

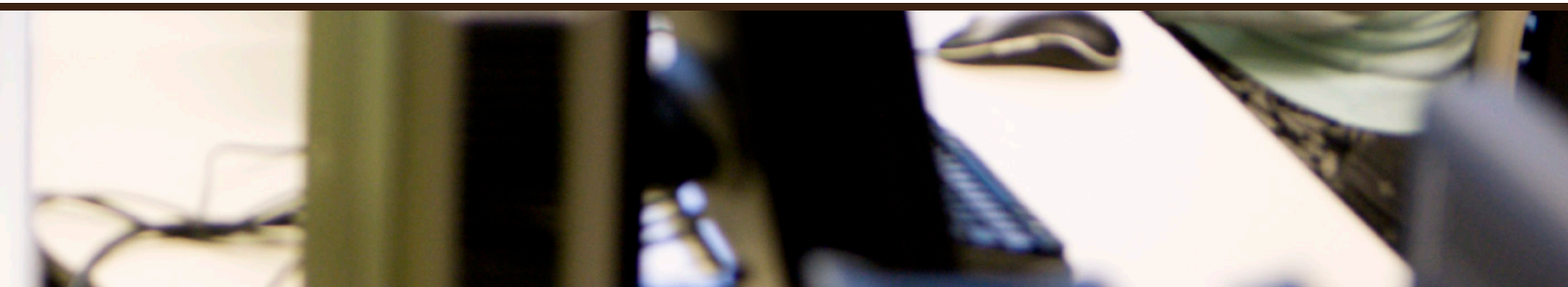


VENDOR PRODUCT REVIEW

A CONSUMER'S GUIDE TO REAL-TIME LABOR MARKET INFORMATION

BY JOHN DORRER AND MYRIAM MILFORT

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JOBS FOR THE FUTURE

Jobs for the Future identifies, develops, and promotes education and workforce strategies that expand opportunity for youth and adults who are struggling to advance in America today. In more than 200 communities across 43 states, JFF improves the pathways leading from high school to college to family-sustaining careers.



Credentials that Work is a JFF initiative that seeks to utilize innovations in the collection and use of real-time labor market information to better align investments in education and training with the needs of the economy. Stronger alignment will ensure that education credentials have high value for both workers and employers.

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ABOUT THE AUTHOR

John Dorrer is a program director in JFF's Building Economic Opportunity Group, which focuses on advancing the education and careers of low-skilled adults and low-wage workers. He leads JFF's emerging work in the development and application of labor market information and workforce research, including helping states use longitudinal data to align their education and training investments with the needs of dynamic regional economies. Mr. Dorrer has 30 years of experience in workforce development. An economist and research administrator, his work has focused on workforce development, human capital, and labor market policies at the state and local levels. He came to JFF from the Maine Department of Labor, where he served as acting commissioner and as director of the Center for Workforce Research and Information for eight years.

Myriam Milfort is a senior project manager in JFF's Building Economic Opportunity Group, where she manages *Credentials that Work*, JFF's emerging work in the development and application of labor market information and workforce research. Before joining JFF, Ms. Milfort served as a Presidential Management Fellow for two offices within the U.S. Department of Labor, where she managed LMI grants for 10 states and oversaw key convenings of state and federal LMI stakeholders. Ms. Milfort previously worked at the Federal Reserve Bank of Boston and J.P. Morgan Chase & Co.

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INTRODUCTION

In recent years, a small number of private, for-profit software companies have developed real-time labor market information tools to transform job postings data into analytics. These firms are aggregating and coding data from job postings based on the North American Industry Classification System (NAICS) and the Standard Occupational Classification (SOC) codes developed by the Bureau of Labor Statistics and the Occupational Information Network (O*NET). They are licensing their data to state and local governments, workforce boards, educational institutions, and economic development and research organizations to enhance the understanding of local labor market conditions.

Jobs for the Future is deeply committed to developing career pathways and guiding individuals to opportunities for advancement in the labor market. Key to that mission is sound information and informed choice. *Credentials that Work*, an initiative led by JFF, uses innovations in real-time labor market data to help institutions better align education and training investments and program and course development with the needs of regional economies. Real-time data can help improve the understanding of hiring trends and employer demand, including certifications and skill requirements, by drawing on current information and consistent signals from the labor market.

