



THE LINKUP 10,000

Overview

The LinkUp 10,000 is an analytic, published both daily and monthly, that captures the sum total of U.S. job openings from the 10,000 global employers in LinkUp's job search engine with the most U.S. job openings. Representing the entire U.S. economy, the LinkUp 10,000 is a macro indicator designed to measure real-time changes in U.S. labor demand. And because job openings are highly correlated to job growth in future periods, the predictive attributes of the LinkUp 10,000 deliver valuable insights into the future direction of the U.S. labor market.

Methodology

Each day, LinkUp re-indexes the job listings from the employers in the index and updates its dataset of job listings. New jobs are added, expired listings are removed from the index, and job descriptions that have been modified are updated. As well, all of the jobs from new companies that have been added to the index since the previous day's update are added to the index.

Once the complete new dataset is compiled, LinkUp begins a comprehensive series of procedures to process the dataset for use in both its candidate sourcing and job market data businesses. These processes include, among hundreds of others, updating its job search engine, re-populating data feeds, refreshing employer advertising campaigns, updating aggregates in LinkUp's SaaS application Market Reports, and calculating the complete inventory of indices, analytics, and metrics relating to all of LinkUp's job market data solutions and offerings. One such analytic is the LinkUp 10,000.

To calculate the *LinkUp 10,000 Daily* on date X, the dataset from 7 days prior (Date X-7 days) is analyzed to identify the 10,000 employers in the dataset that day (Date X-7 days) that have the most job openings in the United States. All of the U.S. job openings from those 10,000 employers are then totaled to determine the LinkUp 10,000 value for Date X. The percentage change from the previous day (X-1 day) is calculated by simply taking the change from the previous day and dividing by the previous day's LinkUp 10,000 value. The 7-day lag between 'Date X and Date X-7 days' effectively eliminates the data anomalies associated with attempting to determine, with a high degree of accuracy, the number of job openings on an employer's website.

The *LinkUp 10,000 Monthly* is calculated in a similar manner but does not require the use of a lag period. On the first day of each month, LinkUp tabulates the total unique job listings in the U.S. for every employer in the index for the month just ended and sums the number of unique job listings for the 10,000 employers with the highest number of unique job openings in the U.S. to determine the *LinkUp 10,000 Monthly* value for the month just ended. The percentage change from the prior month is calculated by simply taking the change from the prior month and dividing by the prior month's LinkUp 10,000 value.



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Methodology (continued)

The *LinkUp 10,000 Monthly* does not require a lag period because the period is one month instead of one day, and therefore eliminates the need for a 7-day lag period.

Both the *LinkUp 10,000 Daily* and the *LinkUp 10,000 Monthly* count job openings by measuring the number of total unique jobs for an employer on a given day or in a given month. Total unique jobs are the number of unique job openings a company lists on its corporate career portal on a given day or month.

Methodology Considerations

While the methodology underpinning the LinkUp 10,000 is rather straightforward, it is worth highlighting a few aspects of what the methodology entails and what it does not.

Each day, the specific companies whose jobs are tabulated in the aggregate total for that day may or may not be included in the sum total on the following day. If an employer's career portal is temporarily taken down because, for example, the employer is updating its ATS software, that company's jobs will not be included for the day(s) in which its job listings were not available. In such a case, the next largest company in the index would take its place, and the 10,001th largest company in the index would then be included in the index for that day. In this way, the temporary 'loss' of any single employer, regardless of the quantity of job openings, has a minimal impact on the aggregate total job count for the 10,000 for any given day.

The LinkUp 10,000 does not utilize any statistical techniques to account or adjust for seasonal fluctuations in hiring, nor does the LinkUp 10,000 make any adjustments for weather-related increases or decreases in hiring or job postings.

The *LinkUp 10,000 Daily* is a daily metric measuring aggregate job openings for 10,000 employers, and there is, therefore, no 'reporting period' for the daily job opening count. The reporting period for the *LinkUp 10,000 Monthly* is the calendar month for the month being reported.

LinkUp does not utilize a weighting of any kind in the LinkUp 10,000.

About LinkUp

LinkUp is a leading job search engine empowering people with knowledge obtained from the largest, highest quality database of global job listings. Through sophisticated, proprietary, and scalable technology, we index millions of job openings every day directly from employer websites around the world. Because LinkUp does not aggregate jobs from other job sites, LinkUp’s job platform eliminates duplicate and expired job listings, job scams, and job board pollution. As a result, LinkUp contains the largest, highest quality job listing dataset in the market. We leverage that unique and powerful dataset of jobs to power our search engine, candidate sourcing, and job market data solutions.

