



In-Depth Analysis of Web3 Job Market: Insights from Blockchain and Cryptocurrency Employment Landscape

Calvina Izumi^{1,*} , Taqwa Hariguna² 

¹School of Management Business, Ciputra University, Surabaya, Indonesia

²Magister of Computer Science, Universitas Amikom Purwokerto, Purwokerto, Indonesia

ABSTRACT

The emergence of Web3, underpinned by blockchain technology, has reshaped the digital realm, ushering in a decentralized and trustless internet paradigm. In this paper, we conduct an extensive analysis of the Web3 job market, leveraging data from 2000 job postings to delineate prevalent keywords, sought-after skills, prevalent job titles, and salary determinants. Our examination reveals compelling insights into the job landscape, showcasing the dominance of technical competencies such as Ethereum proficiency and software development expertise. Among the top skills sought by employers, Ethereum (371 occurrences), React (213 occurrences), NFT (213 occurrences), Java (205 occurrences), and Rust (102 occurrences) prominently feature. Moreover, our analysis uncovers the ascendancy of specialized roles in cybersecurity, technical leadership, and project management, which command premium compensation levels. Notably, security positions emerged as the highest paying roles (average salary: \$153,295.86), followed by tech lead (average salary: \$121,526.32) and operations (average salary: \$120,396.55). These findings offer valuable insights for job seekers, employers, educators, and policymakers navigating the evolving Web3 job landscape. By delineating key trends and challenges, our study contributes to a nuanced understanding of the transformative potential of Web3 and its implications for the future of work.

Keywords VR Headsets, Web3, Blockchain, Cryptocurrency, Job Analysis, Metaverse

INTRODUCTION

The evolution of the internet has witnessed transformative shifts, from the static web of the 1990s to the dynamic Web2 era characterized by user-generated content, social media platforms, and interactive web applications [1], [2]. However, the advent of Web3 represents a paradigmatic leap, promising a decentralized, trustless, and censorship-resistant internet powered by blockchain technology [3], [4]. At its core, Web3 embodies a vision of a peer-to-peer network where individuals have sovereign control over their data, digital identities, and transactions, challenging the centralized models that dominate the current digital landscape [5], [6].

Blockchain technology, the cornerstone of Web3, introduces novel concepts such as distributed consensus mechanisms, cryptographic security, and programmable smart contracts [7], [8], [9]. These innovations enable a wide array of decentralized applications (DApps) and digital assets, ranging from cryptocurrencies and non-fungible tokens (NFTs) to decentralized finance (DeFi) platforms and decentralized autonomous organizations (DAOs) [10], [11], [12], [13]. The potential of Web3 extends far beyond financial applications, with implications for sectors as diverse as supply chain management,

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Corresponding author
Calvina Izumi,
calvinaizumi01@gmail.com

Additional Information and
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healthcare, governance, and entertainment [14].

Despite the growing interest and adoption of Web3 technologies, there exists a research gap in understanding the dynamics of the job market surrounding these emerging technologies. While some studies have explored specific aspects of blockchain employment, such as skill requirements or salary trends, a comprehensive analysis integrating various dimensions of the Web3 job market is lacking. Additionally, the rapid pace of technological innovation and industry evolution necessitates an up-to-date understanding of the state-of-the-art practices and emerging trends in Web3 employment.

In this paper, we aim to address this research gap by conducting a thorough examination of the Web3 and blockchain job market. Through a multi-faceted analysis of job postings, skill requirements, salary trends, and emerging job roles, we seek to provide insights into the evolving landscape of Web3 employment. By identifying key trends, challenges, and opportunities, we aim to contribute to a deeper understanding of the transformative potential of Web3 and its implications for the future of work. Our study also aims to bridge the gap between academia and industry by informing educators, policymakers, employers, and job seekers about the evolving dynamics of Web3 employment.

Literature Review

Evolution of Web3 and Blockchain Technologies

The evolution of Web3 and blockchain technologies has been marked by a transformative journey, reshaping the digital landscape from centralized architectures to decentralized paradigms. Initially conceptualized as the underlying technology for cryptocurrencies, blockchain has transcended its origins to become a foundational framework for a myriad of applications. The concept of Web3, which envisions a decentralized internet powered by blockchain technology, represents a paradigm shift in how digital interactions are conducted. By leveraging cryptographic principles and distributed consensus mechanisms, Web3 offers a decentralized infrastructure that promises enhanced security, transparency, and autonomy. This evolution signifies a departure from traditional models of trust, enabling peer-to-peer transactions and fostering a more equitable and inclusive digital economy [15].

The adoption of blockchain and Web3 technologies spans various sectors, ranging from finance and supply chain to healthcare and governance. With the proliferation of decentralized applications (DApps) and smart contracts, blockchain has emerged as a disruptive force with the potential to revolutionize existing business processes and societal structures. The decentralized nature of blockchain mitigates the risks associated with central points of failure, reduces dependence on intermediaries, and empowers individuals to have greater control over their digital assets and identities. As blockchain continues to mature and expand its utility beyond cryptocurrency, the implications for industries worldwide are profound, heralding a new era of digital innovation and collaboration [16].

