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U.S. App Economy Update, 2022

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PROGRESSIVE POLICY INSTITUTE

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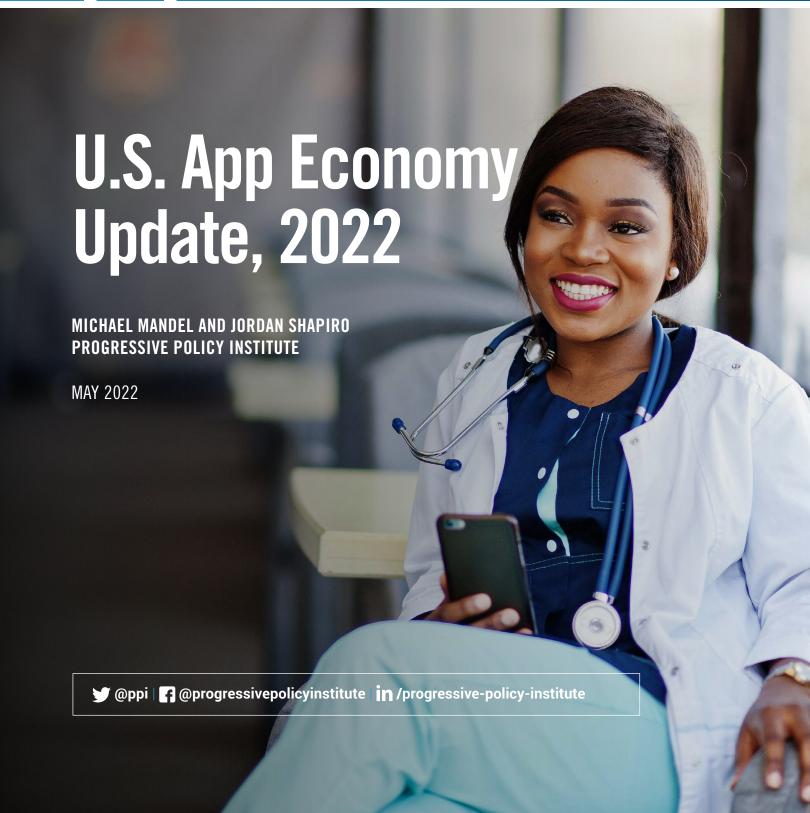# U.S. App Economy Update, 2022

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INTRODUCTION

The unprecedented challenge of the pandemic stressed crucial business and infrastructure systems in every country. Almost overnight, huge swathes of economic activity that relied on face-to-face interactions were forced into virtual mode. Individuals and businesses were suddenly dependent on the internet, their smartphones, and their mobile applications for critical daily activities like work, shopping, and communication with loved ones. The App Economy, already important, became an increasingly indispensable part of the real economy.

For the most part, the infrastructure of the global "App Economy" performed well under the strain. Existing mobile applications were able to respond to soaring demand without significant outages. App developers were able to quickly create new apps to meet the human and economic needs of the pandemic, and get them onto the Apple App Store, Google Play, and other app stores. Publishers launched 2 million new apps in 2021 alone.[1]

At both small and large companies, finding workers with App Economy skills — the ability to develop, maintain, and support mobile applications — became essential. Remote work and sales were critical to keeping businesses going. Even as the pandemic ebbs, many jobs and economic interactions are still remote, placing an increased premium on mobile communications. Health organizations have learned about the usefulness of telehealth apps. Banks and other financial companies are consolidating branches and doing more business remotely. Airlines and other transportation businesses rely on apps to communicate directly with their customers. And many restaurants, while thankful to be open for in-person patrons, still do much of their business by delivery.

1.   Sarah Perez, "App Annie: Global App Stores' Consumer Spend Up 19% to $170B in 2021, Downloads Grew 5% to 230B," TechCrunch, January 12, 2022, https://techcrunch.com/2022/01/12/app-annie-global-app-stores-consumer-spend-up-19-to-170b-in-2021-downloads-grew-5-to-230b/.

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In the United States, as in other countries, the increased prominence of the App Economy was reflected in the growing number of jobs that required App Economy skills. We have been estimating the number of U.S. App Economy jobs since 2012, using detailed data on job postings as our major tool for analysis.

Our latest estimate, as of January 2022, was 2.564 million App Economy jobs, including a conservative estimate of spillover jobs. That is up 14% from 2.246 million as of April 2019, and up 8% from an estimated 2.417 million as of February 2020.

In this updated report, we also estimate App Economy jobs by operating system, and provide estimates of App Economy jobs for leading states. These state estimates are based on a new methodology that takes account of remote work.

