Labor Market Signals: Using Job Postings to Understand Occupational Shifts

North Carolina Department of Commerce

Maggie Smith, PhD
Joshua Levy

Minnesota Dept of Employment and Economic Development

Amanda Rohrer
Savannah Ford

February 2025

North Carolina and Minnesota partnered with the Federal Bureau of Labor Statistics (BLS) to explore potential updates to Standard Occupational Codes (SOC) using evidence from job posting aggregators. The project aimed to identify labor market-driven changes since the last SOC revision.

Job postings provide employers with a platform to describe the skills they seek in employees and offer more detailed insights into job roles than traditional survey tools. Because these postings are forward-looking—many positions are expected to be filled for multiple years—they can serve as an early indicator of emerging occupational trends. Existing job postings sources also have limitations:

- They lack a defined sample frame, making it difficult to assess how representative they are of the overall labor market.
- The sources are in flux, complicating time-series analysis.
- The assigned occupational codes are sometimes inaccurate.

Despite these challenges, job postings reflect employer demand, and meaningful conclusions can be drawn when analyzed within that context. Another key objective of this research was to refine methods for leveraging job postings data and to better understand the limitations. This would enable more effective use of such data in future SOC revisions and other labor market research.

The participating states used different approaches to access job postings data. North Carolina utilized Lightcast, a commercial platform offering value-added features for analysis and filtering. Minnesota, on the other hand, relied on NLXResearchHub data, a free resource available to state LMI offices. While more basic in its analytical tools, NLXResearchHub provides full-text job advertisements along with occupational codes. These differences influenced the research methods each state employed.

Contents

Certification-Defined Skills in Job Advertisements

Amanda Rohrer, Minnesota Department of Employment and Economic Development

Introduction

Job seekers and employers often view the labor market differently from the SOC taxonomy. The language used in job searches and discussions about qualifications may not align with how SOC categorizes data. Survey data provides only limited insight into employer and job seeker perspectives. Instead, we can leverage tools developed by non-governmental entities outside existing taxonomies to connect job seekers and employers to identify potential misalignments with the SOC structure. Two key data sources provide valuable insight: certifications, which are private-sector tools to verify skill sets in high demand, and job advertisements, which employers use to outline desired skills. While job ads may not always reflect the exact duties or qualifications of jobs, they offer a glimpse into employers' expectations and the skills they prioritize.

Methodology

Areas of Focus

Discussions with OEWS staff involved in coding activities highlighted several areas of ambiguity.

Medical Specialists: The SOC hierarchy doesn't fully align with industry terminology, particularly for technologists, technicians, and support personnel. It appears that non-doctor specialists may be taking on expanded responsibilities, likely driven by advances in medical technology or staffing shortages.

Behavioral Interventionists and Counselors: The SOC structure includes various counseling and social work occupations, ranging from highly regulated, graduate-degree-required roles to less formal positions. Job titles like "Behavioral Interventionist" in schools illustrate this ambiguity—they're not educational psychologists or special education teachers but instead they are non-teaching professionals focused on social skills and conflict resolution. Additionally, clergy licensed as marriage counselors in some states may warrant a distinct category or updated descriptions. Social worker occupations also seem misaligned with how higher education defines social work specialties.

Information Technology: IT roles now span nearly every industry, with increasing specialization. Current codes include one management category (11-3021) and a limited set of IT specialist codes. For example, IT project managers fall under 15-1299 ("Computer Occupations, All Other"). Given the growing prominence of IT jobs, there's a need to revisit descriptions and hierarchical placement.

Manufacturing: Manufacturing occupations are often categorized by the types of machines used. However, modern machines are increasingly multi-purpose, and job titles don't always specify machine types. This suggests a potential need to consolidate manufacturing occupations.

Certifications Data Source

CareerOneStop tracks certifications for use on their website. These are continually reviewed and need to meet inclusion criteria. Private sponsorship is one of those criteria, which excludes a number of spurious products, but also some legitimate open-source software certifications.

The dataset includes numerous certifications, each mapped to ONET codes in a many-to-many relationship, though some mappings are overly broad. For this analysis, certifications requiring training or experience were filtered to ensure they represent specific skill areas.

Certifications were then grouped logically. Some were excluded if they were loosely related to the occupation, overly specific, duplicative, or weaker matches compared to others. The focus of this analysis is not on the certifications themselves but on the logical groupings they inform. These groupings represent subcategories of occupations and help generate search terms without limiting them. For example, while a certification might be “Certified Addiction Specialist,” the search terms could include "opiate," reflecting the role of a social worker specializing in opioid addiction. Terms are not exclusive to a single category, and each set is evaluated independently, allowing job openings to fall under multiple categories.

National Labor Exchange (NLX) Job Postings

The National Labor Exchange (NLX) aggregates and posts jobs from three sources: state job banks, private customers (often for compliance reasons), and individual postings. Private customers typically provide data in bulk or allow the NLX to scrape their postings. Duplicates are removed, and postings are validated. Historical data is available for research through the NLX Research Hub.

For this task, job postings initially advertised in 2023 across all states were included. While some jobs are advertised for extended periods, potentially underrepresenting certain roles, this forward-looking approach aligns with the objective of analyzing recent trends. These postings represent roughly 5-15% of national OEWS employment, though representation varies significantly. Compliance, project management, IT, and high-skill/high-education occupations are generally better represented.

Because employers voluntarily participate and use the service differently (e.g., recruiting nationally, repeating ads regularly, or keeping ads open for long periods), the postings are best viewed as a resource for understanding how employers describe skills and job titles rather than a statistically representative sample of the job market. Each posting likely reflects a genuine opening, but its broader statistical significance is less certain. Consequently, this analysis de-emphasizes summary statistics, focusing instead on job descriptions and titles, the strongest aspects of this data source.

All records are auto-coded to a SOC, which is an imperfect process. The autocoder used looks at job title, key words in the job description and industry. Some postings are misclassified, and significant certification categories may reflect miscoded jobs rather than new occupations. These issues are noted in the justification column.

Defining the Intersection

Once the categories and the terms were defined, the job descriptions were pulled for the year and filtered based on the presence of the terms in the descriptions. The number and percentage of job openings that contained the relevant terms were then calculated to get a sense of what the share of job openings may be. While job openings are not directly reflective of the job market as a whole because of different rates of turnover and how widely jobs are advertised and for how long, they do have the advantage of favoring a forward-looking perspective and the characteristics of newly created jobs. Examples of job titles associated with the jobs with terms found in the descriptions were also identified.

Where between 20 and 50 percent of job openings in the SOC contained the terms, the category was further reviewed by the analyst. Categories in this range were either identified as a potentially new occupation or noted as probable mis-coding of an existing other occupation. This range was targeted because:

- If the majority of job postings in a category include the terms, the terms are likely inherent to the occupation and may only need to be added to its description.
- If very few postings include the terms, the category lacks critical mass to warrant focus as a separate area.

The percentages were also applied to OEWS national employment for the occupation to get an estimated number of jobs that could be applied if that category was split out from the whole. While approximate, some of the categories were very small even at 20 percent of national employment and perhaps don't warrant separation on those grounds.

Manufacturing Jobs

In the case of Manufacturing, occupations have become more intermingled with changes of technology. While the same methods were applied, the most relevant results came from a different approach. The jobs, specifically those around Metal and Plastic Manufacturing, were extracted as a set, and terms related to SOC codes were searched for in job titles and descriptions. This allowed for review of the breadth of skills employers are looking for in employees.

Information Technology Jobs

IT jobs tend to be very focused on specific technologies and required different methods. The approach and outcome of that analysis is described in another section of the report.

Results

There were nine occupations that could be added to the SOC structure or watched for future inclusion. These spanned across all identified categories, but were most heavily concentrated in the "All other" types. Several had already been identified by ONET and have associated information in the ONET structure.

