
<td>12,518</td>
<td>-755</td>
<td>-6.0%</td>
</tr>
<tr>
<td>Transportation &amp; Utilities</td>
<td>4,836</td>
<td>5,180</td>
<td>-344</td>
<td>-6.6%</td>
</tr>
<tr>
<td>Information</td>
<td>3,032</td>
<td>2,829</td>
<td>203</td>
<td>7.2%</td>
</tr>
<tr>
<td>Financial Activities</td>
<td>10,756</td>
<td>9,764</td>
<td>992</td>
<td>10.2%</td>
</tr>
<tr>
<td>Finance &amp; Insurance</td>
<td>8,444</td>
<td>7,375</td>
<td>1,069</td>
<td>14.5%</td>
</tr>
<tr>
<td>Real Estate &amp; Rental &amp; Leasing</td>
<td>2,312</td>
<td>2,389</td>
<td>-77</td>
<td>-3.2%</td>
</tr>
<tr>
<td>Professional &amp; Business Services</td>
<td>31,044</td>
<td>28,503</td>
<td>2,541</td>
<td>8.9%</td>
</tr>
<tr>
<td>Professional &amp; Technical Svs.</td>
<td>12,082</td>
<td>10,472</td>
<td>1,610</td>
<td>15.4%</td>
</tr>
<tr>
<td>Management of Companies</td>
<td>67</td>
<td>48</td>
<td>19</td>
<td>39.6%</td>
</tr>
<tr>
<td>Admin &amp; Waste Services</td>
<td>18,895</td>
<td>17,983</td>
<td>912</td>
<td>5.1%</td>
</tr>
<tr>
<td>Education &amp; Health Services</td>
<td>25,055</td>
<td>18,840</td>
<td>6,215</td>
<td>33.0%</td>
</tr>
<tr>
<td>Educational Services</td>
<td>6,373</td>
<td>3,652</td>
<td>2,721</td>
<td>73.8%</td>
</tr>
<tr>
<td>Health Care &amp; Social Assistance</td>
<td>18,782</td>
<td>15,188</td>
<td>3,594</td>
<td>23.7%</td>
</tr>
<tr>
<td>Leisure &amp; Hospitality</td>
<td>4,219</td>
<td>4,798</td>
<td>-579</td>
<td>-12.1%</td>
</tr>
<tr>
<td>Arts, Entertainment &amp; Recreation</td>
<td>748</td>
<td>753</td>
<td>-6</td>
<td>0.8%</td>
</tr>
<tr>
<td>Accommodations &amp; Food Svs.</td>
<td>3,430</td>
<td>4,045</td>
<td>-615</td>
<td>-15.2%</td>
</tr>
<tr>
<td>Other Services</td>
<td>2,315</td>
<td>2,568</td>
<td>-253</td>
<td>-9.9%</td>
</tr>
<tr>
<td>Government</td>
<td>1,400</td>
<td>1,351</td>
<td>49</td>
<td>3.6%</td>
</tr>
<tr>
<td>Unclassified or unavailable</td>
<td>10,480</td>
<td>10,897</td>
<td>-417</td>
<td>-3.8%</td>
</tr>
</tbody>
</table>

Note: Help Wanted Online Ads by industry and occupation are compiled differently and totals will not equal each other.


Link: [http://www.portal.state.pa.us/portal/server.pt?open=514&objID=1217887&mode=2](http://www.portal.state.pa.us/portal/server.pt?open=514&objID=1217887&mode=2)
Other Reports
In addition to monthly reports, many state workforce agencies also issue periodic labor market reviews, economic assessments, or other types of in-depth reports and publications. These report types tend to delve into greater detail and draw upon many other measures – e.g., occupational employment and wages, labor market demographics, and business directories, to name a few – beyond those portrayed in standard monthly reports. Unlike monthly reports, these in-depth reports are released with less regularity, since they are intended to address planning needs or concerns as they arise. They also tend to be more free-form in content and structure than rigidly-templated monthly reports. These practices are illustrated by California and Missouri:
This in-depth publication evaluates occupations in select industry clusters using several labor market measures, both traditional and real-time.

**Real-Time LMI Used with Traditional LMI:**
- Top jobs within an industry cluster (right)
- Top industry cluster jobs by education level (right)

**Traditional measures:**
- Job openings (OES)
- Median wage (OES)
- Education Level (OES)

**Real-time measures:**
- Ad volume by employer, recent and one year prior (below)

**Real-Time LMI Used Separately:**
- Ad volume by employer, recent and one year prior

**Key Occupations by Education Level**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Total Job Openings (2015-2025)</th>
<th>Median Annual Wage (OES)</th>
<th>EWR Job Advertisements (10 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locked: Caregivers, and Level Therapists</td>
<td>1,341</td>
<td>$50,040</td>
<td>571</td>
</tr>
<tr>
<td>Recreation Workers</td>
<td>800</td>
<td>$23,452</td>
<td>1,500</td>
</tr>
<tr>
<td>Accountants and Auditors</td>
<td>557</td>
<td>$58,244</td>
<td>22,763</td>
</tr>
<tr>
<td>Carriers</td>
<td>542</td>
<td>$24,475</td>
<td>29</td>
</tr>
<tr>
<td>Sales Representatives</td>
<td>434</td>
<td>$108,030</td>
<td>12,596</td>
</tr>
</tbody>
</table>

**Requires Some College, Postsecondary Nondegree Award, or Associate’s Degree**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Total Job Openings (2015-2025)</th>
<th>Median Annual Wage (OES)</th>
<th>EWR Job Advertisements (10 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General and Operations Managers</td>
<td>2,111</td>
<td>$91,247</td>
<td>5,942</td>
</tr>
<tr>
<td>Manager, Therapists</td>
<td>942</td>
<td>$34,422</td>
<td>2,113</td>
</tr>
<tr>
<td>Audio and Video Equipment Technicians</td>
<td>417</td>
<td>$47,283</td>
<td>731</td>
</tr>
<tr>
<td>Skilled Trades</td>
<td>235</td>
<td>$32,713</td>
<td>590</td>
</tr>
<tr>
<td>Sound Engineering Technicians</td>
<td>107</td>
<td>$60,327</td>
<td>150</td>
</tr>
</tbody>
</table>

**Requires a High School Diploma or Equivalent Level**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Total Job Openings (2015-2025)</th>
<th>Median Annual Wage (OES)</th>
<th>EWR Job Advertisements (10 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales and Service Workers</td>
<td>1,554,137</td>
<td>$38,810</td>
<td>7,595</td>
</tr>
<tr>
<td>Combined Food Preparation and Serving Workers, Including Fast Food</td>
<td>121,548</td>
<td>$39,085</td>
<td>7,310</td>
</tr>
<tr>
<td>Cooks, Fast Food</td>
<td>51,360</td>
<td>$28,630</td>
<td>7,310</td>
</tr>
<tr>
<td>Cooks, Restaurant</td>
<td>47,360</td>
<td>$25,590</td>
<td>7,310</td>
</tr>
<tr>
<td>Food Preparation Workers</td>
<td>40,600</td>
<td>$19,052</td>
<td>7,310</td>
</tr>
<tr>
<td>Bakers</td>
<td>8,340</td>
<td>$19,013</td>
<td>7,310</td>
</tr>
<tr>
<td>Pastry Bakers</td>
<td>8,340</td>
<td>$22,690</td>
<td>7,310</td>
</tr>
<tr>
<td>Pastry Bakers</td>
<td>8,340</td>
<td>$22,690</td>
<td>7,310</td>
</tr>
<tr>
<td>Pastry Bakers</td>
<td>8,340</td>
<td>$22,690</td>
<td>7,310</td>
</tr>
<tr>
<td>Pastry Bakers</td>
<td>8,340</td>
<td>$22,690</td>
<td>7,310</td>
</tr>
</tbody>
</table>