As JFF explored real-time LMI tools and systems, it became clear that critical information about them, and the data that supported them, lacked transparency. Unlike most traditional sources of labor market information provided by government agencies, which must disclose their methodologies and data sources, real-time LMI is the byproduct of Internet-based transactions and produced by private vendors operating in competitive markets. This presents a challenge because users of any data source should be aware of the method used to gather the data, the strengths and limitations associated with them, and the assumptions that go into producing reports and analyses. Furthermore, real-time LMI systems lack the details users need to have full confidence, and these systems have not been independently evaluated. For these reasons, JFF reviewed the products of multiple vendors of real-time LMI to assist individuals and institutions considering the adoption of this innovative technology.

To help us evaluate the utility of real-time job postings and analytics gathered for end users, *Credentials that Work* examined the products of several real-time LMI firms. These firms create and market products to human resources staff, public workforce agencies, educational institutions, economic developers, One-Stop Career Centers, and individuals. *Aligning Community Colleges to Their Local Labor Markets*, a study commissioned by *Credentials that Work*, identified seven firms (Altstadt 2011). With the study as a starting point, we focused on six vendors, all of which have extraction, analysis, and de-duplication capabilities. To have an accurate picture

of online postings, the firms included in this report employ complex algorithms to identify and remove duplicate online job postings. Without this ability, labor demand based on real-time LMI would be greatly inflated. This report evaluates:

- > Burning Glass Technologies (EmployOn/Labor Insight);
- > Wanted Technologies/Wanted Analytics;
- > Geographic Solutions;
- > Conference Board/Help Wanted Online (HWOL);
- > Career Builder/Supply-Demand Portal; and
- > Monster Government Solutions/Labor Market Analytics.

The data for this brief were gathered using a 42-question, open-response survey. The survey focused on three key areas:

- > Products and services;
- > Product costs and licensing; and
- > Methodological approach and data-quality procedures.

BACKGROUND

Students, jobseekers, education and training providers, workforce development programs, and employers must assess the performance of labor markets and research employment prospects in order to effectively guide their investments and decisions. Accurate, timely, and reliable information about labor market and employment prospects matters. Despite projections for the U.S. economy to improve for the rest of this year, workers and jobseekers will continue to face formidable market challenges.

An individual's ability to succeed in the labor market is largely driven by the level of education he or she attains. Education is the key to improving one's economic status, and it provides greater insulation from unemployment in times of economic turbulence. For instance, in December 2011, the unemployment rate for workers with less than a high school diploma was 13.8 percent compared to 7.7 percent for workers with some college or an Associate's degree.¹

Not only is getting a postsecondary degree or credential important, but area of study also matters. For example, according to Georgetown University's Center on Workforce and Education, the average lifetime earnings for a computer programmer with an Associate's degree are \$2.7 million, while an elementary or middle school teacher with a Bachelor's degree will make only \$1.8 million (Carnevale, Rose, & Ban 2011). These significant statistical indicators provide an important resource that can help students, parents, and educators align education and training decisions with the needs of the regional economy.

While the availability and quality of labor market information has greatly improved over the years, there remain significant limitations in the availability of timely information about employment opportunities and what jobseekers need to prepare for them. The emergence of real-time labor market information is among the most significant innovations and breakthroughs for assessing labor market performance and interpreting employment needs and requirements. Real-time LMI is labor market intelligence derived from the analysis of job postings and resumes placed into public and private labor exchanges. It is "real time" because it can be pulled from the Internet daily. It is labor market intelligence because it can include supply and demand trends, emerging occupations, current and emerging skill requirements, and market demand for education and certifications (Vollman 2010).

SUMMARY OF SURVEY FINDINGS

PRODUCTS AND SERVICES

- > Respondents provide a wide range of products and services for human resources professionals, public workforce agencies, educational institutions, economic developers, One-Stops, and individuals.
- > Respondents spider a variety of websites, including: corporate sites; newspapers; public and private job boards; and occupation-specific jobs boards.
- > Products and services cover a wide geographic scope, including city, county, Metropolitan Statistical Areas, and state-level data.
- > A small number of real-time LMI firms began collecting job-posting data in 2005. The date range for available data varies by company; analytical data are available between 2005 and 2012.

PRODUCT COST AND LICENSING

- > Real-time LMI technologies are typically available for a fee. Licensing fees vary by product, ranging from \$5,000 to \$10,000 for a single-user, one-year license.