Healthcare Support		
Code	*Subcategory*	*Ratios*

31-9092 Medical Assistants and 29-9099 Healthcare Practitioners, All Other	Transplant Coordinators	Extremely small, approximately 400 job openings
While not a huge number of postings, this job seems to require medical specialization with a focus on logistics and coordination in a way that's not quite in line with nursing or other established medical professions. It may warrant watching for future inclusion. Even using terms to narrow it down, some job postings that flagged continued to be medical assistants in a transplant setting. Common job titles: Transplant Coordinator, Organ Donation Coordinator, Transplant Donation Specialist, Registrar Kidney Transplant, Donor Coordinator, Organ Allocation Coordinator, Operating Room Scheduler		

Counseling and Special Education		
Code	*Subcategory*	*Ratios*

21-1091 Health Education Specialists	Specialized Education and Training	46.7% of job postings OEWS Employment: 57,800 Potential Occ Size: 26,995
This category included focuses on wellness or Alzheimer's. These categories are somewhat broad, they could be conducted in a lifestyle setting rather than a medical setting, like most of the other topic-specific terms that came out of certifications for this occupation. They also made up a significant share of jobs, appearing in 46.7% of postings (with some overlap with other terms). Like other health support occupations, setting may make a significant difference in the nature of this work and may be worth considering in future coding of this occupation. Typical titles: health educator, health program representative, consistent with other categories in the occupation		

21-1093 Social and Human Service Assistants	Behavioral and Human Services	24.1% of job postings OEWS Employment: 409,310 Potential Occ Size: 98,638
This category uses the search terms human services and neurofeedback although neurofeedback appeared very infrequently. It made up the largest single category of the occupation, which covers a very diverse array of work, but still only appeared in 24.1% of openings. Job titles were more varied than in most occupations, as well, with the Human Services category containing the following: supports broker, community liaison, case manager, eligibility coordinator, direct support professional		

Manufacturing		
Code	*Subcategory*	*Ratios*

51-8031 Water and Wastewater Treatment Plant and System Operators	Water Distribution	42.7% of job postings OEWS Employment: 120,710 Potential Occ Size: 51,518
	Wastewater Treatment	66.7% of job postings OEWS Employment: 120,710 Potential Occ Size: 80,549

In Occupational Licenses, there is often a distinction with states offering separate "Distribution system" licenses and "Water Treatment" licenses. Of the 40 states that offer some kind of license that gets assigned to the code, 37 offer a license that is specific to wastewater treatment, 23 offer a license that is specific to water distribution, and two offer a single combined license that covers both areas of specialization. In skills, education, and preparation for the two areas, there is a lot of overlap and early in the career path there are opportunities to switch between them. However, the settings and equipment are ultimately different. ONET does not attempt to split the two. With 120,710 nationwide positions and a split in job openings based on terms of potentially 60-40, it may make sense to begin investigating if it's possible to collect data about the differences in these two areas of specialization.

All Other		
Code	*Subcategory*	*Ratios*

17-2199 Engineers, All Other	Automation, Robotics, and System Integration	23.2% of job postings OEWS Employment: 150,990 Potential Occ Size: 35,057
ONET already breaks this out into a separate code, 17-2199.08 Robotics Engineers. If the same ratio of openings is applied to the OEWS total jobs number of 150,990, this occupation could contain 35,000 jobs, which is larger than several of the existing engineering occupations.		

13-1199 Business Operations Specialists, All Other	General Security	30.1% of job postings OEWS Employment: 1,103,440 Potential Occ Size: 331,667
Security terms appear to primarily be managers or people engaged in developing security strategy rather than security guards. ONET has a code for this, 11-3013.01 Security Managers. Terms relating to security appear in 30.1% of job postings in this occupation, and if that ratio is applied to the 1.1 million OEWS jobs in the parent occupation then Security Managers would have 331,667 jobs in it.		

11-9199 Managers, All Other	Regulatory Compliance and Ethics	44.8% of job postings OEWS Employment: 589,750 Potential Occ Size: 264,295
ONET breaks this out as a separate code, 11-9199.02 Compliance Managers. If the ratio found in postings is applied to the 589,750 OEWS jobs in the parent occupation 11-9199, this occupation would contain 264,295 jobs, which is a substantially sized occupation in itself.		

13-2099 Financial Specialists, All Other	Insurance and Fraud Investigation	42.6% of job postings OEWS Employment: 122,730 Potential Occ Size: 52,322
ONET breaks that out as 13-2099.04 Fraud Examiners, Investigators and Analysts and if the ratio found in postings is applied to the 122,730 OEWS jobs in the parent occupation, this occupation would contain 52,322 jobs, a significant size. OEWS guidance suggests these should be coded to 13-2061, but the significant number of job titles listed under the titles of Fraud Investigator, Fraud Prevention Analyst, Fraud and Waste Investigator, Fraud Operation Analyst could indicate a need to update the description or guidance.		

51-4xxx – Metal and Plastic Workers

Additionally, there is potential to revise the descriptions and coding recommendations of SOC codes in Manufacturing.

The distinction between machine types is eroding, with more factories relying on multipurpose machines or expecting employees to work on multiple machines. Looking specifically at 51-4041 Machinists, 51-4111 Tool and Die makers, and the set of occupations that make up Metal and Plastic Workers (51-4031 to 51-4035), many of the title terms appear in other occupations.

For this analysis, job postings beginning with 51-4 were extracted, then 1 to 3 terms were pulled from the SOC title to represent the most common job titles. Coding assigned by the autocoder was not used; these only included the clearest examples of the occupations.

In the chart below, the above occupations are listed. The final column is the number of job openings that were found matching the assigned terms. The first number indicates the average number of terms from other occupations' titles that appear in the descriptions; Machinists have a number in excess of three and so a typical job description may contain the terms "grind", "lathe", and "mill". The next column is the number of jobs assigned to the occupation where the other occupational terms found was 0, and the third, "Pct of jobs with unrelated terms" is the share that contained at least one outside its own area.

Machinists are the highest, which is to be expected given that the role of that position tends to be to work across multiple machines. What was more notable was how high the percentages were for the other occupations. With the exception of 51-4031 Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic, which had an average number of terms of less than 1 and the lowest percentage of unrelated terms, at 63.8 percent, and 51-4111 Tool and Die Makers, which was at 77.6%, all of the occupations were above 80% overlapping and typically had more than 1 other occupation represented in their description.

Lower in the table three additional, less closely related, occupations were included. They were compared to the same occupations and, although there is still overlap, both the percentages and average number of occupational terms are lower. Since they were excluded from the metal workers comparison, they're also being cross-referenced to more jobs and so have a slightly higher chance of matching other occupations.

Overlap Between Metal and Plastic Working Machine Workers, Title and Description, US 2023-2024

SOC	SOC Title	Avg number of other occupational terms	Number jobs w/o unrelated terms	Pct of jobs with unrelated terms	Number of jobs with title terms
51-4041	Machinists	3.06	1,351	95.4%	29,202
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	0.87	1,905	63.8%	5,256
51-4032	Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	1.93	36	88.2%	305
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	2.25	30	98.3%	1,716
51-4034	Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	1.83	307	88.4%	2,636
51-4035	Milling and Planing Machine Setters, Operators and Tenders, Metal and Plastic	1.72	513	83.9%	3,195
51-4111	Tool and Die Makers	2.06	1,224	77.6%	5,457
Separate Occupations for Comparison					
51-4072	Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	1.41	904	74.1%	3,486
51-4121	Welders, Cutters, Solderers, and Brazers	1.31	11,684	69.9%	38,778
51-4193	Plating Machine Setters, Operators, and Tenders, Metal and Plastic	0.61	139	51.6%	287

Many manufacturing occupations require the use of multi-purpose machines or the ability to switch between types of machines.