**Employer Demand**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitality and Tourism</td>
<td>2,355</td>
<td>2,365</td>
<td>-0.4%</td>
</tr>
<tr>
<td>Food &amp; Beverage</td>
<td>1,908</td>
<td>1,900</td>
<td>-0.1%</td>
</tr>
<tr>
<td>Health and Human Services</td>
<td>400</td>
<td>375</td>
<td>6.5%</td>
</tr>
<tr>
<td>Professional Services</td>
<td>320</td>
<td>300</td>
<td>6.7%</td>
</tr>
<tr>
<td>Wholesale and Retail Trade</td>
<td>250</td>
<td>225</td>
<td>11.2%</td>
</tr>
<tr>
<td>Transportation and Warehousing</td>
<td>220</td>
<td>200</td>
<td>10.0%</td>
</tr>
<tr>
<td>Information Technology</td>
<td>200</td>
<td>175</td>
<td>13.7%</td>
</tr>
<tr>
<td>Construction</td>
<td>200</td>
<td>175</td>
<td>13.7%</td>
</tr>
</tbody>
</table>

**Est. Population: 38,802,500**

**Product Type: Regional Economic Analysis Profile**

**Link:** [http://www.calmis.ca.gov/SpecialReports/Statewide_REA_Profile_April2014.pdf](http://www.calmis.ca.gov/SpecialReports/Statewide_REA_Profile_April2014.pdf)
This analysis uses job seekers registered with the state and online job ads to measure statewide and regional labor supply and demand, respectively. This example illustrates areas of possible labor supply oversaturation and opportunity. These findings can help planners optimize workforce and training resources to better position job seekers for success in the labor market.

**Real-Time LMI Used with Traditional LMI:**
- Labor supply and demand by occupational field

**Alternative measure:**
- Number of job seekers registered with the state

**Real-time measures:**
- Ad volume by job field

**SOURCE:** Burning Glass Technologies, Labor Insight, prepared by the Missouri Department of Economic Development.

**Link:** [http://www.missourieconomy.org/pdfs/statewide_labor_supply_n_demand_analysis.pdf](http://www.missourieconomy.org/pdfs/statewide_labor_supply_n_demand_analysis.pdf)
Promising Practices in Leveraging Real-Time Labor Market Information

**Online Dashboards**
Several states also feature dashboards that give valuable insights into key performance indicators of the labor market. These web-based interfaces contain search filters that pull data from online job ads and other sources of LMI. The interactive nature of this product enables users to customize views and produce digital reports on-demand that showcase many of the same indicators that run standard in most state LMI monthly and other periodic reports. Kansas, in cooperation with its vendor Geographic Solutions, is one state of many that offers this interactive feature:
Promising Practices in Leveraging Real-Time Labor Market Information

KANSAS
Est. Population: 2,904,021
Product Type: Online Dashboard Report

Real-Time LMI Used with Traditional LMI:
- Online Dashboard Report

Traditional measures:
- Unemployment rate (LAUS)
- Occupational wage rates (OES)
- Industry employment and wages (QCEW)
- Long-term industry projections (CES and QCEW)
- Long-term occupational projections (OES)
- Current industry employment (CES)

Real-time measures:
- Ad volume by occupation

Real-Time LMI Used Separately:
- Ad volume distribution by industry sector, with over-the-year comparison (shown at right)
- Ad volume by region or area

SOURCE: Labor Market Information Services, Kansas Department of Labor in cooperation with BLS, U.S. Department of Labor and online advertised jobs data.
Promising Practices in Leveraging Real-Time Labor Market Information

Link:

Summary
The reports profiled in this section illustrate the use of traditional and real-time labor market information in different types of reports. While these reports are typically grounded in traditional LMI, states have discovered several uses for integrating real-time data into their reports. Popular combined features include:

1. **Supply/Demand Index or Rate.** This compares demand (with ad volume as proxy) against supply (e.g., the number of unemployed or the number of registered job seekers). This measures the tightness of the labor market supply, which can indicate whether the job market favors employers or job seekers. States either depict this longitudinally in a line graph to draw a relationship between these indicators and how it changes over time, or they use the two indicators to estimate a ratio.

2. **Top Occupations Listings.** States rank occupations returning the highest ad volume above a certain threshold (top 10, 20, 50, etc.). To help guide readers in their review of these high-demand occupations, states list other attributes for each occupation alongside ad volume, such as employment estimates, salary ranges and medians, and educational level.

3. **Gap Analysis.** States compare rates of supply and demand by field or sector to identify areas of job seeker undersupply and oversupply. This information can help industry recruiters and job training providers identify opportunities for greater investment.
3. Identifying In-Demand Occupations

The 1998 Workforce Investment Act (WIA) and its successor, the 2014 Workforce Innovation and Opportunity Act (WIOA), guide and support workforce development activities across the nation. Both federal laws call for training investments in occupations that are “in-demand.” This term loosely describes occupations that “lead to economic self-sufficiency and opportunities for advancement.”

Individual training accounts (ITAs) are the primary vehicle for eligible adults and dislocated workers to access WIA (now WIOA) dollars for job training. By law, these dedicated funds may only be applied toward training for “in-demand” occupations. The “in-demand” designation is intended to help focus WIA and WIOA resources in a way that is responsive to state and local employment training needs and goals. Accordingly, state and local Workforce Investment Boards (WIBs) are charged with setting data-driven “in-demand” criteria for their jurisdictions. WIBs are required to consult a battery of business and labor market information resources to arrive at “in-demand” occupations. Information resource examples include occupational employment projections data and other information made available by the Bureau of Labor Statistics (BLS) and state LMI units; job vacancy surveys; unemployment insurance (UI) claims; and pay.

### Real-Time Labor Market Information

Over the past decade, real-time labor market information has emerged as a complementary resource for workforce development and education practitioners. Real-time LMI is most often used to describe interactive web-based platforms that scrape and de-duplicate online job postings and then make them available in a database for analysis. Users can filter these ads by certain attributes like education level, certifications, occupation class, and location, to name a few. Other resources that can be considered real-time LMI include websites that collect worker information from online surveys or uploaded resumes (e.g., PayScale, Inc., Glassdoor, LinkedIn, etc.).

Unlike traditional LMI, which always has some time lag, real-time LMI is current and it fills an unmet need for timely and geographically-specific information about employer demand, as well as specific occupational and skill needs in a specific labor market. It is often used to complement or validate labor market research findings from traditional sources of LMI.

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6 WIA, Section 134 (d)(4)(G)(ii); WIOA Chapter 3, Section 134 (c)(3)(G)(iii).
7 WIOA, Section 3 (23)(A)(ii).
8 WIOA, Section 3 (23)(B).
9 WIOA, Section 3 (23)(B).
WIOA cites in two places the utility of real-time LMI analysis for creating effective training programs. With WIOA set to be implemented in 2015, many jurisdictions around the country have already begun to ramp up their involvement with real-time LMI and integrate it into their in-demand methodologies. This section describes a few examples of using traditional and real-time LMI to determine in-demand occupations.

### Examples

#### New Jersey

New Jersey is pioneer in using real-time LMI and offers several products that use it in combination with traditional LMI. For example, New Jersey’s statewide **Demand Occupations** list includes traditional LMI indicators (i.e., annual openings, median wage, employment, and educational attainment) and real-time LMI online job ad volume for each detailed occupation.

To qualify as “in-demand,” New Jersey occupations must meet certain criteria related to employment and supply and demand measures. Specifically, occupations must have a statewide employment level above a certain threshold, meet two of three “demand”-side criteria (i.e., strong short-term or long-term employment projections and high-volume online job listings) and fulfill both “supply”-side criteria (i.e., occupational employment ratio and Career Center participant post-training employment success).