Job Market Dynamics in Web3 and Blockchain

The advent of Web3 and blockchain technologies has catalyzed the growth of a dynamic job market characterized by evolving trends and skill requirements. The demand for blockchain-related roles has surged in recent years, fueled by

increased adoption of blockchain solutions across industries. Job postings in areas such as blockchain development, cryptocurrency analysis, smart contract auditing, and decentralized finance (DeFi) have proliferated, signaling the growing importance of blockchain expertise in the workforce. Moreover, the interdisciplinary nature of blockchain projects necessitates a diverse talent pool encompassing skills in software development, cryptography, economics, and legal compliance. As organizations seek to harness the potential of blockchain technology to drive innovation and efficiency, the demand for skilled professional's adept at navigating the complexities of Web3 ecosystems is expected to continue rising [17].

The emergence of Web3 has also led to the creation of new job roles and career pathways, reflecting the evolving nature of digital interactions and economic transactions. Roles such as blockchain developer, crypto analyst, decentralized application architect, and blockchain project manager have become increasingly prominent, offering diverse opportunities for professionals seeking to capitalize on the burgeoning blockchain industry. Furthermore, the decentralized nature of Web3 projects fosters a global talent marketplace, enabling remote work and collaboration across geographical boundaries. As the Web3 ecosystem continues to evolve, the job market is poised to witness sustained growth, presenting unique challenges and opportunities for individuals and organizations alike [18].

Environments Skill Requirements and Training in Web3 and Blockchain

The rapid evolution of Web3 and blockchain technologies necessitates a corresponding evolution in skill sets and training methodologies to meet the demands of the industry. Traditional educational programs and professional certifications have been augmented by specialized courses, bootcamps, and online learning platforms offering blockchain-related curriculum. Universities and institutions worldwide have recognized the importance of blockchain education, incorporating courses on cryptography, distributed systems, smart contract development, and blockchain governance into their curricula. Moreover, industry collaborations and partnerships have facilitated the development of hands-on training programs and real-world projects, providing students and professionals with practical experience in blockchain development and implementation [19].

In addition to formal education, the blockchain community has embraced a culture of continuous learning and skill enhancement through self-directed study and participation in hackathons, meetups, and online forums. Open-source projects and developer communities play a crucial role in knowledge sharing and skill development, offering opportunities for collaboration and mentorship. Furthermore, the decentralized nature of blockchain technology enables individuals to contribute to open-source projects and gain recognition within the community, enhancing their professional profiles and job prospects. As the demand for blockchain expertise continues to grow, ongoing investments in education and training are essential to cultivate a diverse talent pool equipped with the skills and competencies needed to drive innovation and adoption in the Web3 era.

Methodology

Data Collection

The research embarked on a comprehensive data collection endeavor, sourcing a diverse dataset encompassing 2000 job postings from multiple platforms and sources within the Web3, blockchain, and cryptocurrency sectors. This meticulous curation aimed to ensure a representative sample, capturing the breadth and depth of job opportunities and skill requirements prevalent in these industries [20].

Data Preprocessing

Prior to analysis, the collected dataset underwent rigorous preprocessing procedures to enhance its quality and consistency. This preprocessing phase involved several key steps, including duplicate removal, handling of missing values, and standardization of text formats [21]. Furthermore, to prepare the textual data for analysis, a series of NLP-based techniques were employed, such as tokenization, stopword removal, and stemming, thereby ensuring uniformity and coherence across the dataset.

Analysis of Job Market Keywords

The analysis of job market keywords commenced with an exploration of the most frequently occurring terms and phrases within the dataset. Through sophisticated text mining techniques, word frequency counts were generated, shedding light on prevalent themes and trends in job postings. Visualization tools like bar charts and word clouds were then utilized to present the findings, facilitating intuitive comprehension and interpretation of the key insights derived [22].

Identification of In-Demand Skills

A pivotal aspect of the research involved the identification of in-demand skills sought by employers in the Web3, blockchain, and cryptocurrency domains. Leveraging advanced NLP methodologies, the dataset was meticulously scrutinized to extract relevant skills and competencies mentioned in job titles and descriptions. Subsequently, these extracted skills underwent a comprehensive ranking process based on frequency and relevance, offering invaluable insights into the skill landscape of the industry [23].

Analysis of Job Titles

The analysis of job titles sought to uncover the prevailing roles and positions coveted by employers operating within the target industries. Employing a combination of data aggregation, categorization, and trend analysis techniques, the research delved into the distribution and prevalence of various job titles across different sectors and organizational levels. By discerning patterns and trends in job title frequency, the study provided comprehensive insights into the evolving job market dynamics.

Examination of Salary Trends

A meticulous examination of salary trends was conducted to elucidate the remuneration patterns prevailing within the Web3, blockchain, and cryptocurrency job market. This involved rigorous processing and analysis of

salary data extracted from the dataset, encompassing factors such as salary ranges, average compensation levels, and industry-specific salary benchmarks. Through the application of statistical tools and visualization techniques, the research unearthed nuanced insights into the determinants and drivers of salary trends within the industry.