CNC and CAM Machines

One of the trends that may be driving this overlap is the increasing use of computerized machines, which do multiple tasks. The SOC structure contains specific codes for

51-9161 Computer Numerically Controlled Tool Operators

51-9162 Computer Numerically Controlled Tool Programmers

There's indication in job descriptions that CNC is the norm rather than the exception. Looking for the terms "CNC", "CAM ", and "computer" in job descriptions supports this claim. Among metal and plastic workers, Machinists and Tool and Die makers, a substantial share of jobs contain the terms. For Machinists, it's 82.7 percent, the majority of which contain CNC specifically. Milling and Planing and Lathe and Turning are also more than 80 percent. The others are mostly above 40 percent in containing those terms. The types of equipment in active use has evolved since the last major SOC revision to manufacturing codes.

For the comparison occupations, the percentages are lower, below 35 percent for all and below 10 percent for Welders.

Presence of Computer Machining Terms, Title and Description, US 2023-2024

		Number Openings	Number Containing CNC/CAM	Percentage Computer
51-4041	Machinists	29,202	24,159	82.7%
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	5,256	1,912	36.4%
51-4032	Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	305	155	50.8%
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	1,716	696	40.6%
51-4034	Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	2,636	2,304	87.4%
51-4035	Milling and Planing Machine Setters, Operators and Tenders, Metal and Plastic	3,195	2,577	80.7%
51-4111	Tool and Die Makers	5,457	2,351	43.1%
Separate Occupations for Comparison				
51-4072	Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	3,486	829	23.8%
51-4121	Welders, Cutters, Solderers, and Brazers	38,778	2,516	6.5%
51-4193	Plating Machine Setters, Operators, and Tenders, Metal and Plastic	287	99	34.5%

Given the prevalence of computer machining in manufacturing and overlapping skills and equipment, it would be reasonable to encourage OEWS staff to assign ambiguous jobs in the 51-403X codes into the 51-9161 Computer Numerically Controlled Tool Operators category. Where the title is clearly in alignment with the SOC title the occupational code could be preserved, but allowing a more general CNC-specific code to grow with the technology would better reflect current manufacturing practices. The term Programmer, though, shows up in only 3762 job titles in the set and only 16.3 percent of them also contain Machinist in the title, suggesting that the Computer Numerically Controlled Programmer occupation remains distinct and should not be combined with the other manufacturing occupations.

Conclusion

There are some significant inconsistencies between the existing SOC structure and how employers use job titles in certifications and job postings and in occupational licenses. Some occupations, particularly those within “All Other” categories, have grown to the point where they could be split into distinct classifications. For example, roles such as Security Managers, Compliance Managers, and Robotics Engineers already exist in ONET but are not yet fully represented in SOC. Similarly, the

increasing specialization of behavioral health and healthcare support occupations points to a need for refined classifications that better reflect industry needs.

In manufacturing, technological advancements have blurred distinctions between historically separate occupations. The widespread adoption of CNC and CAM machines suggests that existing classifications for machine operators may need to be consolidated or restructured. Additionally, the significant overlap in job descriptions across multiple metal and plastic working roles indicates that rigid distinctions based on machine type may no longer be practical.

While job postings do not provide a complete picture of employment trends, they offer a forward-looking perspective on employer expectations and hiring practices. Certifications, meanwhile, act as market-driven signals of skills in demand. Together, these data sources provide valuable insight into where the SOC structure may require updates to align with how work is performed today.

This research lays the groundwork for future discussions on refining occupational classifications and improving alignment between job market realities and federal taxonomies. By continuing to monitor these trends, policymakers and workforce analysts can ensure that occupational data remains relevant and useful for both job seekers and employers.

Validating O*NET New and Emerging Occupations

Maggie Smith and Joshua Levy, North Carolina Department of Commerce

Introduction

The purpose of this study is to identify new and emerging occupations not currently represented in the Standard Occupational Classification (SOC) taxonomy. This analysis focuses on occupations that are new and emerging in four key sectors: Healthcare, Information Technology, Manufacturing, and Clean Energy & Transportation. These four sectors were selected because they represent large and/or rapidly changing sectors of particular importance to North Carolina's economic development efforts and have distinct challenges in workforce recruitment and preparation. Understanding trends in these sectors is important for adapting workforce and economic development strategies, as well as informing educational programming, to ensure that North Carolina's labor market remains responsive to emerging job opportunities and skill demands.

Methodology

Identifying New and Emerging Occupations

The Occupational Information Network (O*NET) developed a methodology for identifying new and emerging occupations[1] and released a corresponding list in 2009[2]. For this analysis, occupations from O*NET's list that aligned with the four target sectors were selected. A relatively small percentage of occupations had already been incorporated in the SOC taxonomy since 2009 and were therefore excluded from consideration.

Additionally, the European Union's counterpart to O*NET – European Skills, Competences, Qualifications and Occupations (ESCO) – was reviewed to identify additional new and emerging occupations. Artificial Intelligence Engineers and User Experience Analysts were identified in ESCO and also recognized as potential occupations of interest by the North Carolina Occupational Employment and Wage Statistics (OEWS) team.

A total of 101 occupations met the criteria for inclusion in this analysis (refer to the first tab of the LEAD New & Emerging Occupations Excel file).

Job Postings Analysis

Job posting data from Lightcast (see Appendix for detailed methodology) was used to evaluate demand in North Carolina. Thirty-six occupations were identified as having sufficient demand, defined as 1,000 or more job postings over the past 5 years (highlighted in blue in first tab of Excel file). Similar demand trends were observed at both the state and national levels. These new and emerging occupations were further analyzed using Lightcast's job postings analytics, which

[1] National Center for O*NET Development (2006). New and Emerging (N&E) Occupations Methodology Development Report. O*NET Resource Center, https://www.onetcenter.org/dl_files/NewEmerging.pdf
[2] O*NET (2009). New and Emerging Occupations Listings. O*NET Resource Center, https://www.onetcenter.org/dl_files/NewEmergingList.pdf

provided insights into common job titles, industry representation, advertised salary, advertised minimum education requirements, and specialized skills (see industry-specific tabs in the Excel file). It is important to note that education and wage data were available in only about 20% or fewer job postings for each occupation. As a result, the advertised salary and minimum education may not fully represent the actual requirements or wage levels associated with these roles.

Each new and emerging occupation was first compared to its corresponding umbrella SOC code, as identified by O*NET. Lightcast organizes job postings using O*NET Codes, SOC codes, and its proprietary Lightcast Occupational Taxonomy (LOT). When analyzing occupations by SOC code, the percentage of job postings that get assigned to the more detailed O*NET code is also provided. For example, 59% of all job postings for Natural Science Managers (SOC Code: 11-9121) were classified as Clinical Research Coordinators (ONET Code: 11-9121.01), as noted in column N of the industry tables in the Excel file. One justification for recognizing a new and emerging occupation is if it represents a substantial share of total job postings within an existing SOC occupation, indicating it may merit classification as a distinct occupation.

The SOC and O*NET occupations were compared "head-to-head" to identify differences in job titles, industries, education requirements, wages, and skills. For new and emerging occupations, the umbrella SOC from ONET's classification served as the primary comparison unless it fell into an "all other" category. These categories, which group multiple occupations with evolving mixes over time, were deemed less effective for comparisons. In such cases, a non-"all other" SOC occupation was identified based on descriptions from O*NET and the Bureau of Labor Statistics. If no suitable SOC occupation could be identified, no comparison was conducted. Additionally, some new and emerging occupations warranted comparisons with multiple SOC codes.

Validation from the North Carolina OEWS team

The North Carolina OEWS team reviewed the new and emerging occupations and SOC comparisons. Their feedback was considered and incorporated into the final list of recommendations.