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Promising Practices in Leveraging Real-Time Labor Market Information

New Jersey-based programs that train job seekers for these In-Demand occupations can be found on the New Jersey Training Opportunities webpage (www.njtopps.com). Career counselors are encouraged to use the in-demand occupations list as a starting point when approving ITAs and other New Jersey occupational training initiatives. The state also grants exceptions to the occupations on the statewide list. WIBs can apply to the state to assign an in-demand designation to occupations that do not make the state’s In-Demand list but are in-demand in local areas.

New Jersey is redeveloping its “in demand” list. Moving forward, the state plans to replace its all-encompassing list with a series of in-demand occupation lists for seven priority industry sectors. Each list will adopt demand criteria most relevant to the supply and demand realities of the industry sector. Ad volume will likely remain a consideration in those fields where job postings are known to be well-represented online.\footnote{April 22, 2015 phone interview with T. Smith, New Jersey Department of Labor and Workforce Development.}

**Minnesota**

The Minnesota Department of Employment and Economic Development publishes an interactive list of Occupations in Demand (OID)\footnote{Minnesota Department of Employment and Economic Development. Occupations In Demand. https://apps.deed.state.mn.us/lmi/oid/Results_9Columns.aspx} for the state and sub-state regions. Unlike the binary New Jersey Demand List, which assigns a “Yes” or “No” to each occupation’s In-Demand status, the Minnesota OID scores occupations by the number of in-demand criteria that are fulfilled and then ranks occupations accordingly. Occupations meeting at least three criteria are posted to the interactive list and those meeting all five criteria are listed first in descending order. This list can be filtered by wage range, education, and keyword searches.

In general, localities establish demand criteria to determine which occupations offer enough value to be worthy of public investment. One major benefit to the OID approach is that it shows which occupations that make the list are strongest in their ability to satisfy demand criteria, or in other words, which are of the highest value. This additional layer of detail offers further guidance to training providers and the job seekers they serve.\footnote{Incidentally, this particular example does not incorporate real-time measures. Minnesota administers a job vacancy survey, just like Kansas, but this measure appears to be omitted from the OID criteria.}

While this example does not include online ad volume as a variable, it has the structure and capacity to introduce it. Accordingly, it is worthy of some discussion within the context of real-time LMI applications.
Promising Practices in Leveraging Real-Time Labor Market Information

Texas

The Texas Workforce Commission offers online access to several complimentary labor market analysis tools through its Standard Occupational Components for Research and Analysis of Trends in Employment System, or better known by its acronym, SOCRATES. This software package includes an interactive analytic tool that allows labor market analysts and other interested stakeholders to perform a customized Regional Occupational Evaluation.

This tool ranks occupations on their ability to satisfy search criteria users select from a menu of demographic characteristics and labor market performance metrics, which include online ad volume as a measure. Results can help users better understand the nature and composition of Texas occupations that typically employ the populations they serve or other populations of interest. Similarly, this tool can also help them identify key growth industries in a region and determine critical “targeted” occupations worthy of regional educational and training investments.

15 Occupational Evaluation for the State of Texas. SOCRATES. http://socrates.almci.state.tx.us/iSocrates/OCCUVAL/OccuvallIndex.asp
Promising Practices in Leveraging Real-Time Labor Market Information

For each variable (or criterion), users can assign weights from 0 to 5 to indicate the level of importance. Variables with a value of 5 are given greater consideration than criteria assigned a lower value. Users can further refine their results by sub-state region, wage range and education level. Once users have defined their search parameters, SOCRATES will return a summary report ranking, in descending order, occupations that best meet all specified criteria. Users can also generate a detailed report which shows the underlying data behind the overall rankings.

The ranked occupations may not form an “in-demand” list within the WIOA context, but Texas’s approach toward returning a list of best-fit occupations is similar to those used by other states like New Jersey. Moreover, SOCRATES users can simulate a list of demand occupations by prioritizing conventional demand indicators, such as “Local Annual Openings Due to Growth 2010-2020” and emerging demand indicators like online ad volume.
4. Developing Occupational Profiles

Occupational profiles are tools that succinctly convey information about a job. They are intended to help job seekers, students, and education and training institutions understand the occupations and make informed career and curriculum decisions. Occupational profiles typically describe:

- The nature of the work;
- Size of the workforce;
- Demand for workers;
- The industries in which jobs are located;
- Geographic location of jobs;
- Types of employers; and
- Pay range.

Much of this occupational information can be gleaned from sources of traditional LMI, the most common of which are:

- **Occupational Information Network (O*NET).** O*NET OnLine, supported by the U.S. Department of Labor/Employment and Training Administration, contains detailed reports on more than 950 U.S. occupations. These reports describe the abilities, skills, and knowledge that employers generally require; compatible interests; work context; tools and technologies; and more. This information is gathered from routinely administered nationwide surveys of businesses and workers, analyst ratings, and occupational research. O*NET occupation reports are gradually updated over a ten year cycle; therefore some reports offer more current information than others.

- **Occupational Outlook Handbook.** The U.S. Bureau of Labor Statistics (BLS) publishes a compendium of information on hundreds of U.S. occupations that is updated gradually over a 10-year period. Each profiled occupation in the Handbook details the nature of the work, the work environment, how to enter the field, pay estimates, employment outlook, and similar occupations.

- Wage data reported in O*NET OnLine and in the Handbook are derived from the Occupational Employment Statistics (OES) program. Information from both O*NET and the Occupational Outlook Handbook are national in scope.

- **State resources.** OES Survey findings are reported at the state and regional levels, and where available, at the metropolitan and county levels. States use this data to estimate current employment and wages, project future employment, generalize education and skill requirements, and identify industry staffing patterns.
Promising Practices in Leveraging Real-Time Labor Market Information

These popular sources of traditional LMI have many strengths. They use rigorous survey methods, offer detailed descriptions of occupations, and are a reliable source for information on pay by occupation. The process of gathering, analyzing, scrubbing, benchmarking, and reporting information can have some lag time – on average six months.

Also, traditional LMI does not capture data on emerging occupational trends. As a result, traditional methods may overlook immediate workforce needs. This is especially true in fields that are heavily influenced by disruptive technological advances, such as in the field of information technology.

Real-Time Labor Market Information

To supplement traditional LMI and obtain data on current employer demands, the federal government and many states consult additional LMI sources for career exploration that incorporate information about occupations. Real-time labor market information is one of the sources that many states have begun to incorporate in recent years.

Real-time LMI is most often used to describe interactive web-based platforms that scrape and de-duplicate online job postings and then make them available in a database for analysis. Ads can be filtered by certain attributes, or data elements, like education level, certifications, occupation class, and location. Searches for information can also be done by key word. Websites that aggregate job postings and collect worker information from online surveys or uploaded resumes (such as PayScale, Inc., Glassdoor, or LinkedIn) are other examples of real-time LMI.

Real-time LMI can offer greater geographic specificity, and maybe be more up-to-date on new and emerging jobs. For any given occupation, users can explore which employers are currently advertising, who has advertised in the past, and the skills and education those employers seek. Some real-time LMI vendors also offer information such as how difficult it is for employers to find qualified talent, and whether the work is mostly seasonal, salaried, part-time, and so on.

Results can be used to make inferences about local demand and hiring practices. Users can examine individual ads to gain insights into how employers describe a job and how job titles, talent demands, or a job description can vary among employers advertising for a given occupation. Ad volume, especially in populous jurisdictions, may be considered as an indicator of employer demand. Combined with traditional LMI, real-time data help to present an occupational profile that is more targeted, current, and complete.

Below are several examples of occupational profiles that use real-time LMI in conjunction with traditional sources.
Examples

New York State

The New York City Labor Market Information Service (NYCLMIS) was an early adopter of this approach to combine traditional and real-time LMI. NYCLMIS first explored the applications of real-time LMI when it developed a series of occupational profiles with the New York State Department of Labor (NYSDOL) for select “green” jobs in the state. NYCLMIS and NYSDOL surveyed businesses and consulted traditional LMI to better understand emerging green jobs and new “green” demands placed on existing ones. They also needed a source that was able to keep current with the evolving nature of the field. With job ads updated daily and serving as an indication of hiring demand, they discovered real-time LMI could complement, validate, and enhance their findings.