Word Cloud Analysis of Web Development Skills

A nuanced understanding of the key competencies associated with web development roles was garnered through a comprehensive word cloud analysis. By aggregating and visualizing the frequency of programming languages, frameworks, and tools mentioned in job postings related to web development, the research elucidated the prevailing skill preferences and technological trends shaping the Web3 landscape [24].

Statistical Analysis: Statistical techniques formed the bedrock of the research, facilitating rigorous analysis and interpretation of the dataset. Leveraging descriptive statistics, frequency analysis, and correlation analysis, the study unearthed meaningful insights, ranging from trends and patterns to relationships and associations within the data. This robust statistical framework underpinned the research findings, empowering stakeholders with actionable intelligence and strategic guidance.

Result and Discussion

Result

Analysis of Job Market Keywords. The examination of job market keywords in the Web3, blockchain, and cryptocurrency industries offers valuable insights into the prevailing trends and skill requirements within the sector. The analysis, conducted on a comprehensive dataset comprising 2000 job postings sourced from various platforms and companies, aimed to identify the most prevalent terms and themes recurrent in job descriptions and searches.

Among the top keywords identified in the analysis, several recurring themes and terms emerged as prominent features of job postings and searches within the Web3 ecosystem.

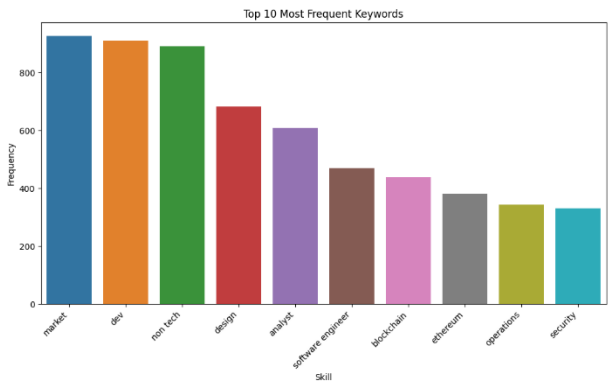


Figure 1 Top 10 Most Frequent Keywords

"Market" (927 occurrences): The frequent occurrence of this term suggests a strong focus on market dynamics, including market analysis, market research, and market strategies within the Web3, blockchain, and cryptocurrency sectors.

Employers may seek candidates with expertise in market analysis and business development to navigate the rapidly evolving landscape of decentralized technologies.

"Dev" (910 occurrences): The prevalence of "Dev" underscores the industry's demand for skilled developers capable of building and maintaining blockchain-based applications, smart contracts, and decentralized protocols. The term encompasses a broad spectrum of technical roles, including blockchain developers, smart contract developers, and DApp developers.

"NonTech" (891 occurrences): The prominence of "NonTech" highlights the recognition of non-technical competencies and skills in the Web3 job market. While technical expertise is crucial, employers also value candidates with strong communication skills, project management abilities, and domain knowledge in areas such as finance, legal compliance, and business strategy.

"Design" (683 occurrences): The inclusion of "Design" as a top keyword reflects the growing importance of user-centric design principles in blockchain and cryptocurrency projects. Employers may seek UX/UI designers, graphic designers, and product designers to create intuitive and engaging user experiences for decentralized applications and platforms.

"Analyst" (609 occurrences): The prevalence of "Analyst" indicates a demand for professionals skilled in data analysis, market research, and business intelligence within the Web3 ecosystem. Analyst roles may involve analyzing blockchain data, conducting market research on cryptocurrency trends, and providing insights to inform strategic decision-making.

"Software Engineer" (469 occurrences): The prominence of "Software Engineer" underscores the industry's need for skilled developers proficient in software engineering principles and practices. Software engineers play a crucial role in building and optimizing blockchain infrastructure, developing decentralized applications, and implementing smart contracts.

"Blockchain" (438 occurrences): The frequent occurrence of "Blockchain" reflects the central role of blockchain technology in the Web3 ecosystem. Employers may seek candidates with expertise in blockchain development, consensus mechanisms, cryptography, and distributed ledger technology to drive innovation and development in decentralized systems.

"Ethereum" (381 occurrences): The prevalence of "Ethereum" highlights the significance of the Ethereum blockchain as a foundational platform for decentralized applications, smart contracts, and DeFi protocols. Candidates with expertise in Ethereum development, Solidity programming, and Ethereum-based token standards may be in high demand.

"Operations" (343 occurrences): The inclusion of "Operations" suggests a need for professionals skilled in operational management, infrastructure management, and project coordination within Web3 companies and organizations. Operations roles may involve ensuring the smooth functioning of blockchain networks, managing decentralized infrastructure, and optimizing organizational processes.

"Security" (330 occurrences): The emphasis on "Security" underscores the critical importance of cybersecurity and risk management in the Web3, blockchain, and cryptocurrency sectors. Employers may seek candidates with

expertise in blockchain security, smart contract auditing, and cryptographic protocols to address security challenges and mitigate risks.