Results

Of the 36 occupations analyzed, 17 were identified as warranting further investigation for potential inclusion in the SOC taxonomy, 13 were flagged as possible candidates for consideration, and six were deemed unlikely to be suitable (refer to Recommendations tab of the Excel file). Detailed notes on the assessment of these new and emerging occupations are available in column V of the industry-specific tabs in the Excel file. The most heavily weighted factors in the evaluation included the percentage of job postings for the new and emerging occupation within the SOC umbrella, as well as comparisons of advertised wages, education requirements, and specialized skills.

Conclusion

This analysis explores potential new and emerging occupations within Healthcare, Information Technology, Manufacturing, and Clean Energy & Transportation industries in North Carolina. Building on prior research from O*NET and leveraging Lightcast's job postings data, at least 17

occupations were identified for further investigation and possible inclusion or reclassification within the SOC taxonomy.

A key takeaway from this study is the inherent difficulty of integrating new roles into the SOC taxonomy. This challenge is reflected in the slow adoption of occupations identified by O*NET as early as 2009, suggesting a possible misalignment: the SOC taxonomy may evolve at a slower pace than the labor market, where job titles, skill requirements, and industry needs are constantly changing. This potential gap could present challenges for workforce development and planning, as classification systems may struggle to fully align with emerging demands.

Additionally, the use of proprietary tools like Lightcast provided valuable insights into job postings, demand trends, and skill requirements. However, these tools also presented challenges, particularly due to their "black box" methodologies, which limit transparency and make it difficult to fully understand or validate the processes underlying their data classifications.

Proactive monitoring and adaptation to labor market trends is valuable to maintaining North Carolina's competitiveness. Establishing periodic reviews of the SOC taxonomy and aligning educational and workforce development initiatives with evolving industry needs can ensure the state is well-prepared for future occupational shifts and emerging economic opportunities.

Outdated Occupations Identified Using OWDN Metabase

Maggie Smith and Joshua Levy, North Carolina Department of Commerce

Introduction

This research examined potential obsolete occupations that may require modifications or consolidation in the SOC taxonomy. This work was primarily done by the North Carolina OEWS team as they have access to information and data sources that are not publicly available.

Methodology

Employment levels were examined at the state and national levels to assess the prevalence of a given SOC occupation in the current labor market. Occupations with suppressed employment data for the State of North Carolina were also collected. In total, 108 occupations were analyzed.

Seventeen "all other" occupations were excluded from the analysis, as these residual categories are not candidates for removal. For potential candidates with low employment numbers, the occupational definitions were reviewed and compared to other similar occupations. After comparing definitions, additional factors such as estimate levels, wages, and the frequency of code usage in schedules in recent years were also analyzed.

To determine the frequency of code usage, a query was performed on the schedules using OWDN Metabase to examine returned surveys that utilized the occupational code. The analysis revealed that some occupations have very specific and unique duties, while others have either broad duties or overlap with similar occupations.

Based on these factors, determinations were then made on whether it was appropriate to move/consolidate into a different occupational code.

Results

Recommended Occupations for Possible Modifications

- **13-1074 Farm Labor Contractors**

This occupation is most likely to be found in the Support Activities for Agriculture & Forestry industry. We confirmed that NC has not seen this occupation in many, many years through consultation with colleagues and in reviewing the historical data. National employment is extremely low (460) - only CA & MN have publishable data.

- **19-3032 Industrial-Organizational Psychologists**

National figures are low at 1,030 – no employment data available out of NC & CA. Duties are unique; not like any of the other psychologists in 19-3030 series. Could be moved to 19-3039 Psychologists, All Other maybe?

- **39-5093 Shampooers**

Dedicated shampooers are not nearly as common in NC anymore. A case may be made to move this position into an "All Other" SOC, such as 39-9099.

- **41-2012 Gambling Change Persons & booth cashiers; and 43-3041 Gambling Cage Workers**

These occupations have some definitional overlap. May be consolidated perhaps?

- **43-4021 Correspondence Clerks**

Position appears to be in decline. Maybe it could be moved to 43-4199 Information & Record Clerks, All Other, or even 43-4051 Customer Service Representatives due to definitional overlaps.

- **47-2142 Paperhangers**

Low employment nationwide (1,830), not just NC. It could be well-suited for an All-Other Occupation, such as 47-4099 Construction & Related Workers, All Other.

Conclusion

Addressing outdated occupations in the SOC taxonomy is important to ensure it accurately reflects current labor market trends. This study identified six occupations with low prevalence in the labor market that may warrant consolidation or modification. Together with the research on new and emerging occupations, these studies establish a framework for evaluating and updating occupations in future revisions of the SOC codes.

Emerging Technologies in Information Technology Occupations

Savannah Ford, Minnesota Department of Employment and Economic Development

Information Technology jobs are heavily based on the platforms and technologies that are in use. In the years since the last SOC revision, those tools have changed rapidly. To identify and categorize new or emerging technology occupations, this analysis focused on defining skills and technologies as “domains”, independent of existing classification structures. Each job posting is mapped to one or more relevant “domains.” Each domain functions like a bucket of associated skills, technologies, and certifications (for example, Networking, Security, Cloud, etc.). The overarching intent is to recognize patterns and trends in thousands of job postings, quantify how many positions require particular skill sets, and derive insights into the evolving tech labor market—particularly around education requirements, salary ranges, and the most frequent job titles.

The data used for analysis is a large set of NLx job postings collected from 2016 to 2023. Each job posting details many descriptive fields, but the fields that are used in this analysis include job title, description, hourly or yearly wage period, minimum and maximum compensation figures, and education requirements. Once this dataset was collected and cleaned, a matching process assigned domains to each job. The domain assignment itself proceeds by scanning or tokenizing the job text (title and/or description) for key terms relevant to each domain. When the matching python code detects a term that appears in a particular domain’s keyword list, that job is assigned that domain. A job could have multiple domains, and often do, so the results of each domain need to be considered with this caveat.

Summary and Insights

Once the dictionary matching was complete, we aggregated key statistics for each domain. These include how many job postings fall into each category, the distribution of education requirements (e.g., High School vs. Bachelor’s), whether roles are typically hourly or salary, and the average minimum or maximum salaries. Education and wage data was employer-submitted structured content and many employers left those fields unused, but because of the volume of job postings there were still a significant number of responses to analyze.

We further identified the most frequent job titles within each domain, highlighting naming conventions that appear repeatedly in real-world postings. These results may offer a breakdown of emerging skills and workforce demands in each specialization.

This process of domain classification allows for an analysis of evolving technology job markets by highlighting the prevalence of certain tools, certifications, and skill sets. Future steps may include deeper trend analysis across different time or more targeted refinements to each domain dictionary—particularly as new technologies, certifications, and specializations arise in the tech industry.

Networking

This domain encompasses the technologies, skills, and certifications underpinning computer networks and their infrastructure. Networking forms the backbone of nearly all IT environments, requiring specialized expertise in routing, switching, and vendor-specific tools (like Cisco or Juniper). It focuses on keywords like "routing," "switching," "cisco," "juniper," "wireshark" and core networking credentials such as CCNA, CCNP, or JNCIP/JNCIE. It also includes emerging areas (like SD-WAN) and specialized vendor tools (NetScout, Netcool). Top occupation titles include Systems Administrator, Technical Support Representative, and Service Desk Analyst. This domain most frequently overlaps with the Security, Data, and Business Analysis domains (approximately 20.5%, 17.3%, and 14.3% respective overlaps).

For hourly roles in the Networking domain, the average minimum wage is about $19.80 per hour, and the average maximum is around $21.20 per hour. Meanwhile, yearly positions average approximately $68,475 at the low end and $80,718 at the high end.

Of the jobs that listed education requirements, 93% reported requiring a high school diploma/GED or higher. About 52% reported requiring a bachelor's degree or higher.