The occupational spotlight shown below incorporates all three sources: traditional LMI, an employer survey, and real-time LMI.

New York State Green Occupation Spotlight

Construction Managers

What do they do?
Conduct industry (usually through subordinate supervision or personnel) activities concerned with the construction and maintenance of structures, facilities, and systems. Participate in the conceptual development of a construction project and oversee its organization, scheduling, budgeting and implementation.

What is a typical entry-level wage?
$56.59 hourly, $117,710 annually

How should I prepare for the job?
Construction managers must typically have a bachelor’s degree and on-the-job experience in the construction industry.

What types of employers might hire me?
A majority of construction managers are self-employed. Salaried construction managers are usually employed by construction companies with some employed by architectural-engineering, and related firms.

Where can I get training?
- Columbia University in the City of New York
- Pratt Institute
- City College of New York
- Erie Community College
- Alfred State College

Green Description
How many construction managers are involved in green business in New York State?
In construction trades, almost 5,400 green construction managers work at 2,180 businesses.

What do employers say about recruiting them?
11% of businesses in construction trades that hire green construction managers report having difficulty recruiting qualified workers for these jobs.

What kind of green activities would I do?
Almost all of green construction managers are involved in energy efficiency projects, such as retrofitting or new construction. A third of these managers are also involved in renewable energy projects, involving solar and/or geothermal energy.

How would I get the skills to do green projects?
Almost all firms in construction trades that hire construction managers require employees to acquire new enhanced skills to perform a green job. The most common source of these skills is on-the-job training, followed by training through a professional trade association.

For more Information about this occupation go to:
- www.onetonline.org/link?sum=11-9011.00
- www.laborstats.nysed.gov/ọcr/ọct/19021.htm
- www.nccerszone.org/c2/profile.jsp?netcore=11-9021.00

Case Study
Construction Managers in the green economy make sure that the work is done according to specifications, whether it’s new construction, renovation, weatherization or installation of renewable energy technologies, such as solar panels. They supervise staff and oversee contracts. They handle contracts and other agreements. Most importantly, they check on the quality of work, and in the words of one green construction manager, “make sure the work is done in a proper way” and to progressing.

They deal with customers, tenants and owners and mitigate problems while “trying to keep everybody happy and keep the work flowing.” They also handle post-inspection quality assurance.

Large construction companies want a construction manager to have a bachelor’s degree. As one said, “It’s not like 50 years ago where a guy could drop his tool belt and become a career senior manager. The industry has become too sophisticated and the industry standards need to be learned in a classroom setting.”

For more information about green jobs, go to:
- Green Careers NY: www.greencareerny.com

Real-Time LMI: Job Ad Geographic Distribution

Source: Geographic Editions, AAMc, 2012-011
New York City

Following its work with the New York State Department of Labor on green jobs, NYCLMIS began to combine real-time LMI with traditional LMI in all of its occupational profiles. As part of an in-depth report on traveler accommodation in New York City, NYCLMIS prepared a series of profiles on key occupations in the industry. Each profile blends findings from OES data, occupational information from O*NET, employer interviews, and real-time LMI. An example, Guest Service Agents, is shown below.
These insights offered a more detailed and refined analysis of local industry employment than what was previously available to the public.

NYCLMIS now combines real-time LMI into all occupational profiles as a standard practice, and these profiles include many of the elements showcased on the previous page: wages and employment trends, job characteristics, employee characteristics and qualifications (including required education, training, and/or licensing), the abilities and skills necessary to be successful in the occupation, and the volume of online listings.

To learn more about these profiles or view others, visit the NYCLMIS occupational profile page: http://www.gc.cuny.edu/lmis/information_tools/occupational_profiles.
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California

The California Employment Development Department publishes a series of interactive profiles on its website for nearly every major occupation in the state. The data underlying these profiles is linked to an assortment of LMI sources: OES data, job bank data, relevant licensing authorities, business and training program directories, O*NET, and more.

These web-based profiles are dynamic and interactive. Most information fields appear to be auto-populated and synced to external sources. Each section links to webpages containing additional information. Each profile contains a section where visitors can explore local job openings for that position.

These automated features probably lend themselves well to mass producing material. This one-size fits all approach is effective for conveying some information about a lot of jobs, especially where job seekers and career counselors are the intended audience.

To explore California’s portfolio of interactive occupations profiles, visit: http://www.labormarketinfo.edd.ca.gov/cgi/databrowing/occExplorerQSSelection.asp?menuchoice=occExplorer.
Kansas

Kansas also publishes dynamic and interactive profiles for most major occupations in the state. Each report contains a combination of traditional and real-time sources. These profiles appear to be generated from a standard template, like California. They are highly detailed and present occupational information using a combination of interactive narrative text, tables, maps, and graphs. The details displayed in a given profile are too numerous to showcase here in full. Below are some examples of key profile features:

Mostly traditional LMI:

![Promising Practices in Leveraging Real-Time Labor Market Information]

Mostly real-time LMI:

![Promising Practices in Leveraging Real-Time Labor Market Information]
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To view the complete occupational profile or profiles of other Kansas occupations, visit the Kansas Labor Information Center:


**Summary**

These examples from New York, California, and Kansas illustrate different ways that real-time LMI can complement traditional LMI and other sources in developing occupational profiles. In fact, real-time LMI contains most elements that are central to any occupational profile. Demand for workers is measured by ad volume. The geographic distribution of ads shows where job opportunities are greatest, down to the city or county level (see: New York). (This level of geographic specificity is unmatched by nearly all other LMI sources.) Ad volume distribution can also identify top advertising employers (see: Kansas) as well as other top attributes, such as education, certifications, advertised pay (if pay is indeed advertised), etc., that are unique to a given occupation. The nature of the work can be ascertained from a scan of job descriptions. Finally, profiles can directly link to job boards and exchanges to allow readers to view underlying postings in real time (see: California).

Altogether, real-time LMI insights can build upon traditional LMI to present a well-rounded portrayal of occupations.
5. Supporting Industry Sector Strategies

Sector strategies — regional, industry-based approaches to developing skilled workforces — are effective ways to align service providers to address the talent needs of employers. They enable workers to receive the training necessary to begin a job with career advancement potential, and allow employers to find the workers with the skills they need to remain competitive and grow. Recognizing that sector-based strategies can move regions toward longer-term, systemic collaboration and improved competitiveness, state and federal governments have increasingly invested in sector development initiatives and scaling effective transformational models. Due to the long-term nature of sector strategies, employment projections are a key variable in the initial analysis, which always begins with traditional LMI. Real-time LMI can be a valuable supplemental resource throughout the sector development process, helping to contextualize regional in-demand industries and enhance engagement among regional workforce development stakeholders.

### Identifying Target Industries and Occupations

Collecting and analyzing labor market data is often the first step in developing a sector strategy. It forms the basis for identifying target sectors, building consensus among regional employers, and aligning training with workforce needs. Since each LMI data resource contains inherent strengths and limitations, the best practice is for stakeholders to analyze multiple measures and then build consensus around data thresholds and regional priorities. Data analysis begins with a high-level examination of broad industry activity within a region, drilling down into critical occupations within important industries, and mapping critical skills and career advancement pathways for workers within those occupations.