The analysis of job market keywords provides valuable insights into the skill requirements, job roles, and thematic priorities within the Web3, blockchain, and cryptocurrency industries. The prevalence of technical keywords such as "Dev," "Software Engineer," and "Blockchain" highlights the industry's demand for skilled developers and technologists capable of driving innovation and development in decentralized technologies.

Additionally, the recognition of non-technical competencies through keywords like "NonTech," "Design," and "Operations" suggests a holistic approach to talent acquisition, wherein employers value a diverse skill set encompassing both technical and non-technical proficiencies. This underscores the interdisciplinary nature of roles within the Web3 ecosystem and the importance of collaboration across domains.

Furthermore, the prominence of specific technologies such as "Ethereum" and thematic keywords like "Security" reflects ongoing trends and developments within the industry. Employers prioritize candidates with expertise in emerging technologies and specialized domains such as cybersecurity, reflecting the evolving nature of challenges and opportunities in the Web3 landscape.

Overall, the analysis of job market keywords sheds light on the skill requirements, thematic priorities, and industry dynamics within the Web3, blockchain, and cryptocurrency sectors. By understanding the prevailing trends and keywords recurrent in job postings and searches, stakeholders can make informed decisions regarding talent acquisition, skills development, and strategic planning within the industry.

In-Demand Skills for Blockchain-Related Jobs The analysis of in-demand skills for blockchain-related positions offers valuable insights into the proficiencies sought after by employers in the rapidly evolving Web3 landscape. By examining a wide range of skills, including programming languages, development frameworks, and domain-specific knowledge, the research aimed to identify key skill sets essential for success in blockchain-related roles.

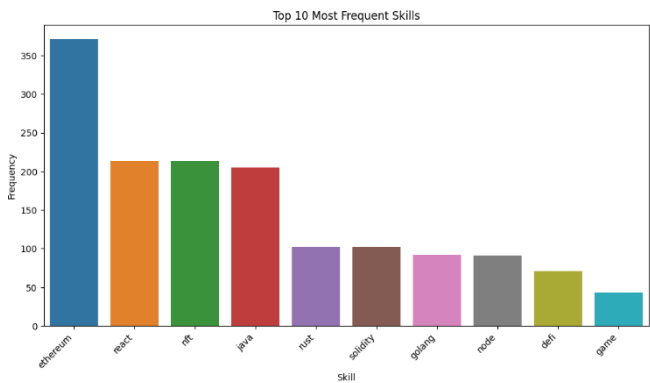


Figure 2 Top 10 Most Frequent Skills

The analysis revealed several in-demand skills that are highly sought after by employers within the blockchain industry:

Proficiency in Ethereum (371 occurrences): Ethereum stands out as a dominant

force in the blockchain space, serving as a foundational platform for DApps, smart contracts, and DeFi protocols. Candidates with expertise in Ethereum development, Solidity programming, and Ethereum-based token standards are in high demand, reflecting the widespread adoption and innovation driven by the Ethereum ecosystem.

React (213 occurrences): React, a popular JavaScript library for building user interfaces, emerged as a key skill for blockchain-related positions. Employers value candidates proficient in React for developing intuitive and responsive user interfaces for decentralized applications and blockchain-based platforms, enhancing user experience and engagement.

NFT (213 occurrences): The rise of non-fungible tokens (NFTs) has led to a surge in demand for skills related to NFT development, marketplaces, and platforms. Candidates with expertise in NFT standards, smart contract development for NFTs, and NFT marketplace integration are sought after by companies and projects exploring opportunities in the burgeoning NFT space.

Java (205 occurrences): Java, a versatile and widely used programming language, retains its relevance in blockchain development, particularly for enterprise-grade solutions and interoperability with existing systems. Candidates proficient in Java may be involved in building blockchain solutions, enterprise applications, and DeFi platforms compatible with Java-based ecosystems.

Rust (102 occurrences): Rust, known for its performance, safety, and concurrency features, has gained traction in blockchain development, particularly for projects emphasizing security and scalability. Candidates with expertise in Rust may contribute to the development of blockchain protocols, infrastructure, and decentralized applications requiring high-performance computing and secure code execution.

Solidity (102 occurrences): Solidity, the primary programming language for writing smart contracts on the Ethereum blockchain, remains a fundamental skill for blockchain developers. Candidates proficient in Solidity are capable of designing and implementing smart contracts for various use cases, including DeFi, tokenization, and decentralized autonomous organizations (DAOs).

Golang (92 occurrences): Golang, also known as Go, has emerged as a preferred language for building scalable and efficient blockchain solutions, thanks to its simplicity, concurrency support, and built-in features for network programming. Candidates with expertise in Golang may contribute to the development of blockchain protocols, decentralized applications, and backend infrastructure optimized for performance and reliability.

Node (91 occurrences): Node.js, a JavaScript runtime environment, remains a valuable skill for blockchain developers, particularly for server-side development and backend services. Candidates proficient in Node.js may work on building decentralized applications, API servers, and blockchain node infrastructure, leveraging the asynchronous and event-driven nature of Node.js for scalable and responsive solutions.