METHODOLOGICAL APPROACH AND DATA-QUALITY PROCEDURES

- > Real-time LMI vendors spider up to 20,000 sites daily.
- > Real-time LMI tools parse up to 4 million job postings daily.
- > Several firms are investigating or provide “supply side” labor market analyses through the collection of resumes.
- > Firms use both automated and manual procedures to scrape and spider job boards, to code various data elements, and for parsing and job matching.
- > Real-time LMI technologies employ procedures to de-duplicate 60 to 90 percent of jobs ads collected. The rate of de-duplication varies by company.
- > All firms surveyed or researched employ complex algorithms to increase integrity and reliability of data provided for analysis and decision making.
- > The firms employ complex parsing, coding, and data-extraction procedures. Proper coding is one of the most critical aspects of turning job ads into analytical reports.

THE SURVEY FINDINGS

Burning Glass Technologies and Geographic Solutions responded to JFF’s survey. Wanted Technologies chose not to participate, citing confidentiality. For Conference Board/Help Wanted Online, JFF gathered most of the requisite information from published technical notes provided on the web.² (The Conference Board is a user of the Wanted Technologies Internet job postings data.) Career Builder did not complete the survey; instead, in August 2011, it responded to several survey questions via a conference call. JFF also learned through its research that Wanted Technologies provides the real-time LMI data for Career Builder’s Supply and Demand Portal, Monster’s Real Time Labor Market Intelligence, and the Conference Board’s Help-Wanted Online Data Series.³

Products and Services

JFF asked seven questions about products and services in order to identify consumer, analytical, and human resources capabilities. Survey questions asked respondents to identify and categorize products and services by user group. (See the appendix for survey questions.) We classified real-time LMI technologies into two categories, primary and derivative products or services. Table 1 lists primary real-time LMI products and services.

TABLE 1.
PRIMARY REAL-TIME PRODUCTS AND SERVICES

REAL-TIME FIRM	REAL-TIME PRODUCTS	DATA COLLECTION TIMEFRAME	ACCESS AND COVERAGE
Wanted Technologies	Wanted Analytics 3.0	2005-12	Access to 2,500 records for a single user: \$7,140 per year Content available to consumer determined by cost
Geographic Solutions	VOS Jobs America’s Labor Market Analyzer (ALMA)	2005-12	Annual subscription, single-seat license Full access to current and historical data; \$7,999 per year
Burning Glass Technologies	Labor Insight Focus Career	2007-12	Full underlying content Cost determined by number of users or product

Derivative designations are reserved for real-time LMI products or services created using data from an external source. Table 2 lists the most common derivative products or services.

TABLE 2.
DERIVATIVE REAL-TIME PRODUCTS AND SERVICES

FIRM NAME	DERIVATIVE PRODUCT/ SERVICE	PRIMARY DATA AGGREGATOR	PRODUCT/SERVICE DESCRIPTION
Career Builder	Supply and Demand Portal	Wanted Technologies	Career builder developed the Supply and Demand Portal by combining its resume data (supply) to Wanted Analytics aggregated job postings database (demand).
Conference Board	Help Wanted Online data series	Wanted Technologies	A business tool that measures the number of new, first-time online jobs and jobs reposted from the previous month
Monster Government Solutions	Monster Real Time Labor Intelligence	Wanted Technologies	Subscription service; consumers can purchase annual or quarterly supply (Monster resumes) and demand-side (Wanted job postings data) reports or aggregate data.

Note that several public workforce agencies and One-Stop Career Centers have created custom derivative products and services for their stakeholders using data from vendors listed in Table 1. These products will be highlighted in an upcoming brief.

Product Costs and Licensing

The vendors surveyed or researched make their products and services available on a subscription basis, with customers paying a monthly or annual fee. In JFF’s assessment of the market, we found that these subscription costs are often negotiable; community colleges, workforce boards, and other customers may want to negotiate group rates rather than single-use agreements. The fees for products and services can be found on the company websites; however, fees for custom research or data are not posted. the cost of a one-year license may range from \$5,000 to \$10,000, depending on the number of users or data-access level.

Methodological Approach and Data-quality Procedures

Drawing actionable data from real-time job postings is a complex undertaking; duplication of job openings occurs frequently and is not always easily detected. Moreover, data-quality procedures for many of the real-time LMI firms are confidential. However, all firms surveyed or researched indicate rigorous quality and integrity procedures that include a daily review of errors, postings, and duplications. At a minimum, all firms provide information that is geographically comprehensive and coded to the industry and occupation level. All firms have developed proprietary intelligence to capture, analyze, de-duplicate, and code job postings.