For industries and occupations, critical traditional labor market indicators include:

- The relative size of an industry in a region based on employment totals
- The concentration of an industry in a region, measured by location quotient
- Recent and projected employment growth


17 The per-capita concentration of an industry in a region compared to the national average. Industries with a location quotient above 1.0 are more concentrated than the national average.
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- Salary or wages
- The number of business establishments in a region, and the average jobs per establishment
- The distribution of occupations within an industry
- Annual job openings due to growth and replacement

Real-time LMI can further contextualize sector demand by providing:

- Online posting trends and current openings
- Occupations and job titles in demand
- Baseline and specialized skills in demand
- Individual employers in need of workers

To identify important industries in a region, it is helpful to organize this data in a fashion that helps determine whether an industry pays competitive wages, employs a significant number of regional workers, and has experienced recent growth or is projected to grow. Location quotient is also an important indicator of how prevalent or competitive an industry is in a region; a highly concentrated industry makes the area more attractive to prospective employers and can indicate positive employment prospects for job seekers.

The Lancaster, Pennsylvania Workforce Investment Board (WIB) illustrates one way to visualize multiple measures of high-level industry data. In the table below, the size of the bubble indicates the number of people employed, the vertical axis measures projected employment growth, and the horizontal axis represents the location quotient of the industry.
This chart, based on traditional LMI, indicates that Healthcare, Builders and Contractors, and Wholesale Trade are industries with positive growth projections, substantial regional employment, and high concentration in the area, making them potential target sectors for development. The Lancaster WIB performed additional research into specific occupations within these industries paying high wages and with large numbers of average annual openings to further refine their sector development targets.18

The KentuckianaWorks Workforce Investment Board in Louisville, Kentucky provides another example of how to display data from multiple sources to understand the types of jobs within a target industry sector. Examining the healthcare industry, they identified the types of healthcare organizations employing large numbers of workers, the largest occupations within the industry, and then supplemented it with job posting activity in those occupations. By dividing the industry into “acute care” and “long-term care” roles, they were able to determine how to organize their employer outreach and workforce training efforts within the sector.

18http://www.lancastercountywib.com/images/Top%20100%20Jobs%20in%20Lancaster%20County%202014.pdf
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**Industry**

**Occupation**
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Job Postings

HEALTHCARE JOBS BY TOP JOB POSTINGS
LOUISVILLE MSA
Verifying Data with Stakeholders

Local workforce development stakeholders play a critical role in developing sector strategies. They can offer unique insights that can both complement and verify major takeaways from traditional and real-time LMI. This information can help ensure the regional framework will be responsive to localized needs.

In addition to in-depth sector analysis, traditional and real-time LMI can spark important discussions and enhance engagement among regional sector development partners. Different data sources can tell different stories about activity within an industry or a set of occupations, so it is imperative to integrate qualitative local insight into any sector strategy.

Important stakeholders include:

- Employers and Industry Organizations
- Workforce Development – Workforce Investment Boards, Career Center Leaders
- Economic Development/Business Councils
- Educational Institutions (K-12, Community Colleges, 4-Year Schools)
- Community Based Organizations/Direct Service Providers
- Organized Labor or Labor/Management Councils

Stakeholder convenings should discuss:

- Data thresholds for target occupations, such as wages, growth, and required education
- Agreement on important industries, occupations, and skills
- Existing regional development priorities
- Assessments of what feels “real” based on regional knowledge
- On-the-ground knowledge not captured in the data
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### Translating Data into Career Development Pathways

In addition to helping define industry sectors and important occupations, real-time LMI can be incorporated into sector-driven career development resources. Career pathway maps are usually conceptualized as a progression of credentials, but to employers, credentials and certifications are only as valuable as the knowledge, skills, and abilities they attest for a potential employee. The O*NET database contains a robust list of knowledge, skills, and abilities for each occupation and is an important starting point for understanding job competencies. Real-time LMI can supplement those components of the O*NET database by presenting career advancement in terms of a progression of skills and/or job titles within an O*NET/SOC category, as well as a progression of credentials, based on prior work history and credentials held by current workers in a key occupation or on credentials specified in job postings. The JP Morgan Chase New Skills at Work Project includes examples of industry sector-based career pathways incorporating transferable skills. In addition, the sector-based career pathways published by KentuckianaWorks demonstrate how to include real-time job postings for their featured occupations.
## Promising Practices in Leveraging Real-Time Labor Market Information

### INSURANCE PATHWAY

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Columbus MSA Wage (median hourly wage)</th>
<th>Industry Valued Certification</th>
<th>Skills and Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underwriter</td>
<td>$30.81</td>
<td>Bachelor’s degree, Chartered Property Casualty Underwriter, Associate in Underwriting, Chartered Life Underwriter, Registered Professional Liability Underwriter</td>
<td>Customer service; legal/compliance rules for claims, underwriting, liability and compensation assessment, workers compensation, negotiation, medical coding; operations monitoring</td>
</tr>
<tr>
<td>Insurance Claims Specialist</td>
<td>$29.15</td>
<td>Associate’s degree, Bachelor’s degree for advancement; No license or certification required in Ohio</td>
<td>Customer Service: Sales, negotiation</td>
</tr>
<tr>
<td>Insurance Sales Agent</td>
<td>$26.30</td>
<td>Associate’s degree for agent, Bachelor’s degree for manager, Accredited Adviser in Insurance, Certified Professional Insurance Agent, Chartered Property Casualty Underwriter, Certified Risk Manager</td>
<td>Sales: Operation and administrative management, business development, telemarketing, product demonstration; insurance underwriting rules and insurance products</td>
</tr>
<tr>
<td>Auto Damage Appraiser</td>
<td>$23.54</td>
<td>Legal and compliance rules for claims adjustments; inspection and estimating automotive repair; negotiation</td>
<td></td>
</tr>
<tr>
<td>Claims Representative</td>
<td>$22.41</td>
<td>Associate’s degree, Bachelor’s degree for advancement; no license or certification required in Ohio</td>
<td></td>
</tr>
<tr>
<td>Underwriting Assistant</td>
<td>$14.34</td>
<td>Administrative Support: Underwriting rules, document management, claims processes, scheduling, billing inquiries and systems</td>
<td></td>
</tr>
<tr>
<td>Insurance Claims Clerk</td>
<td>$17.81</td>
<td>No license or certification required in Ohio</td>
<td>Administrative Support: Underwriting rules, document management, claims processes, scheduling, billing inquiries and systems</td>
</tr>
<tr>
<td>Customer Service Representative</td>
<td>$15.29</td>
<td>Professional certification</td>
<td></td>
</tr>
</tbody>
</table>

Sources: Adapted from Insurancenations.org, data drawn from Burning Glass and EMSL. Median wage for Columbus MSA is from Bureau of Labor Statistics.

### Promising Practices in Leveraging Real-Time Labor Market Information

**Health Enterprises and Lifelong Wellness & Aging Career Pathways**  
Louisville Metropolitan Statistical Area • July - September 2014