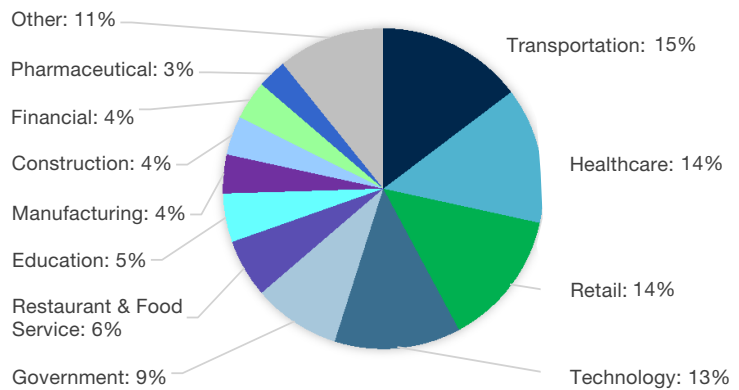
Coverage

LinkUp’s search engine and our dataset of job listings includes approximately 5 million jobs sourced directly from roughly 50,000 employer websites around the world. Our index includes every employer type (public, private, non-profit, government, etc.), company size, industry, job category, and salary range.

In the U.S., our industry coverage closely mirrors employment distribution by industry for the entire U.S. economy.

Not surprisingly, our database of job listings also maps closely to the nation’s population and employment distribution by state and city or Metropolitan Statistical Area (MSA).