DeFi (71 occurrences): DeFi has emerged as a transformative force in the blockchain space, driving innovation in areas such as lending, borrowing, trading, and asset management. Candidates with expertise in DeFi protocols,

decentralized exchanges (DEXs), liquidity pools, and smart contract development for financial applications are in high demand as the DeFi ecosystem continues to expand.

Game development (43 occurrences): The intersection of blockchain technology and gaming has created new opportunities for game developers, designers, and entrepreneurs. Candidates with skills in blockchain-based game development, NFTs for gaming, and decentralized gaming platforms may contribute to the creation of innovative gaming experiences, play-to-earn models, and virtual economies powered by blockchain technology.

The analysis of in-demand skills for blockchain-related jobs provides valuable insights into the evolving skill requirements and technological trends within the Web3 ecosystem. The identified skills reflect the diverse nature of roles and projects in blockchain development, spanning from DeFi and NFTs to smart contracts, gaming, and enterprise solutions.

Employers seek candidates with a versatile skill set encompassing proficiency in blockchain platforms, programming languages, and development frameworks relevant to their specific projects and objectives. Additionally, the prominence of emerging technologies such as Ethereum, React, and Rust underscores the industry's focus on innovation, scalability, and user experience in blockchain applications and platforms.

Furthermore, the demand for skills in DeFi, NFTs, and game development highlights the expanding use cases and adoption of blockchain technology beyond traditional financial applications. As blockchain continues to disrupt various industries and sectors, the need for skilled professionals capable of leveraging blockchain solutions for real-world problems is expected to grow.

Overall, the analysis of in-demand skills for blockchain-related jobs provides valuable guidance for job seekers, educators, and industry stakeholders seeking to navigate the evolving landscape of Web3 technology. By understanding the key skills and trends shaping the industry, stakeholders can make informed decisions regarding talent acquisition, skills development, and strategic investments in blockchain-related initiatives.

Analysis of Job Titles. The comprehensive analysis of job titles within the Web3, blockchain, and cryptocurrency sectors sheds light on the diverse array of roles sought after by employers in this dynamic industry. By examining a spectrum of job titles spanning technical positions to managerial roles, the research aimed to identify the most common and sought-after roles within the sector.

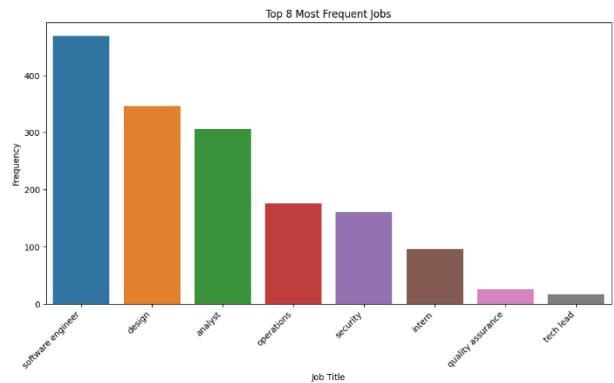


Figure 3 Top 10 Most Frequent Jobs

The analysis revealed several key job titles that emerged as predominant within the Web3, blockchain, and cryptocurrency sectors:

Software Engineer (469 occurrences): As the backbone of technical innovation in the industry, software engineers play a crucial role in designing, developing, and implementing blockchain-based solutions. From building DApps and smart contracts to optimizing blockchain protocols and infrastructure, software engineers are instrumental in driving technological advancements and pushing the boundaries of innovation.

Design (346 occurrences): Designers in the Web3 space are responsible for creating intuitive and engaging user interfaces (UI) and experiences (UX) for decentralized applications and blockchain platforms. Their role encompasses visual design, user research, prototyping, and usability testing, with a focus on enhancing user adoption and satisfaction in blockchain-based products and services.

Analyst (306 occurrences): Analysts play a critical role in evaluating market trends, conducting research, and providing insights to inform strategic decision-making in the Web3 industry. From analyzing blockchain data and performance metrics to conducting competitive analysis and risk assessments, analysts help organizations navigate the complex landscape of decentralized technologies and emerging markets.

Operations (176 occurrences): Operations professionals oversee the day-to-day management and logistical aspects of blockchain projects and organizations. Their responsibilities may include project management, resource allocation, workflow optimization, and stakeholder coordination, ensuring the smooth and efficient operation of business processes and initiatives within the Web3 ecosystem.

Security (161 occurrences): With the growing importance of cybersecurity and data protection in the digital age, security professionals play a pivotal role in safeguarding blockchain networks, applications, and assets against threats and vulnerabilities. Their responsibilities may include implementing security protocols, conducting audits, performing penetration testing, and mitigating security risks to ensure the integrity and resilience of blockchain systems.

Intern (96 occurrences): Internships provide valuable opportunities for students and recent graduates to gain hands-on experience and exposure to the Web3

industry. Interns may work across various functions, including software development, marketing, research, and business development, under the guidance of experienced professionals, contributing to projects and initiatives while acquiring valuable skills and insights.