METHODOLOGY

For this study, a worker is in the App Economy if he or she is in:

- An IT-related job that uses App Economy skills — the ability to develop, maintain, or support mobile applications. We will call this a "core" app economy job. Core app economy jobs include app developers; software engineers whose work requires knowledge of mobile applications; security engineers who help keep mobile apps safe from being hacked; and help desk workers who support use of mobile apps.

- A non-IT job (such as sales, marketing, finance, human resources, or administrative staff) that supports core app economy jobs in the same enterprise. We will call this an "indirect" app economy job.

- A job in the local economy that is supported either by the goods and services purchased by the enterprise, or by the income flowing to core and indirect app economy workers. These "spillover" jobs include local professional services such as bank tellers, law offices, and building managers; telecom, electric, and cable installers and maintainers; education, recreation, lodging, and restaurant jobs; and all the other necessary services.

We use public job postings from the Indeed real-time database of job postings to estimate the number of core App Economy jobs.[2] We analyze job postings for App Economy jobs based on the national methodology described in our 2017 report, "U.S. App Economy Update." Then we use a conservative multiplier of indirect and spillover jobs to estimate overall App Economy jobs.[3]

Table 1 shows the full history of our estimates of the App Economy. (The February 2020 pre-pandemic figure represents an interpolated data point based on the April 2019 and August 2020 figures).

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2. Indeed, which bills itself as "the #1 job site in the world," offers a searchable continually updated database of job postings in the United States, as well as similar databases for more than 60 other countries.
3. The latest Occupational Employment and Wage Statistics from the BLS (May 2021) show that computer occupations such as app developers make up 46% of software industry employment and 52% of employment in the computer systems design industry. So we make the reasonable assumption that each core App Economy job corresponds to one indirect App Economy job in the same organization. Next, we make the very conservative assumption that each core or indirect App Economy job generates 0.5 jobs in the relevant geographic area.

TABLE 1: MORE THAN A DECADE OF APP ECONOMY ESTIMATES

DATE OF ESTIMATE	DATE OF PUBLICATION	APP ECONOMY JOBS (THOUSANDS	NONFARM PAYROLL JOBS (MILLIONS)
July 2008	*Creation of first App Store*	0	137.5
November 2011	February 2012	466	132.7
April 2012	October 2012	519	133.8
June 2013	July 2013	752	136.3
December 2015	January 2016	1660	143.1
December 2016	May 2017	1729	145.4
April 2019	September 2019	2246	150.6
February 2020	*Interpolated**	2417	152.5
August 2020	August 2020	2520	140.7
January 2022	May 2022	2564	149.7

Interpolated from April 2019 and August 2020 figures.
Source: South Mountain Economics, Progressive Policy Institute, Indeed.com

Measured against the size of the whole economy, the roughly 2.6 million workers in the App Economy represent about 1.7% of total nonfarm employment of nearly 150 million. That's significant, but not overwhelming.

But we get a different perspective by looking at the App Economy's contribution to job growth since Apple opened the first App Store in July 2008. From July 2008 to early 2022, the economy overall added roughly 13 million jobs, while the App Economy has gone from zero to 2.564 million jobs, including indirect and spillover jobs.[4]

That implies that the App Economy has contributed about 20% of nonfarm job growth since its inception. Perhaps more important, the App Economy has been an "autonomous" source of hiring even while other parts of the economy have faltered.

APP ECONOMY BY OPERATING SYSTEM

We can analyze App Economy job postings to see whether they refer to iOS- and/or Android-related skills.[5] That allows us to assign App Economy jobs to either the iOS or Android

4. Based on an average of 150.4 million nonfarm payroll jobs for the first quarter of 2022.
5. The full procedure is outlined in the methodology appendix to our 2017 report, "U.S. App Economy Update."

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"ecosystems" or both. For example, if a job posting is looking for an iOS developer without any mention of Android, then that job and the associated indirect and spillover jobs are part of the iOS ecosystem but not the Android ecosystem.

It needs to be noted that many App Economy job postings, especially in the United States, refer to both iOS and Android skills. A job posting might explicitly be directed at finding an Android software engineer, for example, but part of required or preferred experience might include previous development of either iOS or Android apps. As a result, most App Economy jobs in the U.S. belong to both the iOS and Android

ecosystems. That isn't necessarily true in other countries.

Table 2 below reports on iOS and Android ecosystem jobs as of January 2022. The iOS ecosystem included 2.225 million jobs, including indirect and spillover jobs. The Android ecosystem includes 2.065 million jobs.

This implies that the growth of the iOS ecosystem accounts for about 17% of nonfarm payroll job growth from July 2008 to January 2022. Similarly, the growth of the Android ecosystem accounts for about 16% of nonfarm payroll job growth from July 2008 to January 2022. Note that these figures are not additive.