<table>
<thead>
<tr>
<th>Degree Level</th>
<th>Title of Role</th>
<th>Direct Patient Care</th>
<th>Diagnostic/Therapeutic</th>
<th>Administrative/Corporate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Doctoral or Professional Degree</strong></td>
<td>Physician and Surgeons; Physical Therapists; Audiologists; Family and General Practitioners</td>
<td><strong>151 JOB POSTINGS</strong></td>
<td><strong>32 JOB POSTINGS</strong></td>
<td><strong>Healthcare Lawyers</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$55.40 to $72.74 HOURLY RATE</td>
<td>$55.71 to $72.82 HOURLY RATE</td>
<td>$34.68 to $53.83 HOURLY RATE</td>
</tr>
<tr>
<td><strong>Master’s Degree</strong></td>
<td>Nurse Practitioners; Occupational Therapists; Physical Assistants; Nurse Anesthetists; Speech Language Pathologists</td>
<td><strong>290 JOB POSTINGS</strong></td>
<td><strong>48 JOB POSTINGS</strong></td>
<td><strong>Healthcare Social Workers, Statisticians</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$36.11 to $48.74 HOURLY RATE</td>
<td>$13.75 to $18.91 HOURLY RATE</td>
<td>$20.00 to $28.96 HOURLY RATE</td>
</tr>
<tr>
<td><strong>BA/BS (4 YRS)</strong></td>
<td>Directors of Nursing</td>
<td><strong>290 JOB POSTINGS</strong></td>
<td><strong>74 JOB POSTINGS</strong></td>
<td><strong>Systems Analysts; Accounting Analysts; Business Office Managers; Human Resources Specialists; Human Resources Managers; Marketing Managers; Marketing Coordinators; Information Technology Managers; Network Engineers; Risk Analysts; Financial Analysts</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$32.74 to $53.03 HOURLY RATE</td>
<td>$24.30 to $32.33 HOURLY RATE</td>
<td>$23.27 to $37.96 HOURLY RATE</td>
</tr>
<tr>
<td><strong>Associate Degree (2 YRS)</strong></td>
<td>Registered Nurses; Physical and Occupational Therapist Assistants; Respiratory Therapists; Sonographers; Cardiovascular Technicians.</td>
<td><strong>1,231 JOB POSTINGS</strong></td>
<td><strong>95 JOB POSTINGS</strong></td>
<td><strong>Executive Assistants</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$24.08 to $33.66 HOURLY RATE</td>
<td>$20.83 to $28.98 HOURLY RATE</td>
<td>$16.89 to $23.67 HOURLY RATE</td>
</tr>
<tr>
<td><strong>Certificate (1-2 YRS)</strong></td>
<td>Nursing Assistants; Emergency Technicians and Paramedics; Medical Assistants; Licensed Nurses</td>
<td><strong>926 JOB POSTINGS</strong></td>
<td><strong>134 JOB POSTINGS</strong></td>
<td><strong>Medical Transcriptionists; Medical Records Clerks</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$12.05 to $16.14 HOURLY RATE</td>
<td>$14.30 to $19.23 HOURLY RATE</td>
<td>$12.22 to $17.96 HOURLY RATE</td>
</tr>
<tr>
<td><strong>High School or GED</strong></td>
<td>Physical Therapist Aides; Patient Transienters; Sterile Processing Technicians; Endoscopy Technicians; Emergency Room Technicians</td>
<td><strong>335 POSTINGS</strong></td>
<td><strong>116 JOB POSTINGS</strong></td>
<td><strong>Medical Receptionists; Bookkeepers; Telephone Operators; Office Managers; Customer Service Representatives</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$14.27 to $21.37 HOURLY RATE</td>
<td>$59.60 to $12.80 HOURLY RATE</td>
<td>$14.26 to $21.39 HOURLY RATE</td>
</tr>
</tbody>
</table>

**Sources:** Job postings data come from Burning Glass Labor Insight job postings. 2/14 through 9/01/14, discounted by 20 percent to account for possible duplication. All other data from Emsi Analyst for 2013-2014. Numbers are not guarantees of job placement. Some occupations may be underrepresented in online job postings.

6. Aligning Education and Training Investments and Programs

States and regions are adopting innovative economic and workforce development strategies that depend on postsecondary institutions graduating workers with the skills sought by area employers. Keeping training programs aligned with dynamic labor market environments and changing skill requirements is a challenging but critical imperative for education providers. Students need to be able to invest in their education with the confidence that they will learn the skills and competencies necessary to compete for jobs. Understanding local labor market demand helps training providers to strategically plan and review their program offerings to match the needed learning outcomes. Labor market data sources, including real-time LMI, can complement the existing work of faculty and industry advisory panels that determine the content of programs of study and workforce development offerings.

At present, those looking to align training programs with labor market demand typically use traditional labor market information to get the data they need. Training providers seeking to learn more about the requirements of different occupations start with O*NET OnLine. Using national survey data, O*NET provides extensive lists of tasks, required tools and technology, knowledge, skills, abilities, work activities, and workplace context for each occupation in its database. O*NET also lists the education level of workers in those occupations, along with an estimate of related work experience. In addition, the site includes links to relevant professional associations, local training programs, and job openings listed on state job boards. O*NET OnLine also contains an education program to occupation crosswalk (based on the Classification of Instructional Programs [CIP]), which maps education and training programs to the occupations with which they are potentially aligned.

The Department of Labor also operates a Competency Model Clearinghouse site online with more than 20 industry competency models, developed in partnership with industry associations, educators, and labor and workforce professionals. The site also contains an interactive tool for customizing the models and several worksheets to use the competency information from the models to verify or validate skill needs with local employers and to align curriculum to those needs. Case summaries on the site document examples of how the Geospatial Technology model was used for this purpose. Real-time LMI as well as direct employer input is useful in developing and/or customizing such industry competency models:

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19 [https://www.onetonline.org/](https://www.onetonline.org/)
Employers are an additional resource for helping postsecondary institutions and training providers understand in-demand skills and job classifications. In addition to meeting with industry advisory boards of local employers, employers themselves (either individually or collectively) can publish learning outcomes and important in-demand skills based on their own surveys and research. As an example, the Association for Computing Machinery publishes curriculum guidelines for a range of information technology occupations at both the undergraduate and two-year college levels. The Manufacturing Institute also publishes a

[21] https://www.acm.org/education/curricula-recommendations
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series of guides and resources targeted at helping educators understand how to train future workers with the skills necessary to populate a talent pipeline. These resources are often free, and can give colleges a baseline for in-demand skills that they can test with their own employers.

Real-time LMI is a valuable complement to the different components of the skills mapping processes mentioned above. It can complement the O*NET job classifications and industry-produced curriculum guides by providing lists of current, in-demand skills from jobs posted online by local employers. To help connect a set of occupations to training programs, real-time LMI software provides ways to search job postings by education levels, occupational family, or job postings advertising for a specific set of skills. For colleges forming industry advisory boards, real-time LMI can help identify top advertising local employers to consult. For colleges with existing industry advisory boards, job postings can help enhance the value of discussions by presenting employers with lists of advertised skills and job titles and asking them to provide additional context. Real-time LMI can also expand industry advisory groups by identifying hiring employers from industries that may not sit on existing review boards.

Understanding the most important in-demand skills, competencies, and learning outcomes to include in a training program involves a collective, team-based approach on the part of an institution. Any effort to align an education or training program with local demand needs to incorporate feedback from key stakeholders across the institution to ensure implementation support. Faculty members, deans, curriculum planning committees, and institutional research staff have their own understanding of their local labor market. Staff members also understand institutional policies, their curricular review procedures, and the equipment and classroom capacities available.

Once institutional staff identifies in-demand skills and learning outcomes, the staff team can also “map” skills to the programs in their course curriculum, along with skills or learning outcomes that need to be added. The mapping exercise can help organize lists of important skills from both traditional and real-time resources, provide a set of questions or items for further review with employers, and document the alignment between course offerings and local employer demand. Here’s one example from Washington County Community College in Maine:

### Promising Practices in Leveraging Real-Time Labor Market Information

#### WCCC Computer Technology

<table>
<thead>
<tr>
<th>Learning Objectives</th>
<th>Curriculum/Software Taught</th>
<th>Faculty Comments</th>
<th>Exam</th>
<th>Employer Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication, verbal, written, and listening skills</td>
<td>ENG 101 and ENG 110</td>
<td>&quot;Cannot stress enough how important these are.&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organization</td>
<td>CO 200 and CO 210</td>
<td>&quot;Part of IT Certification.&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generic Soft.</td>
<td>CTT 100 and CTT 150</td>
<td>&quot;This is critical to success in IT.&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem solving skill</td>
<td>CTT course</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analytical Skills</td>
<td>CTT course, MAT 217 and MAT 227</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confidentiality</td>
<td>CTT 160 and CTT 150</td>
<td>&quot;Be prepared, etc. Demands this. IT is often exposed to confidential information.&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliability</td>
<td>All CTT courses and FYE 100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teamwork</td>
<td>All CTT courses and FYE 100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diversity</td>
<td>FYE 100, Humanities Literacy and WCCC Code of Conduct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organization</td>
<td>All CTT courses, FYE 100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software/IT Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS Office</td>
<td>CTT 110, CTT 250, Microsoft Academy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SQL</td>
<td>CTT 250, CTT 255</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cisco (Routers, Switches, ASA)</td>
<td>CTT 150, CTT 245</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security</td>
<td>CTT 150, CTT 245</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network Security</td>
<td>Course delivered through CMCC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtualization (VMware Player, ESX, Virtual Box, Hyper-V)</td>
<td>CTT 270</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Database (MS SQL)</td>
<td>CTT 120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Programming</td>
<td>CTT 120</td>
<td></td>
<td>&quot;Add HTML for web development.&quot;</td>
<td></td>
</tr>
</tbody>
</table>