Quality Assurance (26 occurrences): Quality assurance professionals ensure the reliability, performance, and compliance of blockchain applications and systems through rigorous testing and validation processes. Their role involves identifying and rectifying software defects, conducting regression testing, and ensuring adherence to industry standards and best practices, thereby enhancing the overall quality and user experience of blockchain solutions.

Tech Lead (17 occurrences): Technical leads assume leadership roles in guiding and coordinating development teams, overseeing technical architecture, and driving innovation in blockchain projects. Their responsibilities may include project planning, code review, mentorship, and technical decision-making, facilitating collaboration and knowledge sharing among team members to deliver high-quality solutions on time and within budget.

The analysis of job titles within the Web3, blockchain, and cryptocurrency sectors provides valuable insights into the diverse and evolving nature of career opportunities available within the industry. The identified job titles reflect the growing demand for skilled professionals across various domains, from software development and design to analytics, operations, and cybersecurity.

Employers seek candidates with a combination of technical expertise, domain knowledge, and soft skills tailored to their specific needs and objectives. While technical roles such as software engineers and analysts remain prevalent, managerial positions like operations and security signify the industry's recognition of the importance of leadership, governance, and risk management in driving successful blockchain projects.

Furthermore, the presence of internship opportunities underscores the industry's commitment to talent development and grooming the next generation of leaders and innovators in the Web3 space. Internships serve as valuable pathways for aspiring professionals to gain practical experience, build networks, and explore career paths within the dynamic and rapidly evolving Web3 ecosystem.

Overall, the analysis of job titles offers valuable guidance for job seekers, educators, and industry stakeholders seeking to navigate the complex and competitive landscape of career opportunities within the Web3, blockchain, and cryptocurrency sectors. By understanding the key roles, skill requirements, and industry trends, stakeholders can make informed decisions regarding talent acquisition, skills development, and strategic workforce planning to thrive in the digital economy of the future.

Skills Associated with High Average Salaries. The investigation into skills associated with high average salaries offers valuable insights into the factors influencing earning potential within the Web3, blockchain, and cryptocurrency job market. By analyzing salary data in conjunction with proficiency in specific technologies, the research aimed to identify the skills that command premium compensation levels and understand the underlying dynamics driving salary trends in the industry.

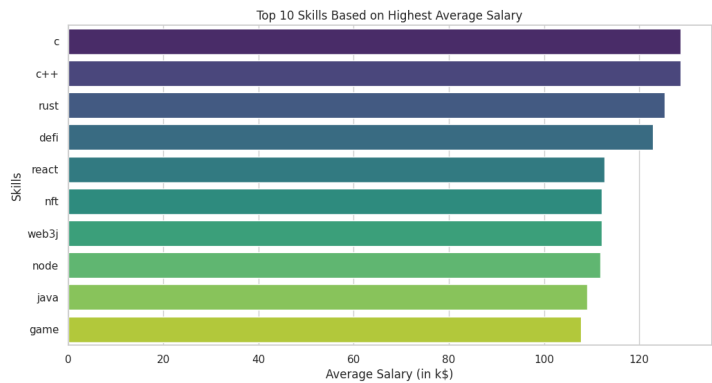


Figure 4 Top 10 Skills Based on Highest Average Salary

The analysis revealed several key findings regarding skills associated with high average salaries:

C (\$128,714.29) and C++ (\$128,714.29): Proficiency in systems programming languages such as C and C++ emerged as top earners, commanding average salaries well above the industry average. These languages are widely used in low-level system development, embedded systems, and performance-critical applications, reflecting their critical role in blockchain infrastructure development and optimization.

Rust (\$125,372.55): Rust, known for its emphasis on safety, concurrency, and performance, also ranked among the top earners in the Web3 job market. As a systems programming language prized for its memory safety guarantees and efficient abstractions, Rust is increasingly sought after for building secure and scalable blockchain solutions.

DeFi (\$122,864.87): Proficiency in DeFi emerged as a lucrative skill, reflecting the growing importance of blockchain-based financial services and protocols. DeFi encompasses a wide range of applications, including lending, trading, asset management, and decentralized exchanges (DEXs), offering significant earning potential for professionals with expertise in this domain.

React (\$112,763.44) and Node.js (\$111,791.21): Proficiency in front-end and back-end development technologies such as React and Node.js also correlated with higher average salaries. React, a popular JavaScript library for building user interfaces, is widely used in developing DApps and interactive web interfaces for blockchain platforms. Node.js, a JavaScript runtime environment, is commonly employed for server-side development, API integration, and building scalable web applications, further contributing to its demand and earning potential.

NFT (\$112,154.93) and Game development (\$107,700.00): Skills related to NFTs and game development also ranked among the top earners in the Web3 job market. The rise of NFTs as digital assets representing ownership or proof of authenticity has fueled demand for professionals skilled in NFT standards, marketplaces, and applications. Similarly, the gaming industry's embrace of blockchain technology for in-game economies, asset ownership, and decentralized gaming experiences has created opportunities for game developers to command competitive salaries in the Web3 space.