Data

Centered on the management, analysis, and governance of data, this domain spans everything from databases and ETL processes to big data analytics and AI. It exists separately because data processing and architecture demand distinct knowledge, tools, and best practices beyond general IT functions. The Data domain concerns analytics, big data engineering, and database technologies. It includes terms like "hadoop," "etl," "machine learning," "sql," "oracle db," "power bi," and references to data governance or MDM. Whether it's advanced analytics (Spark, SAS) or data visualization (Tableau, Cognos), this category captures the skills and tools crucial for handling large-scale data solutions. Top occupation titles, excluding generic titles such as "software engineer", "project manager" or "software developer", includes Business Systems Analyst, Technical Support Representative, and Supply Chain Analyst. This domain most frequently overlaps with the Security, Business Analysis, and Software Engineering domains (approximately 22.4%, 18.0%, and 11.9% respective overlaps).

For hourly roles in the Networking domain, the average minimum wage is about $26.14 per hour, and the average maximum is around $27.59 per hour. Meanwhile, yearly wages average approximately $74,927 at the low end and $85,144 at the high end.

Of the jobs that listed education requirements, 93% reported requiring a high school diploma/GED or higher. About 60% reported requiring a bachelor's degree or higher.

Security

Dedicated to safeguarding systems and information, this domain covers cybersecurity concepts, tools, and compliance frameworks. Security addresses risk mitigation, threat intelligence, and protection measures critical to all tech solutions. This domain focuses on cybersecurity, covering fundamentals (e.g., "firewall," "siem," "zero trust"), advanced threat detection, and identity

management. Certifications and products—like CISSP, CEH, Qradar, Zscaler—are included, along with references to forensics ("ethical hacking," "digital forensics"). The dictionary aims to capture everything from compliance to incident response across the security landscape. Top occupation titles include Software Engineer – Oracle Cloud Infrastructure, Systems Engineer, and Business Systems Analyst. This domain most frequently overlaps with the Data, Software Engineering, and Business Analysis domains (approximately 20.6%, 18.1%, and 11.9% respective overlaps).

For hourly roles in the Networking domain, the average minimum wage is about $29.78 per hour, and the average maximum is around $31.37 per hour. Meanwhile, yearly positions average approximately $81,035 at the low end and $94,009 at the high end.

Of the jobs that listed education requirements, 92% reported requiring a high school diploma/GED or higher. About 57% reported requiring a bachelor's degree or higher.

Cloud

This domain has a focus on cloud computing services, deployment models, and container-based infrastructure. Cloud requires specialized skills in provisioning, scaling, and integrating hosted environments (e.g., AWS, Azure) that differ from on-premises IT. The Cloud domain includes public, private, and hybrid cloud technologies, alongside containerization and cloud-native development. Phrases such as *"aws," "azure," "kubernetes," "terraform," "cloud native"* frequently appear, and many vendor-specific certifications (*AWS Solutions Architect, Azure Administrator, GCP*) are flagged. It also covers emerging frameworks (*IBM Cloud Pak*, *OpenShift*) for cloud deployment and management. Top distinct occupation titles include DevOps Engineer and Systems Engineer. This domain most frequently overlaps with the Security, Data, and Business Analysis domains (approximately 19.1%, 17.0%, and 14.1% respective overlaps).

For hourly roles in the Networking domain, the average minimum wage is about $32.89 per hour, and the average maximum is around $33.87 per hour. Meanwhile, yearly positions average approximately $81,804 at the low end and $95,755 at the high end.

Of the jobs that listed education requirements, 93% reported requiring a high school diploma/GED or higher. About 60% reported requiring a bachelor's degree or higher.

Software Engineering

Spanning software design, development, and DevOps pipelines, this domain captures the creation and maintenance of software systems. It is distinct due to the strong emphasis on coding languages, development frameworks, and continuous integration processes. Keywords like "devops," "cicd," "infrastructure as code," "java," "python," "docker" capture both language-specific references and broader engineering methodologies. It includes everything from code architecture to automation tools (Jenkins, GitLab, Chef) under the software development umbrella. Top occupation titles include Software Engineer, Java Developer, and Software Developer. This domain most frequently overlaps with the Security, Data, and Business Analysis domains (approximately 18.7%, 17.1%, and 14.3% respective overlaps).

For hourly roles in the Networking domain, the average minimum wage is about $33.57 per hour, and the average maximum is around $34.96 per hour. Meanwhile, yearly positions average approximately $89,355 at the low end and $96,228 at the high end.

Of the jobs that listed education requirements, 93% reported requiring a high school diploma/GED or higher. About 65% reported requiring a bachelor's degree or higher.

Systems

Covering operating systems and system administration, this domain addresses the setup and upkeep of servers and OS-level infrastructure (Linux, Windows, mainframe). Systems expertise is a separate sphere as it deals heavily with OS-level performance, patches, and configurations. Sample terms include *"linux," "aix," "z/os," "rhel,"* and relevant administration references (*"solaris 11 advanced administration"*). This domain emphasizes provisioning, maintenance, and performance optimization of on-prem or enterprise servers. Top distinct occupation titles include Systems Engineer, Embedded Software Engineer, and DevOps Engineer. This domain most frequently overlaps with the Security, Data, and Software Engineering domains (approximately 17.0%, 15.0%, and 13.8% respective overlaps).

For hourly roles in the Networking domain, the average minimum wage is about $22.41 per hour, and the average maximum is around $23.99 per hour. Meanwhile, yearly positions average approximately $98,733 at the low end and $112,187 at the high end.

Of the jobs that listed education requirements, 94% reported requiring a high school diploma/GED or higher. About 67% reported requiring a bachelor's degree or higher.

Admin Tools

This domain has an emphasis is on enterprise management, ITSM solutions, and administrative platforms (like ServiceNow or SCCM). These tools support ticketing, monitoring, and automation tasks that cut across multiple technology stacks. Example key words include "servicenow," "sccm," "bmc," "incident management," "salesforce," or test-management software (LoadRunner, ALM). It broadly includes any technology used to manage, monitor, or automate enterprise IT tasks. Top occupation titles include Project Manager, Consulting Technical Manager, and Scrum Master. This domain most frequently overlaps with the Security, Data, and Business Analysis domains (approximately 19.8%, 17.7%, and 15.3% respective overlaps).

For hourly roles in the Networking domain, the average minimum wage is about $28.38 per hour, and the average maximum is around $30.07 per hour. Meanwhile, yearly positions average approximately $88,969 at the low end and $96,198 at the high end.

Of the jobs that listed education requirements, 93% reported requiring a high school diploma/GED or higher. About 61% reported requiring a bachelor's degree or higher.

Business Analysis

Focusing on process modeling, requirements gathering, and workflow improvements, this domain supports bridging business needs with tech solutions. Business analysis and BPM require distinct methodologies, tools (e.g., BPMN), and facilitation skills not typically found in core IT roles. Keywords such as *"bpm," "bpmn," "ba," "requirements management," "blueworks," "pega"* reflect roles focusing on process improvement, workflow design, and bridging tech solutions with business needs. Tools like *documentum* or references to *agile analysis* also appear here. Top distinct occupation titles include Supply Chain Associate, Business Systems Analyst, and Business Analyst. This domain most frequently overlaps with the Security, Data, and Software Engineering domains (approximately 22.2%, 20.4%, and 11.2% respective overlaps).

For hourly roles in the Networking domain, the average minimum wage is about $29.24 per hour, and the average maximum is around $30.82 per hour. Meanwhile, yearly positions average approximately $82,084 at the low end and $93,267 at the high end.

Of the jobs that listed education requirements, 96% reported requiring a high school diploma/GED or higher. About 63% reported requiring a bachelor's degree or higher.