TABLE 2: APP ECONOMY JOBS BY OPERATING SYSTEM, JANUARY 2022

DATE OF ESTIMATE	DATE OF PUBLICATION	TOTAL APP ECONOMY JOBS	IOS ECOSYSTEM JOBS	ANDROID ECOSYSTEM JOBS
		THOUSANDS OF JOBS		
April 2019	September 2019	2246	1853	1736
February 2020	*Interpolated*	2417	2029	1890
August 2020	August 2020	2520	2135	1983
January 2022	May 2022	2564	2225	2065

Data: Progressive Policy Institute, Indeed.com

LOCATION OF JOBS

Previous to the pandemic, our App Economy reports and updates generally included estimates of App Economy jobs by state. This was possible because, pre-pandemic, most job

postings specified a location for the job. We were therefore able to distribute App Economy jobs by state and even by metro area.

The likely permanent rise of remote work means that the previous methodology no longer is sufficient. Many App Economy job postings now say "remote from" some city, meaning that the worker can be located anywhere, even if they have an "official" location. Let's call these "tethered remote" jobs. Some job postings don't even specify a home base, opting for "United States" or just "remote." Let's call these "untethered remote." In addition, many jobs are now advertised as being based in any one of a number of different locations.

In this section we will describe a new preliminary methodology for estimating the job market impact of the App Economy by state. First, it is important to realize that this new methodology gives state estimates that are noncomparable to previous years. Second, this is a preliminary methodology and will likely change in future updates as we better understand the nature of remote work.

Recall that we divide App Economy jobs into core, indirect, and spillover jobs. Remote work means that the core jobs (such as app developers, mobile app security specialists, mobile app tech support staff) need not be in the same location as the indirect jobs (such as accounting, legal, marketing, and management). Spillover jobs (local service jobs, such as restaurants and retail, conservatively estimated) should be distributed according to the location of the core or indirect jobs.

The first step in our preliminary methodology involves searching for all job postings that

contain either the term iOS or Android nationally and by state. We also identify the number of job postings that are "tethered remote."

- Core App Economy jobs that have a location and are not remote are allocated to that location, along with the resulting indirect and spillover jobs.

- Core App Economy jobs that have a location and are "tethered remote" are allocated according to a two-step process. First, the associated indirect jobs and spillover jobs are allocated to the reported location. Second, the tethered remote core jobs are allocated by state according to the distribution of employment and jobs growth in NAICS 5415 ("computer systems design"), which is the industry where most app developers are found.[6]

- Core App Economy jobs which have no location ("untethered remote") are allocated by state according to the distribution of employment and jobs growth in NAICS 5415. In addition, the associated indirect and spillover jobs are allocated the same way.

Under the new methodology, California is still first on the list with 408, but the gap between California and other states has narrowed. California is followed by Texas, Washington, New York, Florida, Pennsylvania, Illinois, Virginia, and Georgia. Table 3 also reports iOS and Android ecosystem jobs by the top 25 states.

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6. For this preliminary methodology, we based our allocation on the average of the state-level distribution of NAICS 5415 jobs in the third quarter of 2021 (the latest data available), and the state-level distribution of NAICS 5415 job growth from the third quarter of 2019 to the third quarter of 2021. For example, California accounted for 14.9% of NAICS 5415 jobs in the third quarter of 2021. But it lost NAICS 5415 jobs over the previous two years equivalent to -0.8% of national NAICS 5415 job growth, so we assigned California 7.1% of tethered remote core jobs. We note that the state-level NAICS 5415 job data comes from the BLS QCEW data set, which itself may not be accurately reporting the location of "temporary" remote jobs.

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TABLE 3: PRELIMINARY ALLOCATION OF APP ECONOMY JOBS BY TOP 25 STATES (NEW METHODOLOGY) (THOUSANDS)

	TOTAL APP ECONOMY JOBS	IOS ECOSYSTEM	ANDROID ECOSYSTEM
California	408	354	328
Texas	239	208	193
Washington	137	119	110
New York	136	118	109
Florida	129	112	104
Pennsylvania	114	99	92
Illinois	90	78	73
Virginia	83	72	67
Georgia	81	71	66
Massachusetts	81	71	65
Colorado	75	65	60
Ohio	74	64	60
North Carolina	74	64	60
New Jersey	69	60	55
Minnesota	62	54	50
Michigan	52	45	42
Maryland	52	45	42
Oregon	44	39	36
Missouri	44	38	35
Tennessee	43	37	34
Arizona	40	35	33
Indiana	35	30	28
Wisconsin	35	30	28
Utah	28	24	22

Data: Progressive Policy Institute, Indeed.com

EXAMPLES OF CORE APP ECONOMY JOBS

In this section we report some examples showing the wide-ranging variety of companies, large and small, who are looking for App Economy workers. We start with the tech sector. As of March 2022, a company named Headway, based in Green Bay(WI). was looking for an iOS mobile developer with SwiftUI experience for remote work. Headway advertises itself as a company that helps startups launch, get funding, and strategize for success.