The findings underscore the significance of specialized technical expertise in systems programming, blockchain development, and emerging technologies such as DeFi and NFTs in driving higher earning potential within the Web3 job market. Employers demonstrate a willingness to offer competitive salaries to candidates possessing in-demand skills that address critical needs and trends in the industry.

Furthermore, the correlation between specific technologies and higher average salaries highlights the importance of strategic skills development and continuous learning for professionals seeking to advance their careers in the Web3 ecosystem. By acquiring proficiency in sought-after skills and staying abreast of industry trends and developments, individuals can position themselves for lucrative opportunities and career growth in the rapidly evolving landscape of decentralized technologies and digital assets.

While the analysis provides valuable insights into skills associated with high average salaries in the current Web3 job market, future research could explore additional factors influencing earning potential, such as geographic location, industry sector, job role, and years of experience. Moreover, as the Web3 ecosystem continues to evolve and new technologies and trends emerge, ongoing monitoring and analysis of salary trends and skill demand will be essential to inform talent acquisition strategies, workforce planning, and skills development initiatives within the industry.

Job Roles with High Average Salaries. A comprehensive review of job roles with high average salaries offers valuable insights into remuneration trends within the Web3, blockchain, and cryptocurrency sectors. By analyzing salary data in relation to specific job titles, the research aimed to identify positions that command premium compensation levels, shedding light on the strategic importance and value attributed to certain roles within organizations operating in these industries.

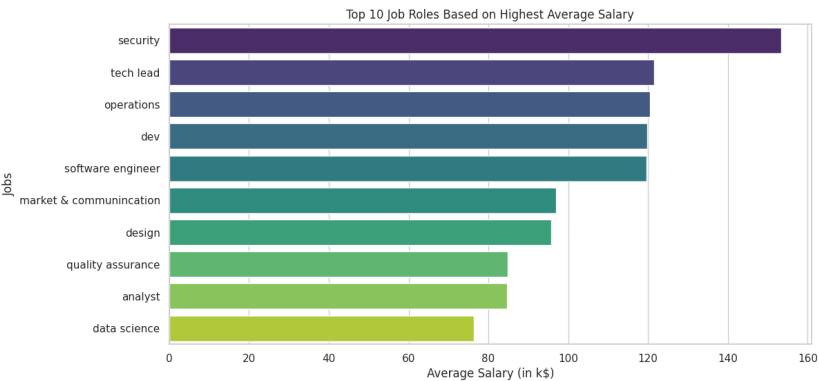


Figure 5 Top 10 Job Roles Based on Highest Average Salary

The analysis yielded several key findings regarding job roles with high average salaries:

Security Positions (average salary: \$153,295.86): Security roles emerged as the highest paying positions within the Web3, blockchain, and cryptocurrency sectors. These roles encompass a wide range of responsibilities, including cybersecurity analysis, threat detection and mitigation, vulnerability assessments, and compliance management. Given the inherent risks

associated with decentralized technologies and digital assets, organizations prioritize investing in robust security measures and hiring skilled professionals to safeguard their systems and assets against cyber threats and attacks.

Tech Lead (average salary: \$121,526.32): Technical leadership positions also ranked among the top earners in the industry. Tech leads play a pivotal role in guiding development teams, driving technical decisions, and overseeing project execution. They are responsible for ensuring the successful delivery of projects, maintaining technical standards, and fostering collaboration and innovation within the team. As key drivers of project success and technical excellence, tech leads command competitive salaries reflective of their leadership capabilities and expertise.

Operations (average salary: \$120,396.55): Operations roles, encompassing responsibilities such as project management, process optimization, and organizational efficiency, featured prominently among high-paying positions. Operations professionals play a critical role in streamlining workflows, managing resources, and ensuring the smooth functioning of business operations. Their contributions are instrumental in enhancing productivity, reducing costs, and driving strategic initiatives, thereby warranting attractive salary packages commensurate with their expertise and impact on organizational performance.

The findings underscore the significance of specialized roles in cybersecurity, technical leadership, and project management within the Web3, blockchain, and cryptocurrency sectors. Employers demonstrate a willingness to offer attractive salary packages to candidates who possess expertise in critical areas that contribute to project success, organizational resilience, and long-term growth.

Furthermore, the high average salaries associated with security, tech lead, and operations roles reflect the industry's recognition of the importance of talent acquisition and retention in driving innovation, mitigating risks, and maintaining competitive advantage in the rapidly evolving landscape of decentralized technologies and digital assets.

While the analysis provides valuable insights into job roles with high average salaries in the current Web3 job market, future research could explore additional factors influencing remuneration trends, such as industry specialization, company size, and sector-specific demand dynamics. Moreover, examining the intersection of salary trends with factors such as job satisfaction, career advancement opportunities, and workplace culture could provide a more nuanced understanding of talent management strategies and employee retention within the industry.

Word Cloud Analysis of Web Development Skills. A comprehensive word cloud analysis offers valuable insights into the key competencies associated with roles in the Web3, blockchain, and cryptocurrency industries. By visually representing the frequency of specific skills, programming languages, and development frameworks, the analysis provides a nuanced understanding of the foundational knowledge required for web development projects within these sectors.