Continuity Risk Resilience

This domain targets business continuity, disaster recovery, and risk management strategies. Continuity risk requires specialized planning and compliance approaches needed to ensure systems and operations remain intact in adverse events. This domain features key words such as "business continuity," "disaster recovery," "risk assessment," "cyber resilience". Jobs in this category oversee strategies to minimize downtime, ensure compliance, and manage crises in public or private sector environments. Top distinct occupation titles include Consulting Project Technical Manager, Systems Administrator, and Database Administrator. This domain most frequently overlaps with the Security, Data, and Business Analysis domains (approximately 18.6%, 16.4%, and 13.8% respective overlaps).

For hourly roles in the Networking domain, the average minimum wage is about $28.82 per hour, and the average maximum is around $29.98 per hour. Meanwhile, yearly positions average approximately $75,925 at the low end and $94,349 at the high end.

Of the jobs that listed education requirements, 95% reported requiring a high school diploma/GED or higher. About 59% reported requiring a bachelor's degree or higher.

Modeling UML

The Modeling UML domain covers formal modeling techniques like UML, SysML, and MBSE that specify or visualize software/systems architectures. These skills justify their own domain because structured modeling, with its associated certifications and frameworks, represents a unique body of knowledge distinct from general coding. Terms like "uml," "sysml," "mbse," "omg certified" revolve around formal methods of specifying software/systems architecture. This category often appears in roles requiring structured diagramming, advanced modeling, or systems engineering certifications. Top distinct occupation titles include Data Architect, Cloud Systems Engineer, and

Cloud Systems Engineer Advisor. This domain most frequently overlaps with the Security, Data, and Business Analysis domains (approximately 17.4%, 15.0%, and 16.8% respective overlaps).

For hourly roles in the Networking domain, the average minimum wage is about $38.7 per hour, and the average maximum is around $39 per hour. Meanwhile, yearly positions average approximately $101,475 at the low end and $105,938 at the high end.

Of the jobs that listed education requirements, 95% reported requiring a high school diploma/GED or higher. About 68% reported requiring a bachelor's degree or higher.

Marketing Product

Covering marketing platforms (e.g., Adobe Campaign) and product management roles, this domain deals with how products are planned, positioned, and measured in tech. It's important as a separate area because digital marketing and product ownership demand distinct tools and analytics beyond core dev or IT operations. This domain highlights digital marketing platforms and product management. Typical entries are "marketing," "adobe campaign," "product manager," "competitive intelligence," "digital marketing." Roles often involve campaign tools, analytics for marketing funnels, and occasionally product ownership or analysis references. Top distinct occupation titles include Supply Chain Associate and Product Manager. This domain most frequently overlaps with the Security, Data, and Business Analysis domains (approximately 19.0%, 17.0%, and 15.8% respective overlaps).

For hourly roles in the Networking domain, the average minimum wage is about $25.37 per hour, and the average maximum is around $26.11 per hour. Meanwhile, yearly positions average approximately $61,341 at the low end.

Of the jobs that listed education requirements, 93% reported requiring a high school diploma/GED or higher. About 52% reported requiring a bachelor's degree or higher.

Agile Scrum

Dedicated to agile methodologies (Scrum, sprints, retros), this domain captures roles that revolve around iterative project management and team facilitation. Centered on Agile and Scrum methodologies, it includes "scrum master," "psm," "agile," "sprint," "backlog," and so forth. Jobs here revolve around iterative development, team facilitation, retrospective events, and the servant leadership model in project management. Top distinct occupation titles include Scrum Master, Project Manager, and Software Engineer. This domain most frequently overlaps with the Security, Data, and Business Analysis domains (approximately 17.9%, 16.5%, and 14.7% respective overlaps).

For hourly roles in the Networking domain, the average minimum wage is about $47.14 per hour, and the average maximum is around $50.71 per hour. Meanwhile, yearly positions average approximately $99,497 at the low end and $108,498 at the high end.

Of the jobs that listed education requirements, 94% reported requiring a high school diploma/GED or higher. About 70% reported requiring a bachelor's degree or higher.

QA Testing

Focused on software testing, QA processes, and automated testing frameworks, this domain emphasizes ensuring code quality and reliability. It is isolated as its own domain due to the specialized testing methodologies, tools, and certifications that often differ from mainstream dev work. Common terms include “test automation,” “istqb,” “performance testing,” “loadrunner,” plus management references like “defect tracking,” “test planning,” “alm octane.” This domain also covers specialized testing (e.g., mobile app, automotive software) and continuous testing pipelines. Top distinct occupation titles include QA Analyst, Quality Assurance Analyst, and Business Analyst. This domain most frequently overlaps with the Data, Security, and Business Analysis domains (approximately 17.0%, 16.6%, and 15.1% respective overlaps).

For hourly roles in the Networking domain, the average minimum wage is about $38.17 per hour, and the average maximum is around $41.64 per hour. Meanwhile, yearly positions average approximately $82,870 at the low end and $94,140 at the high end.

Of the jobs that listed education requirements, 95% reported requiring a high school diploma/GED or higher. About 65% reported requiring a bachelor’s degree or higher.

UX Usability

Concentrated on user experience design and usability testing, this domain addresses how products meet user needs at a design and interface level. It exists apart from other dev or IT fields because UX requires specialized practices like user research, interaction design, and interface evaluation. Keywords include “ux,” “usability,” “ui testing,” “user research,” “experience design.” It’s for roles that integrate human-centered design, interface optimization, and testing user journeys. Top distinct occupation titles include UX Designer, Front End Developer, and User Experience Designer. This domain most frequently overlaps with the Security, Data, and Business Analysis domains (approximately 17.0%, 14.9%, and 14.2% respective overlaps).

For hourly roles in the Networking domain, the average minimum wage is about $38.67 per hour, and the average maximum is around $39.55 per hour. Meanwhile, yearly positions average approximately $68,694 at the low end and $84,802 at the high end.

Of the jobs that listed education requirements, 93% reported requiring a high school diploma/GED or higher. About 63% reported requiring a bachelor’s degree or higher.

Domains Analysis

In the following analysis, we present high-level trends in both the wage data and education requirements for each domain. These findings derive from structured fields that employers submitted—namely, what salary range or minimum education level they indicated when listing the position. As such, while certain job descriptions might contain more nuanced or updated information, our focus here is strictly on the standardized data fields that were readily available across all postings. Because this approach relies on fields that can be left incomplete or aggregated inconsistently, it may omit certain subtleties that could appear in unstructured text sections of the postings. Nevertheless, by centering on the structured wage and education inputs,

we are able to compare these domains in a consistent manner. Below, we outline each domain's wage distribution and typical educational expectations, noting where higher degrees or specialized credentials appear to predominate.

Education Analysis

Overall, most postings across the domains display a diverse range of education requirements, with many indicating higher-degree prerequisites. Across the domains that did specify education requirements, which was roughly only 15% of the tech job postings, most fields show over half of postings calling for at least a bachelor's degree. Agile/Scrum, Networking, and Systems in particular stand out for higher percentages of bachelor's or above, while Software Engineering and Agile/Scrum also feature a modestly higher proportion of advanced (master's/doctoral) degrees than other domains. By contrast, Marketing Product shows a larger share of roles open to high-school credentials alone, reflecting more flexibility in formal schooling for that category. It is possible that the non-response category contains postings where employers genuinely have no education requirements.