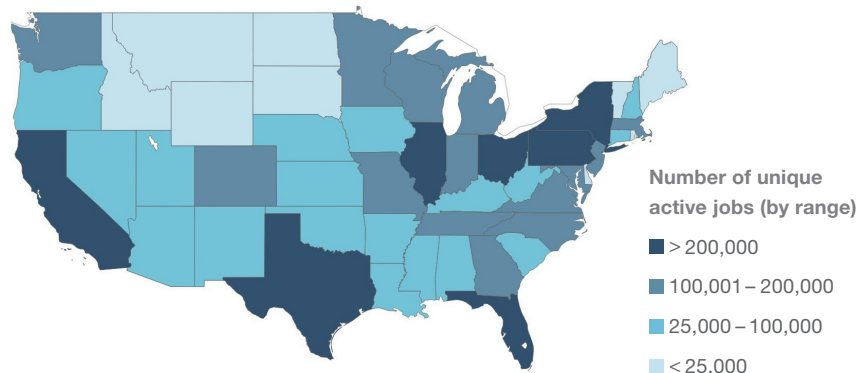
Job count % by vertical



Jobs with a state
99.8%

Jobs with a city
99.7%

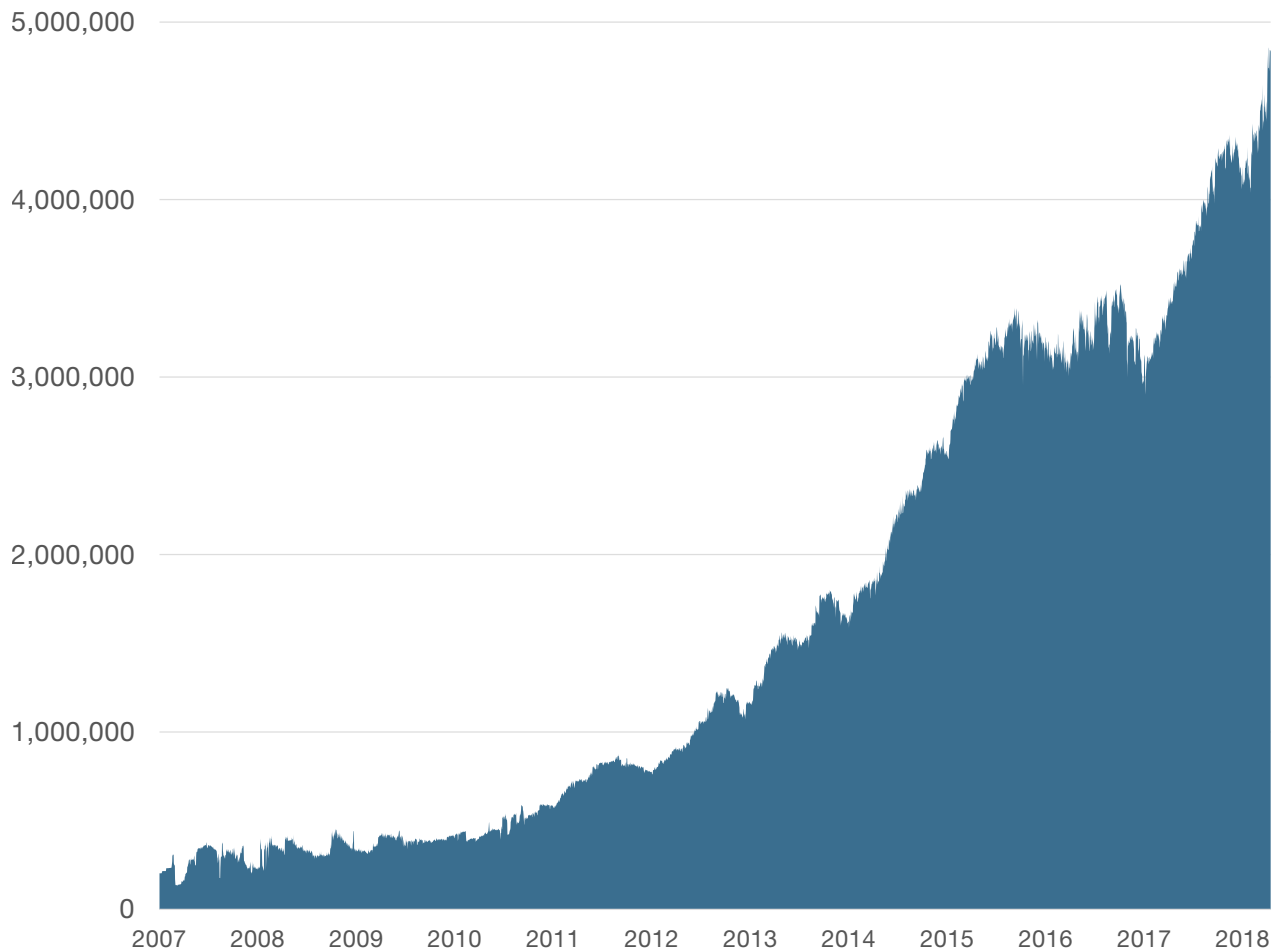
Jobs with a zip code
90.6%



Growth

Since LinkUp began indexing jobs directly from company websites over 10 years ago, we have continuously added companies and jobs to the index. And as we have developed increasingly sophisticated technology, the rate of growth in the index has accelerated. We expect to reach 5 million active daily jobs in Q2 2018 and 6 million active daily jobs by the end of the year.

Job Openings In LinkUp's Job Search Engine



Indexing

LinkUp's proprietary technology indexes approximately 5 million jobs from more than 50,000 employer websites around the world. LinkUp's job listing dataset does not include any jobs sourced from job boards, staffing firms, recruiting firms, temp agencies, industry trade associations, or any other 3rd-party job sites. LinkUp's search engine does not allow anyone to post jobs directly to our site, nor does our job market dataset include any duration-based, pay-to-post job listings from any source. Our entire dataset is comprised of jobs sourced directly from the career portals contained on an employer's website.

For each company and employer in the index, we scrape every single job listed on their career portal regardless of where in the world the job is located, whether it is part-time or full-time, in what language it is written, the department, division, job title, salary level, or any other factor related to the job opening.

At its most basic level, our indexing is accomplished by programmatically sending a series of specific HTTP requests to the web servers of individual employers and performing custom pattern-matching to extract particular structured data from the web pages returned. These functions are often highly-customized for each employer to ensure that we are accessing and parsing all of the data completely and accurately.

The frequency with which companies are indexed or 'scraped' can vary and is often based on a site's number of jobs and job volatility. Currently, companies are scraped every 1-3 days, but the average scrape cycle for our dataset is continuously decreasing.

Processing

LinkUp's advanced infrastructure processes and analyzes data for myriad uses by a variety of client types. We provide raw and compiled or aggregate information based on many of the fields below that allows our clients to gain insight into essentially every conceivable aspect of the job market.

When a job is captured by LinkUp, the following data fields can be parsed and analyzed, subject to availability by employer listing:

- Company name
- Company NAICS code
- Unique company identifier
- Unique job identifier
- Job title
- Complete job description
- City, state and zip code of job listing
- Country of job listing location
- Unique job category identifier
- Date job was created
- Date job was last checked
- Date job was deleted
- Additional data fields as available on each unique career portal

Processing (continued)

Data collections of LinkUp's magnitude come with inherent challenges that we diligently address and minimize. Additionally, as is the case with most data sets, the scope of our data has limitations; in our case, our dataset is limited by how companies publish their job listings on their corporate career portal. Some companies do not post jobs online, and others post in non-scrapable formats such as PDFs, Word Docs, Flash, etc.