In the wake of the ongoing pandemic, health care and well-being enterprises have embraced the App Economy. For example, as of March 2022, the University of Colorado Health, a large not-for-profit health care system based in Aurora, Colorado, with affiliated hospitals in Wyoming and Nebraska, was looking for an iOS and Android Application Developer Associate. CareRev, founded in 2015, is a Los Angeles-based health care staffing platform that connects per diem shift opportunities to health care professionals. As of March 2022, the company was seeking iOS and Android engineers.

As of March 2022, OurFamilyWizard, which offers an app for parents managing shared parenting, was looking for a Senior iOS and Android Developer in Minneapolis, Minnesota, with the option of remote work. Stride Health, a small business benefits company based in San Francisco and focused on independent workers, was seeking a Senior iOS Application Engineer for remote work. Vyvo, a digital health company founded in 2019, was seeking an Android and an iOS developer in Miami, Florida. As of March 2022, pharmaceutical company Eli Lilly, was seeking multiple iOS developers and Android developers to work at their headquarters location in Indianapolis, Indiana.

The rise of e-commerce during the pandemic has generated an exceptional number of App Economy jobs. 1-800-Flowers, a well-known food and flower delivery company, was advertising for Lead Android and iOS Developers in Jericho, New York, as of March 2022. Lululemon, a high-end athletic and athleisure wear retailer, was looking for a Senior iOS Engineer to work remotely for their Seattle office. And New York-based nate, a shopping app that allows users to buy from any online retailer, was looking for iOS engineers in New York.

Entertainment, sports, and gambling are increasingly replying on App Economy workers. As of March 2022, Major League Baseball (MLB) was seeking Senior Software Engineers for iOS and Android to work on the MLB app in New York City and Boulder, Colorado. Disney Cruise Lines, based in Orlando, Florida, was looking for a Senior iOS software engineer. And FanDuel, one of the largest sports gambling platforms, was looking for iOS and Android software engineers in Atlanta, New York City, and remote.

Financial services are becoming increasing integrated with online applications. As of March 2022, Bank of Americas is seeking a multitude of iOS and Android software engineers and developers in a variety of locations including Boston, Charlotte, San Francisco, Atlanta, and Addison (Texas). TIAA, a Fortune 500 financial services organization, was looking for multiple iOS and Android Senior Developers in Charlotte, North Carolina, and Iselin, New Jersey. At the other end of the size scale, SOHO Square Solutions, a financial services management consulting firm, was looking for a Georgia-based Mobile Front End Developer.

Education has been a fertile field for App Economy jobs during the pandemic. For

example, in March 2022, Midwest Tape, an Ohio-based public library media distributor specializing in library-ready DVDs and other digital media, was looking for Senior iOS and Java developers to work remotely and in-person in their Holland, Ohio, location.

And mobility is an essential part of the App Economy — not just Uber and Lyft, but many other companies as well. For example, in March 2022, Flexcar, which offers customers unlimited car access without hassle of ownership, was seeking a Lead and Senior Android Engineer, as well as a Senior iOS Engineer based in Boston, Massachusetts. McLeod Software, a Birmingham, Alabama, based transportation management software company that provides project support and training services to trucking companies, was advertising for a Birmingham-based Java Developer.

CONCLUSION

Building on a tremendous job performance in the early months of the pandemic, our estimates of App Economy employment based on job postings continue to rise. As of January 2022, we estimate that the U.S. App Economy includes 2.564 million jobs, up 14% since April 2019. These jobs are spread across industries and states. Using a new preliminary methodology that accounts for remote work, the top 10 states for App Economy jobs are California, Texas, Washington, New York, Florida, Pennsylvania, Illinois, Virginia, Georgia, and Massachusetts. Our approach to understanding the location of App Economy jobs may evolve as attitudes toward remote work mature.

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The Progressive Policy Institute is a catalyst for policy innovation and political reform based in Washington, D.C. Its mission is to create radically pragmatic ideas for moving America beyond ideological and partisan deadlock.

Founded in 1989, PPI started as the intellectual home of the New Democrats and earned a reputation as President Bill Clinton's "idea mill." Many of its mold-breaking ideas have been translated into public policy and law and have influenced international efforts to modernize progressive politics.

Today, PPI is developing fresh proposals for stimulating U.S. economic innovation and growth; equipping all Americans with the skills and assets that social mobility in the knowledge economy requires; modernizing an overly bureaucratic and centralized public sector; and defending liberal democracy in a dangerous world.