Domain Education Requirements in Percentages Table

	Blank	Less than High School	High School Diploma/GED	Some College	Associate's Degree	Vocational Degree	Bachelor's Degree	Master's Degree	Doctoral Degree
NETWORKING	83.61	0.98	5.38	0.14	1.30	0.08	8.25	0.24	0.02
DATA	82.32	1.23	4.91	0.06	0.79	0.03	10.22	0.39	0.06
SECURITY	83.68	1.22	4.93	0.05	0.78	0.03	9.06	0.23	0.03
CLOUD	86.21	0.90	4.08	0.02	0.50	0.02	7.93	0.30	0.04
SOFTWARE ENGINEERING	84.34	1.03	3.97	0.02	0.44	0.01	9.62	0.47	0.08
SYSTEMS	83.94	0.86	4.00	0.02	0.37	0.03	10.27	0.40	0.12
ADMIN TOOLS	84.96	1.07	4.21	0.01	0.63	0.01	8.82	0.26	0.03
BUSINESS ANALYSIS BPM	82.34	0.67	4.94	0.03	0.76	0.04	10.82	0.35	0.05
CONTINUITY RISK RESILIENCE	83.80	0.69	4.35	0.04	1.37	0.13	9.51	0.09	0.03
MODELING UML	82.23	0.95	4.04	0.02	0.60	0.02	11.71	0.42	
MARKETING PRODUCT	81.34	1.28	7.01	0.02	0.68	0.02	9.37	0.23	0.05
AGILE SCRUM	84.33	0.88	3.60	0.01	0.21	0.00	10.51	0.41	0.04
QA TESTING	82.00	0.87	4.48	0.02	0.85		11.48	0.26	0.04
UX USABILITY	83.12	1.05	4.61	0.05	0.48	0.03	10.43	0.20	0.01

Domain Wages

In our structured wage data, each posting typically recorded a minimum and maximum pay level along with a designated pay period (most often either hourly or yearly). While many postings fell under a more ambiguous label ("other" or "unknown"), the available averages suggest that typical hourly rates in several domains can vary widely, from roughly $20 per hour at the low end up to over $50, while yearly salaries often range from the $60k–$100k level, with some domains creeping above $110k.

Domain Wages Table

		Minimum Reported Wage	Maximum Reported Wage
Networking	**Hourly**	$23.42	$29.41
	Yearly	$68,474.96	$90,086.95
Data	**Hourly**	$27.53	$33.79
	Yearly	$75,247.56	$95,892.37
Security	**Hourly**	$30.04	$36.51
	Yearly	$81,258.00	$100,907.54
Cloud	**Yearly**	$81,755.06	$104,543.70
	Hourly	$32.89	$39.79
Software Engineering	**Yearly**	$89,294.24	$106,969.84
	Hourly	$33.57	$39.00
Systems	**Yearly**	$98,733.63	$117,659.01
	Hourly	$41.79	$48.69
Admin Tools	**Hourly**	$28.38	$33.45
	Yearly	$88,968.95	$103,743.09
Business Analysis	**Yearly**	$82,397.50	$101,363.85
	Hourly	$29.51	$36.16
Continuity Risk	**Yearly**	$75,925.02	$101,797.99
	Hourly	$28.82	$34.26
Modeling UML	**Yearly**	$101,475.29	$113,000.64
	Hourly	$38.70	$48.75
Marketing Product	**Yearly**	$61,341.43	$74,327.87
	Hourly	$25.37	$30.24
Agile/Scrum	**Yearly**	$99,681.91	$114,544.91
	Hourly	$47.85	$53.10
QA Testing	**Yearly**	$82,870.38	$99,903.84
	Hourly	$38.17	$43.78
UX Usability	**Hourly**	$38.67	$43.64
	Yearly	$68,693.76	$95,402.35

It's important to note that we did not rely on any more detailed pay information in the free-text descriptions, meaning some nuances or updated figures may not be captured here. Additionally, a role like Desktop Support Engineer—frequently assigned to multiple domains due to its broad scope—may be suppressing some average wage values if it is relatively lower-paying and heavily represented across categories. This overlap can lead to a downward skew in the structured data for certain fields. The data also combines job postings from multiple years, which may mean that occupations that have seen significant wage growth in the recent past may be depressing wages overall.

New and Emerging Occupation Recommendations

Below is a refined list of proposed new or updated ONET occupational codes that repeatedly surfaced across multiple domains, excluding smaller-volume or highly specialized roles. Each recommendation is based on recurring job titles and tasks that don't fit neatly into existing ONET classifications.

1. **DevOps Engineer**
   - **Why**: "DevOps Engineer" is ubiquitous across the Cloud, Software Engineering, and Security domains, yet it typically defaults to 15-1252.00 (Software Developers), 15-1244.00 (Network and Computer Systems Administrators), and 15-1299.00 (Computer Occupations, All Other)
   - **Scope**: Continuous integration/delivery (CI/CD), infrastructure as code, security testing, automation of build and deployment pipelines.
   - **Potential Occ Size MN 2016-2023**: 4,892
   - **Percentage of SOCs that would be affected by having this occupation have its own code**: 1.3%
   - ***Common job titles****: DevSecOps, Site Reliability Engineer (SRE), Cloud DevOps Engineer, DevOps Engineer, DevSecOps Engineer, Software DevOps Engineer, Principal DevOps Engineer, DevOps Manager, IT DevOps Engineer, Systems Engineer Manager (DevOps), DevOps Architect, DevOps Developer, Virtualization Automation Engineer, Azure DevOps Engineer, DevOps Consultant, DevOps Software Developer*
2. **Cloud Engineer / Cloud Architect**
   - **Why**: Many postings specifically reference *AWS, Azure, Oracle Cloud Infrastructure* or *Cloud Architect*. O*NET typically lumps these either under 15-1252.00 (Software Developers) or 15-1299.00 (Computer Occupations, All Other). Computer Systems Engineers/Architects (15-1299.08) is a similar occupation realm with enough specific job duties to represent its own code. Cloud Engineering is one such occupation that also has distinct job duties reflected in this role.
   - **Scope**: Designing, deploying, and maintaining cloud-native environments, with specialized tasks in containerization, serverless computing, or cloud orchestration.
   - **Potential Occ Size MN 2016-2023**: 20,542
   - **Percentage of SOCs that would be affected by having this occupation have its own code**: 5.5%
   - ***Common job titles****: Cloud Engineer, Cloud Architect, Oracle Cloud Infrastructure Engineer, Cloud Solutions Architect, Principal Cloud Architect, Enterprise Cloud Architect, Cloud Security Architect, Cloud Software Developer, Cloud Security Engineer, Cloud Engineering Infrastructure Development, Cloud Operations Engineer, Cloud Software Engineer, Cloud Software Development Engineer, Cloud Systems Engineer, Cloud Systems Engineer Advisor, Cloud Infrastructure Architect, Cloud Implementation Orchestration, Oracle Analytics Cloud (OAC) Engineer, Cloud Customer Operations Engineer*
3. **Data Engineer**
   - **Why**: "Data Engineer" appears across Data, Security, and Cloud. These roles don't map cleanly to 15-1252.00 (Software Developers), 15-1299.00 (Computer Occupations, All Other), and 15-1221.00 (Computer and Information Research Scientists). This role may also

significantly overlap 15-2051 Data Scientists in some organizations but has a focus on the processing of data rather than the analysis of data. A Database Architect (15-1243) primarily designs the structure, strategy, and optimization of databases or data warehouses, ensuring efficient storage and retrieval of data rather than engineering large-scale data pipelines. In contrast, a Data Engineer focuses on designing, building, and maintaining the infrastructure that enables data storage, processing, and retrieval, often working with ETL (Extract, Transform, Load) pipelines, cloud platforms, and big data technologies. Thus, if Database Architect is warranted its own ONET code, Data Engineer can make a similar case.