Each firm also maintains discrete procedures regarding the frequency of data updates, percent of ads de-duplicated, and the number and types of sites spidered. As a result of efforts to improve the integrity and quality of their data, both Wanted Technologies and Burning Glass Technologies have improved their de-duplication processes.

To transform job postings data into actionable real-time LMI, data aggregators all adopt the following procedures:

- > Use of proprietary technology to spider or search for job postings from a variety of job search engines. While the types of site searched vary by company, common ones include newspapers, job boards, social media sites (e.g., LinkedIn), corporate sites, and government job boards.
- > Selection of data elements to code (e.g., based on the job posting, assigning at a minimum geographic, industry, and occupation codes).
- > Employ de-duplication procedures to get a more accurate count of job postings.
- > Code select data elements (e.g., geography, industry/NAICS, occupation/SOC) in order to transform job-posting data into analytics.

Table 3 provides a firm-specific summary of methodological approach.

TABLE 3.
METHODOLOGICAL APPROACH OF REAL-TIME LMI PROVIDERS

	NUMBER OF SITES SPIDERED	TYPES OF SITES SPIDERED	CODED DATA ELEMENTS	DE-DUPLICATION	DATA UPDATE FREQUENCY
Burning Glass Technologies	17,000+	<ul style="list-style-type: none"> > Newspaper ads > Internet job boards > Corporate sites (small, mid-size, large) 	<ul style="list-style-type: none"> > Geographic > Employer > Industry > Occupation > Job title > Skills > Certifications > Education > Experience > Job type > Salary > # of Positions BG codes at least 70 data elements	<ul style="list-style-type: none"> > >80% de-duplication > Automated & manual processes 	Daily
Geographic Solutions	16,000-17,000	<ul style="list-style-type: none"> > Newspaper ads > Public and private job boards > Government and military sites > Education institutions > Hospital sites > Volunteer sites > Recruiter sites > Occupation specific boards > Chambers of commerce > Corporate sites 	48 elements including: <ul style="list-style-type: none"> > Geography > Industry > Occupation > Geography > Education > Experience > Employer > Wage > Job type > Certifications > Skills 	<ul style="list-style-type: none"> > Automated and manual processes > Percent de-duplicated not provided 	Daily
Wanted Technologies	1,200+	<ul style="list-style-type: none"> > Newspaper ads > Internet job boards 	<ul style="list-style-type: none"> > Geography > Industry > Occupation > Job title > Skills 	<ul style="list-style-type: none"> > 79% de-duplicated (Reduces jobs collected from 14 million to 3 million)	Daily

The term “data-quality procedures” in this report refers to de-duplication, parsing, and job spidering. All firms were hesitant to share actual data integrity procedures but did indicate these procedures exist and are considered business confidential.

RECOMMENDATIONS

In recent years, educators and workforce development practitioners have shown increased interest in making data-driven decisions. To that end, several firms have created tools and systems that collect and analyze new types of data, including data on job postings. These new data sets are an important input to help guide organizations as they make a wide range of decisions that can ultimately improve student success—including decisions around curricula, strategic planning, and student counseling.

Selecting the right real-time LMI technology or system for an organization is a complex decision. JFF recommends that potential clients take several steps before adopting any real-time LMI technology or system:

Investigate the purchase as a collaborative effort with a consortium or with a network. Collaboration can affect the price of the tool, lead to a focused application of knowledge and expertise, make more effective use of resources, lead to a higher level commitment to action, and help increase the adoption within each organization.

Consider all available real-time LMI tools and systems. No one tool fits all users. Examine organizational needs before making any purchase to determine the right tool—one that leads to better outcomes and choices for students.

Recognize that real-time LMI is a complement to, not a replacement for, traditional labor market information. The availability of real-time LMI is a recent development, and its use in the context of occupational training programs is just emerging. And while real-time LMI is an important innovation in itself, it is a limited input. As part of *Credentials that Work*, JFF encourages institutions to consider a mix of data sources, including the many traditional labor market information data series (e.g., occupational projections).

Discuss plans with early implementers, including your local and state LMI entities. Many state LMI entities draw on real-time LMI technologies to complement the traditional data they produce. Before a state decides to adopt this emerging technology widely, JFF recommends examining how state LMI entities currently capture and implement real-time LMI data.

Validate information received from real-time LMI tools. JFF encourages users to maintain a healthy degree of skepticism and take a close look at individual job postings available to get a more detailed look at the nature of jobs. The use of real-time LMI analytics is growing, and vendors have made significant improvements in their spidering and parsing processes. However, outputs are generally only as good as inputs; we recommend validating all real-time data.