#### Tasks and Technology

| Visual Studio programming environment | CTT 150, CTT 155 | | | |
| Terminal emulators and remote development | CTT 150, CTT 155 | | | |
| PC Tech Troubleshooters, Power supply testers | CTT 150, CTT 155 | | | |
| Network Test Tools: Cable testers, Cable testers, Network scanners, Punch-down tools | CTT 150 | | | |
| Microsoft tools and utilities for diagnostics and performance | CTT 150, CTT 155 | | | |
| Virtual machine (VirtualBox) | CTT 270 | | | |
| Racks, PDAs, UPS, cable management, power management | CTT 150, CTT 155 | | | |
| FC components (DHX, RAN, Disk, Network) | CTT 150 | | | |
| BIOS | CTT 250 | | | |

#### Tasks and Task Activities

| Install and configure basic routing | CTT 155, CTT 245 | | | |
| Install and configure basic NAT | CTT 155, CTT 245 | | | |
| Install and configure DHCP | CTT 155, CTT 245 | | | |
| Install and configure basic network switch | CTT 155, CTT 245 | | | |
| Configure a VLAN | CTT 155, CTT 245 | | | |
| Install Windows XP from DVD and from PXE image | CTT 155 | | | |
| Install and configure wireless network firewall, router, security gateway, Office and other software | CTT 150, CTT 150 | | | |
| Install PKI, create and maintain X.509, digital signature | CTT 270 | | | |

#### Needs Improvement

- Needs improvement
Promising Practices in Leveraging Real-Time Labor Market Information

As a result of this mapping exercise, training provider teams can either confirm that the skills and learning outcomes in their curricula are aligned with local labor market demand, or they can recommend changes: combining programs, creating new ones, or introducing additional modules into a program.

7. Developing Career Maps and Career Pathways

Introduction
Traditional labor market information offers a great deal of data on occupations. It tells us how many people work in each occupation and what each occupation pays at the entry, median, and experienced levels. It offers information on the knowledge, skills, abilities, and typical education and experience requirements for each occupation. It shows which occupations are related to other occupations.

Many career maps that have been developed by educators and others tend to be aspirational – they reflect career trajectories as we would ideally like to see them. Understanding which jobs actually lead to careers and what real career progressions look like can help students, job seekers, and incumbent workers set short- and long-term goals when planning for the future. It can also help career and guidance counselors to give advice to students and job seekers based on real-life experiences. But, where can we get data on actual career paths?

Fortunately, with the rising popularity of “big data,” large datasets of work histories are becoming increasingly accessible. It is now common practice for people to post resumes on jobs boards and social media sites or to complete online surveys that collect and store respondents’ work histories.

These sources capture large quantities of actual work histories, and they can be used to help ascertain common career progressions. Used in combination with traditional LMI, this data can help to map career pathways in a more data-driven way.

With growing access to these new big data sources, workforce researchers and practitioners now have the means to explore the utility of these real-time sources in depicting real-life career pathways and transitions. Below are examples of some recent efforts.

Examples

The City University of New York

The City University of New York (CUNY) serves over 500,000 degree and continuing education students in 24 colleges on 17 campuses throughout New York City. CUNY houses the New York City Labor Market Information Service (NYCLMIS), which was begun in 2008 as a joint initiative of the New York City Workforce Investment Board and CUNY, and is located at the CUNY Graduate Center.

Through the CUNY CareerPATH program, the NYCLMIS worked to develop data-driven career maps that span 10-15 years of work experience for three common entry-level jobs: Medical Assistant, Home Health Aide, and Cook. To access work histories for each of these base jobs, CUNY turned to Monster
Promising Practices in Leveraging Real-Time Labor Market Information

Government Solutions and Payscale.com, an online resource for job seekers and employers to obtain current information about compensation. According to PayScale, each day thousands of people visit its website and take its salary survey online. While responses are gathered primarily to inform salary estimates, they are also stored in a database for later analysis.

In the online survey, PayScale respondents are asked to provide detailed information about their education and work experiences, including their current job and the job they held five years before. At the request of the NYCLMIS and Monster Government Solutions, PayScale used this information to trace a five-year progression for each base job. For example, for the Home Health Aide career map, PayScale generated information on everyone who completed their survey in New York State who:

- Said their job five years ago was Home Health Aide
- Had less than five years’ experience at that time

PayScale then identified the three most common occupations in the present held by people who said they were Medical Assistants five years ago.

This process was repeated to get the 10-year progressions, pulling everyone who said their job five years before was one of the three most common occupations, and had less than 10 years’ experience at that time. PayScale also provided information on the percentages of people who were in these occupations five and ten years later.23

Once career pathways for each occupation were clearly delineated, the NYCLMIS discussed and validated the findings with industry experts. A career map was developed that included not only career paths, but descriptions of the jobs and information on salary ranges, typical education, and whether licensing or certification was required for the job. This information was derived from both traditional and real-time LMI sources. CUNY then contracted with a graphic designer to present the information in an attractive and reader-friendly format.

The final product took the form of a trifold brochure, which contained an inside spread featuring an illustration of the career progression. An excerpt of the map for Home Health Aides is featured below. Other pages contained narratives with introductory language and detailed descriptions.

23 For a more detailed description of the results and mapping methodology, visit www.gc.cuny/lmis and look for CUNY CareerPATH Career Maps.
The Solar Foundation®

The Solar Foundation® (TSF) also worked with Monster Government Solutions and PayScale.com to map out a career pathway for Solar Photovoltaic (solar panel) installers. Similar to the CUNY-NYCLMIS approach, TSF leveraged PayScale’s stored data on work histories in order to trace actual progressions. Unlike CUNY-NYCLMIS, however, this map also wanted to explore common careers both before and after becoming a solar panel installer. Accordingly, TSF drew data on the most commonly held occupations prior to becoming a solar installer (within five years) as well as the most common transitions that follow solar photovoltaic work. These real-time vendors also provided data on wages, skills, and employment. Results are summarized in the following infographic:
Promising Practices in Leveraging Real-Time Labor Market Information

**Burning Glass Technologies, Harvard Business School, and Accenture**

As part of a project with Harvard Business School and Accenture that investigated “middle-skill” jobs and their impact on U.S. competitiveness, Burning Glass Technologies used another source of big data to identify career pathways. The source was resume data obtained by Burning Glass from a variety of sources, with approximately 7 million resumes to look at. Using its own proprietary resume parser software, Burning Glass began with Retail Sales Associate and looked at the employment history on the resumes to begin to identify common next-step transitions.

Burning Glass tried to identify the likelihood of transitions based on skills. They looked at the skill sets in Job A compared to the skill sets in Job B. This helped to identify what skills people need to move from Job A to Job B.

For the career map, resume data was combined with other sources of data on employer demand and wages/salaries. Demand data for each transition job that falls along the career progression was culled from Burning Glass’s database of online job postings. Burning Glass generally uses the BLS OES data for wage estimates and derives wage distributions from online ads when traditional LMI is unavailable. They perform industry validation of the data before developing the career map. Concerned with any
“gating” factors that could impact career progression (e.g., such as required education or a particular credential, license, or certification that would stand in the way of skills-based progression), Burning Glass validated its findings with industry experts.