- **Scope**: Building pipelines for big data ingestion, ETL, real-time streaming, database optimization, advanced data modeling.
- **Potential Occ Size MN 2016-2023**: 27,886
- **Percentage of SOCs that would be affected by having this occupation have its own code**: 7.4%
- ***Common job titles****: Data Scientist, Data Engineer, Data Analyst, Database Administrator, Database Developer, Database and Systems Engineer, Data Specialist, Database Analyst, Database Engineer, Big Data Engineer, Solution Architect Big Data, Customer Data Specialist, Data Warehouse Architect, Big Data Developer*

4. **Scrum Master / Agile Lead**
    - **Why**: Roles like *Scrum Master* and *Release Train Engineer* are common in agile development but are generally coded to 15-1252.00 (Software Developers), which is what we're using for the analysis, or 15-1211 Computer Systems Analysts. The specialized skill set in agile frameworks (Scrum, SAFe) warrants its own category as these roles differ substantially from traditional project management. Technology Project Managers (15-1299.09) is an example of a similar occupation with ONET-specific code information. This is further evidence supporting the need for more clarity around how IT project managers should be coded in the current SOC structure or if there is a need for an additional new code.
    - **Scope**: Agile facilitation, sprint planning, backlog refinement, removing team impediments.
    - **Potential Occ Size MN 2016-2023**: 5,064
    - **Percentage of SOCs that would be affected by having this occupation have its own code**: 1.4%
    - ***Common job titles****: Scrum Master, Agile Coach, Project Manager, Scrum Master Advisor, Agile Software Developer, Agile Product Owner, Agile Practitioner*

Conclusion

These four broad categories—DevOps Engineer, Cloud Engineer/Architect, Data Engineer, Scrum Master/Agile Lead—represent recurring, high-volume roles that lack precise ONET codes today. While existing ONET occupations can house these positions under more general classifications, the ongoing demand and specialized skill sets suggest that future updates might consider establishing distinct occupational codes for each.

Appendix A: Lightcast's Job Postings Methodology

(from Lightcast's Knowledge Base)

Aggregation

The methodology used to obtain job advertisements from publicly available online job boards and company websites is based on Lightcast's advanced scraping technology. Once Lightcast identifies an online site as a valid source of employment opportunities, a dedicated spider is programmed, tested, and activated. The spider visits the site regularly and pulls job information for all posted jobs; the information is then stored in a database. Sites with the newest jobs or the highest frequency of posting changes are visited most frequently. For sites that have daily collected postings the time window from posted, to scraped, processed, and published in the data is 36 hours. Lightcast currently scrapes more than 65,000 sites worldwide.

Deduplication

Lightcast's database is a full reflection of job listings posted across the internet. As such, robust processes are required to identify and remove duplicate listings. Lightcast applies a unique two-step approach to deduplication, resulting in up to 80% of the jobs Lightcast collects being deduplicated.

The first step: On a source-level basis, Lightcast uses intelligence contained within the scraping spiders to identify new advertisements for that source. The spiders refrain from collecting advertisements that have previously been aggregated.

The second step: Since the same new advertisement can be found across multiple sources, Lightcast uses normalized fields such as job title, company, and location, and check if these fields have been used in new advertisements found in another source. This process is checked across 60 days of data to identify duplicates.

To illustrate step two, here is an example: If a job for a Marketing Specialist at Google is posted for the first time on March 1st, Lightcast considers this the "original posting." For the next 60 days, Lightcast considers any advertisements for this job found elsewhere as duplicates. In theory, if Google posts the same ad every day for a year on different sources, Lightcast will count it six times.

Data curation

The posting data seen in Lightcast products is not smoothed. The deduplication process uses a fixed algorithm that ensures Lightcast deduplicates 80% of all postings collected. This high rate serves as redundancy and ensures stable data.

Lightcast curates the data to remove outliers, usually around 1% of the data monthly. This is done by a proprietary tool that removes postings considered bad data or noise in the dataset. Examples of these include:

- Postings where the employee must invest their own money
- Pyramid schemes/MLM postings
- Sexually explicit postings

- Discriminatory content postings
- Spamming, including items such as gig economy, military, or trucking.

Enrichment Process

Once postings are collected, Lightcast technologies parse, extract, and code dozens of data elements, including Lightcast job titles, occupations, companies, and detailed data about the specific skills, educational credentials, certifications, experience levels, and work activities required for the job. Lightcast also collects data about salary, the number of openings, and job types. This high level of detail enables users to look beyond summary statistics to discover specific skills in demand and skills that job seekers can identify and acquire if needed.

Occupations

Lightcast classifies occupations using a proprietary process that combines machine learning (ML) models with rules curated by their in-house taxonomy team.

Rules are applied first, and the model is used only if no rule matches. When a job posting matches a predefined rule pattern, it is assigned a Lightcast Specialized Occupation. This ensures that job postings with clear rule-based classifications are efficiently processed without further analysis by the machine learning model. Nonproprietary occupation taxonomies are then applied to postings based on the classified Lightcast Specialized Occupation and an additional set of disambiguation rules.

As Lightcast continuously improves the rules and models based on internal quality checks and client feedback, the data becomes increasingly accurate. This improved coding is then used to retrain the model for further refinement.

Throughout the process, a dedicated team performs hand curation and quality checks to ensure accuracy.

Education Level

Lightcast assigns an education level to each posting using a machine learning model. If multiple education levels are mentioned, the posting will be tagged with all levels. Possible values include High School/GED, Associate's Degree, Bachelor's Degree, Master's Degree, or Ph.D./Professional Degree. If no education requirements are listed, the posting will be tagged as Unspecified.

More information can be found here.

Advertised Salary

Some job postings include the salary or salary range. Lightcast extracts and cleans this information and includes it when it reflects the position accurately. Lightcast does not present an 'estimated salary' that may be reasonable for the individual job posting.

Hourly salaries are converted to annual formats, and vice versa, using appropriate work hours for each country. For example, in Turkey, Lightcast uses the annual standard of 2,340 work hours.

Skills

Each skill in the Lightcast Taxonomy has one display name, but their models also use aliases, acronyms, abbreviations, and historic names to extract skills. The process begins by segmenting and tokenizing job postings to remove extra characters (punctuation) and new lines. The model then scans the text for word sequences that indicate skills in the proper context. For example, when "AWS" appears, the surrounding context helps determine whether it refers to the "American Welding Society" or "Amazon Web Services." A confidence score is assigned, and accuracy thresholds ensure quality predictions are displayed.

Titles

Raw titles are cleaned and normalized to Lightcast Titles taxonomy, simplifying complex titles to more general ones. For example, a posting listed as “Data Science Manager, Messenger” for Facebook would be normalized to “Data Science Manager.”

Appendix B: Example Manufacturing Job Descriptions

Entry-Level Machinist at Fastenal

OVERVIEW: Working as Part-time Entry-Level Manufacturing Machine Operator, you will setup and operate multiple pieces of equipment such as saws, threading machines, bending machines, lathes, mills, and various other pieces of manual and/or CNC equipment. This an entry-level position and training will be provided.

Roll Mill Set Up Operator - Production Team Member at Conductix

ESSENTIAL DUTIES AND RESPONSIBILITIES include the following. Other duties may be assigned.

- Know capacity and operate forklift and overhead crane. Bridgeport mills, punch press and use a variety of hand tools.
- Set up and operate punch presses, drill presses, Bridgeport, saw, sanders, wire strippers, wire cutter, 8-Bar curve machine, C-Channel curve machine and an assortment of hand tools.
- Have a good understanding of the operations of air, hydraulics and electrical systems.
- Measure boards using measuring tape, mark cutting lines and saw to required sizes.
- Construct pallets, boxes, or crates using staple gun with hammer, nails, and 3/4" Bandar.
- Operate table and radial saw.
- Operate floor controlled 2-ton overhead crane, transport and position materials by following established procedures and safety rules.
- Use chains, grabs, slings and spreader bar to handle materials using care to prevent materials from slipping, dropping, or being damaged during the move.
- Set up and operate machine to punch, cut or process bar. Pushes button or depresses pedal to activate machine.
- Perform visual as well as physical inspection of equipment such as; roll tooling, roller stand, punch press, and cut off dies.
- Use various measuring instruments such as; tape, dial calipers, micrometer, square and protractor.