SURVEY QUESTIONS

The data for this brief were gathered using this 42-question, open-response survey. The survey was emailed, with follow-up telephone interviews.

BASIC INFORMATION ABOUT YOUR BUSINESS

Describe your firm's mission and purpose.

What are your key business activities/products?

How long has your business been active (months/years)?

How many people does your business employ?

What are your estimated annual revenues/sales?

PRODUCTS AND SERVICES

What are your primary products and services?

Do you provide consumer services? List all consumer services provided. (Consumer services include but are not limited to job banks, resume matching, and job search tools.)

Do you provide analytical services? List all analytical services provided. (Analytical services include but are not limited to labor market information, economic and demographic analysis, and industry and occupational analysis.)

Do you provide human resources services? List all HR services provided. (HR services include but are not limited to job/candidate matching, resume parsing, and workforce analytics.)

What is the geographic scope (state, regional, local)?

Please estimate the percentage of your products/services that are provided in the following categories:

- > Consumer Services: _____ %
- > Analytical Services: _____ %
- > HR Services: _____ %
- > Workforce Analytics: _____ %

Please estimate the percentage of your customers by category:

- > Businesses and Employers: _____ %
- > Economic Developers: _____ %
- > Educators: _____ %
- > Job Boards: _____ %
- > Labor Market Analysts: _____ %
- > Recruitment Agencies: _____ %
- > State Unemployment Insurance Agencies: _____ %
- > Workforce Agencies: _____ %

PRODUCT LICENSING STRUCTURE

Do your products require a license?

Do you have any products that do not require a license? If yes, please list:

Please discuss or provide the scope of your licenses. Are they exclusive/nonexclusive; transferable/nontransferable; limitations/restrictions on use; updates, enhancements releases.

Are product subscriptions available?

Are seat licenses available?

Please list licenses by type (data, software).

Discuss the licensee's obligation.

Are there training costs associated with a license purchase?

Provide your products' terms & terminations:

- > Discuss renewal terms.
- > Discuss product warranties (quality of service, software performance).

What are the product/license costs?

- > Provide payment form, amount, and schedule
- > What is included?
- > Are license fees separate from service fees?

TECHNOLOGICAL/METHODOLOGICAL APPROACH

Do you use scraping methodologies?

Do you use spidering methodologies?

How many spidering sites do you use?

What is the average number of postings (weekly, monthly, annually)?

What is your frequency of spidering (weekly, monthly, annually)?

Estimate the percentage of sites that are included in the spidering by type:

- > Corporate: _____ %
- > Newspaper: _____ %
- > Public Job Boards (federal, state, local): _____ %
- > Private Job Boards: _____ %
- > Regional Job Boards: _____ %
- > Occupation Specific Job Boards: _____ %
- > Other: _____ %

Describe your technological approach.

Describe your approach with the following:

- > Data Coding
- > Parsing
- > Job Matching

DATA QUALITY

Describe or provide your policies and procedures around data quality and integrity.

Describe or provide your quality control procedures. (Include total number of ads reviewed, acceptable error rates, etc.)

Have you experienced data quality issues? Please describe.

How do you eliminate duplicate job postings?

How do you assign industry and occupational codes?

Describe your geographic assignment procedures.

Describe or provide your job posting (ads) retention policies. (How long do you retain ads? How do you determine new/old ads? What are your timeframes for categorizing ads?)

Describe or provide your text interpretation/coding policies and procedures.

> How do you code job titles, tasks, and requirements in ads?

Describe or provide your editing policies and procedures.

Do you compare raw posts to parsed?

Generally describe your current and future plans for addressing data issues.

ENDNOTES

¹ See: <http://www.bls.gov/web/empsit/cpseea05.pdf>

² See: <http://www.conference-board.org/data/helpwantedonline.cfm>

³ See: <http://www.worldbusinesschicago.com/node/843>

⁴ This research came from many sources: discussions with John Dorrer but not directly from survey responses; the link above provides a reference that was published; and HWOL technical notes.

⁵ See: <http://www.unleashthemonster.net/wp-content/uploads/RLI-0vw-2010.pdf>

⁶ See: <http://www.conference-board.org/data/helpwantedonline.cfm>

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JOBS FOR THE FUTURE

TEL 617.728.4446 FAX 617.728.4857 info@jff.org

88 Broad Street, 8th Floor, Boston, MA 02110
122 C Street, NW, Suite 650A, Washington, DC 20001

WWW.JFF.ORG