The project with Harvard University and Accenture was to visualize several middle-skill career pathways. The example below was developed for retail careers:

This map begins with an entry-level position and then identifies the three top transition jobs that typically follow. From there, Burning Glass profiles the top roles people may advance into with the addition of new skills.

**Summary**
This section has given examples of career maps that use a combination of “big data” derived from real-time LMI sources, traditional LMI, and validation with industry experts to give a reality-based picture. These career maps depict real-life transitions using the most up-to-date information. When integrated with robust occupational employment and wage data from traditional sources, real-time career pathways offer important insights into actual career transitions, helping students, workers, and job seekers make data-driven career decisions.
8. Enhancing Career Advising and Service Delivery for Job Seekers

Beyond analytical applications, labor market information can help frontline staff communicate career opportunities directly to job seekers. Understanding the labor market value of obtaining a credential or completing a training program helps job seekers confidently invest their time and resources to enhance their skills. To help individuals navigate their career options and identify training opportunities, traditional and real-time LMI can combine to display clear occupational pathways, wages, required training, and current job openings within a local region. As with the other uses of LMI profiled in this report, vetting labor market information from any resource with local employers, faculty members, and workforce development stakeholders is critical in order to ensure the accuracy and relevance of resulting materials.

The U.S. Department of Labor’s CareerOneStop\(^{24}\) website is one free resource that frontline staff can use to present labor market information to job seekers and help them explore career opportunities. MySkillsMyFuture\(^{25}\), a CareerOneStop website, enables job seekers to identify local job opportunities in their area based on their current or previous jobs. Searching an occupation or job title returns a list of corresponding job opportunities, wages, and typical required education. The website also allows job seekers to “compare” their own skills to those of existing job opportunities in order to identify additional training, licensing, or certifications they might need to acquire. The CareerOneStop website draws labor market information from the O*NET database, and is a valuable resource to help frontline staff communicate career opportunities to job seekers in an organized, easy-to-understand fashion. It also links to real-time resource: actual online job postings.

\(^{24}\) [http://www.careeronestop.org/](http://www.careeronestop.org/)
\(^{25}\) [http://www.myskillsmyfuture.org/](http://www.myskillsmyfuture.org/)
While many labor market information resources such as O*NET and CareerOneStop are publicly available, some career advisors may not be well-acclimated with these myriad LMI resources nor understand their value-add.

In addition to publicly-available websites, some states have purchased licenses with real-time LMI vendors and are training frontline staff in how to use this information in combination with tradition LMI. As part of its Kentucky Workforce Academy training modules, the Commonwealth of Kentucky provides training to its frontline staff to ensure that they have a foundational knowledge of the LMI resources made available by the state, the strengths and weaknesses of traditional and real-time LMI, and the types of information they should convey to job seekers.

A sample Career Center workshop exercise consists of walking job seekers through local employment and unemployment trends, industry trends, occupational trends, job posting trends, and next steps for job seekers.26

26 For more information and additional resources from the Kentucky Workforce Academy, visit http://kysectorstrategies.com/academy/participant-materials
As noted earlier in the Occupational Profiles discussion, a helpful way to display labor market information to job seekers is in the form of a career profile or brochure, combining information from multiple labor market resources into a succinct description of what a job entails, what local opportunities exist, and the training necessary to advance along a career pathway. These career profiles or brochures can be displayed on online, made available in Career Centers, or included as a supplement to traditional course catalogs. The New York City College of Technology profiles Heating and Air Conditioning\textsuperscript{27} and Health Information Technician\textsuperscript{28} careers in a way that links local labor market indicators, demonstrating the value of both careers with existing training opportunities at the school.

\textsuperscript{27} http://www.jff.org/sites/default/files/JFF%2520City%2520Tech%2520Heating%2520AC%2520Technician%2520Best%2520Profile_0_0.pdf

\textsuperscript{28} http://www.jff.org/sites/default/files/JFF%2520City%2520Tech%2520Medical%2520Tech%2520Best%2520Profile_0_0.pdf
Getting a Foot in the Door: What Employers are Looking For

Employers may also refer to me as a(n):
- Heating, Ventilation, Air Conditioning Service Technician (HVAC Service Technician)
- Heating, Ventilation, Air Conditioning, and Refrigeration Technician (HVACR Technician)
- Service Technician
- Heating, Ventilation, Air Conditioning Installer (HVAC Installer)
- HVAC Specialist

Employers in the NYC region include:
- HVAC Contractors such as Interstate Air Conditioning & Heating and Absolute Mechanical
- Hospitals such as Methodist Hospital and NewYork-Presbyterian
- Government Agencies such as New York City Housing Authority (NYCHA) and the Metropolitan Transportation Authority (MTA)
- Universities such as The City University of New York (CUNY) and Columbia University

Getting a Credential that Can Help You Land a Job

HEATING EQUIPMENT TECHNICIAN CERTIFICATE PROGRAM
New York City College of Technology (City Tech) of CUNY • 300 Jay St., Brooklyn, NY 11201
Anthony Treglia, Chairman, Dept. of Environmental Control Technology • 172 Pearl St. (E-206), Brooklyn • 718-260-5160
atreglia@citytech.cuny.edu

Note: The program information on this and the following page was collected in Sept. 2013; it is subject to change over time.

STEP 1: Learn about the program and make sure it's a good fit for your interests, goals, needs, and schedule.
- This 16-credit program admits students twice per year in the fall and spring and takes at least 2 semesters to complete. Classes are typically 3-4 hours per day for 3 days per week. Depending on the semester, classes may be offered in the day and evening.
- No prior knowledge of this kind of work is needed. Students start by learning the underlying principles of heat transfer and then advance to upper-level courses where they learn combustion processes, hydronic systems design, sizing and selection of pumps and domestic hot water systems, wiring practices, testing, service and adjustment of oil and gas-fired heating systems. Students entering this program or City Tech's Air Conditioning Equipment Technician Certificate Program will take the same 3 courses in the first semester.
- The highest level of math used in this program is algebra.
- When you successfully complete the program, you earn a Heating Equipment Technician Certificate of Completion from City Tech. Graduates typically work as heating equipment technicians, outside contractors, or in-house maintenance technicians, and/or continue their studies to earn a degree. This certificate program is part of City Tech's Associate in Applied Science (A.A.S.) Degree Program in Environmental Control Technology, therefore graduates are encouraged to complete the requirements for that degree to improve their job prospects, pay, and opportunities to advance in the industry.

STEP 2: Find out the cost of the program and make sure it's a good fit for your wallet.
V. CONCLUSION

The examples discussed in this report explore just some of the various ways that real-time LMI can be used in combination with traditional forms of LMI to support workforce development strategies and services. As noted in the Introduction, many other promising models for leveraging both traditional and real-time labor market information exist in the field and merit further exploration. As states and local areas expand their use of new data sets, and as new data tools and functionality emerge over time, additional innovations in the use of diverse labor market information sources will no doubt be identified.

To learn more about how state and local workforce development stakeholders are integrating traditional and real-time LMI, please see additional resources developed under ETA’s 2013-2015 real-time LMI technical assistance project:

- [April 2014 webinar](#) on real-time LMI and practitioner usage examples
- [September 2014 environmental scan report](#) on real-time LMI vendors and workforce development users
- [February 2015 webinar](#) on the environmental scan report
- [March 2015 NAWB Forum presentation](#) on enhancing labor market intelligence with real-time LMI
- [June 2015 peer learning exchange](#) on using traditional and real-time LMI to support industry sector strategies

Please also note that additional real-time LMI resources developed under Phase 2 of the technical assistance project, including a fact sheet, a web-based tutorial, and a resource guide, will soon be made available through [ETA’s Labor Market Information Community of Practice](#).