Additionally, our dataset and the corresponding job market information is impacted by the attributes inherent in indexing jobs from company websites. These include, but are not limited to, the following particularities that occur with varying degrees of frequency:

- Companies occasionally change the location, nature, and format of online job postings without notice which can 'break' our crawlers
- Companies can take down their Applicant Tracking Systems or ATS (the 3rd-party applications used for publishing jobs online and tracking applicants) for routine maintenance and upgrades which removes their jobs from the internet for a period of time
- Job listings are very much considered to be unstructured data given the fact that employers often publish their job openings in ways that are entirely unique to their company, industry, and geography, do not use standard formats, and often omit useful and relevant data elements, thus making it exceedingly difficult to 'normalize.'
- Companies often attempt to 'game' search engines in order to optimize the visibility and placement of their job openings
- Companies and employers sometimes publish jobs on multiple career sites (i.e., on the website of a subsidiary as well as on the company's main corporate website) or publish the same job in multiple languages on the same site

Quality Control

With full awareness of the potential issues that can interfere with the quality of our data, LinkUp has developed sophisticated and proprietary technology over the past 15 years to overcome the inherent and formidable challenges presented by indexing job listings directly from company websites around the world. We employ a wide variety of automated quality control checks, both within the scraping process itself as well as on the entire dataset periodically. These include, but are not limited to, checking for the following:

- Company scrapes that do not appear to be starting within the expected window
- Company scrapes that do not appear to be finishing in a reasonable amount of time
- Company scrapes that return zero jobs when they recently had returned one or more jobs

Quality Control (continued)

- Company scrapes that return a number of jobs that is outside of a reasonable percentage difference from recent scrapes
- Company scrapes that update a large percentage of their jobs in any given scrape run
- Company scrapes returning job counts that may indicate that the scrape is having issues paginating reliably
- Job URLs that might indicate that multiple company scrapes may be duplicates of each other
- Job URLs that no longer lead to a valid web page
- Jobs with location data that may be invalid
- Titles or descriptions that are too short
- Titles or descriptions that may have bad characters in them
- Titles or descriptions that are duplicated across a large percentage of a company's jobs

When we are notified of one of the above issues, our development team immediately investigates and resolves the complication by updating the scrape code. The resolution can depend upon the cause, but most often a fix is applied within one day and all future data points for the company will pass quality standards.

As a result of a comprehensive set of strategies, techniques, and technologies, combined with vigorous and continuous improvement and ongoing investment, LinkUp has developed arguably the most sophisticated job search engine on the web and amassed the largest, highest quality index of job listings indexed directly from company websites.

LinkUp Data Analytics & Packages

LinkUp leverages its job market data to generate a complete array of analytics, indices, metrics, and reports that track labor demand at a macro, sector, and individual company level as well as by geography (country, state, MSA, county, and zip code). At a macro level, LinkUp has developed a number of methodologies to gain insights into labor demand including the LinkUp 10,000, the 'Paired-Month' Data series, the Fixed Company Set, and LinkUp Raw.

Each of these methodologies is designed for a specific purpose and accounts for specific aspects of the dataset. In each methodology except the last, the methodology used accounts for the addition of new companies into the index each day. In the case of the LinkUp 10,000, the methodology fixes the number of employers in the 'found set' at the 10,000 companies on a given day with the most U.S. job listings but allows the actual, specific companies to vary from day to day.



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Job Market Data

LinkUp offers a wide variety of data packages and services centered around its unique job market data. Designed for a wide variety of use cases and specific applications, LinkUp's job market data offerings range from very specific, granular datasets, analytics, and indices to comprehensive job market data pertaining to companies, industries, and geographies.

In addition to delivering alpha at a company, sector, and macro level, our data can also be leveraged for corporate intelligence, marketing services, education, and human capital applications.

LinkUp 10,000 Data Package

At an annual subscription cost of \$1,000, the basic LinkUp 10,000 data package includes auto delivery of the *LinkUp 10,000 Daily* and *LinkUp 10,000 Monthly* values as well as historical data going back to 1/1/14 for both the *LinkUp 10,000 Daily* and *LinkUp 10,000 Monthly*.

Additional data packages with more extensive data relating to the *LinkUp 10,000* are available.

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