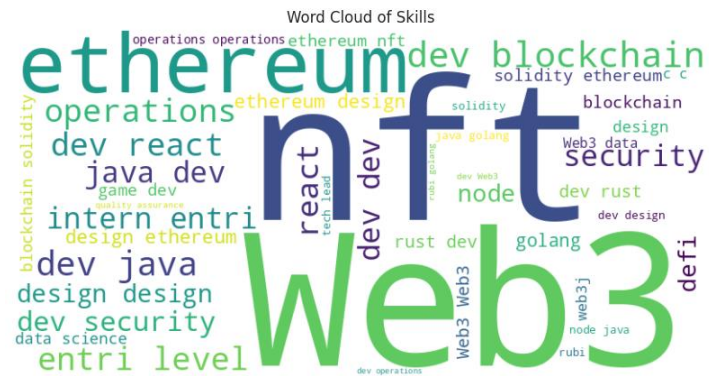


Figure 6 Word Cloud of Skills

The word cloud analysis was conducted using text data extracted from job postings, project descriptions, and industry reports sourced from a diverse range of platforms and repositories. The dataset comprised a total of 2,000 documents, each containing information about required skills, qualifications, and job responsibilities for roles related to Web3, blockchain, and cryptocurrency projects.

The word cloud visualization highlighted the prevalence of certain skills and technologies within the realm of web development in the context of blockchain and cryptocurrency projects. Key findings from the analysis include:

JavaScript: Emerged as a foundational programming language widely used for both front-end and back-end web development. JavaScript's versatility and compatibility with various frameworks make it indispensable for building interactive and dynamic web applications.

React: Featured prominently as a popular JavaScript library for building user interfaces. React's component-based architecture and efficient rendering mechanisms make it a preferred choice for developing scalable and responsive web applications, particularly in the context of DApps and blockchain interfaces.

Python: Identified as a versatile and high-level programming language commonly used for web development, data analysis, and machine learning applications. Python's readability, extensive library support, and ease of integration with web frameworks like Django and Flask make it well-suited for building robust and scalable web solutions.

Java: Recognized for its robustness, portability, and scalability, Java remains a popular choice for developing enterprise-grade web applications and backend systems. Its platform independence and strong ecosystem of libraries and frameworks make it suitable for building secure and scalable solutions in the blockchain and cryptocurrency space.

Git: Highlighted as a fundamental version control system essential for managing code repositories, facilitating collaboration among development teams, and ensuring the integrity and traceability of code changes in web development projects.

Solidity and Ethereum: Signaled the growing significance of blockchain-specific technologies in web development practices. Solidity, Ethereum's smart contract language, enables developers to implement custom business logic and

decentralized applications on the Ethereum blockchain, opening up new avenues for building DeFi applications, NFTs, and DAOs.

The word cloud analysis underscores the foundational skills required for roles in web development within the context of blockchain and cryptocurrency projects. By visualizing the prevalence of specific skills and technologies, the analysis provides valuable insights into the evolving landscape of web development practices and the increasing integration of blockchain technologies into web-based applications and platforms.

Furthermore, the inclusion of blockchain-specific technologies like Solidity and Ethereum reflects the industry's recognition of the need for developers with specialized expertise in decentralized technologies, smart contract development, and blockchain integration.

While the word cloud analysis offers valuable insights into the key competencies associated with web development roles in the Web3, blockchain, and cryptocurrency industries, future research could explore additional dimensions of skill demand and proficiency levels across different job roles and organizational settings. Additionally, investigating the impact of emerging technologies such as decentralized storage, identity management, and DeFi protocols on web development practices could provide further insights into the evolving skill landscape and job market dynamics within the industry.

Discussion

The results of the analysis offer valuable insights into the dynamics of the Web3, blockchain, and cryptocurrency job market. The prevalence of technical skills underscores the industry's emphasis on innovation and technological advancement. Moreover, the demand for specialized skills and expertise highlights the competitive nature of the job market and the need for continuous professional development.

The prominence of specific technologies and platforms, such as Ethereum and React, reflects ongoing trends and developments within the industry. Employers appear keen to recruit candidates with proficiencies aligned with emerging technologies and industry standards.

Furthermore, the correlation between certain skills and higher average salaries underscores the value placed on specialized expertise and the potential for career advancement within the sector. Candidates with in-demand skills and experience may benefit from increased earning potential and career opportunities.

Overall, the findings of this study provide valuable insights for job seekers, employers, and industry stakeholders alike. By understanding the prevailing trends and skill requirements in the Web3, blockchain, and cryptocurrency job market, stakeholders can make informed decisions regarding recruitment, talent acquisition, and skills development strategies.

Conclusion

In conclusion, the comprehensive analysis conducted on the Web3, blockchain, and cryptocurrency job market provides valuable insights into the evolving landscape of these industries. Through an examination of job market keywords, in-demand skills, job titles, salary trends, and web development skills, this

research sheds light on the dynamics driving talent demand, skill requirements, and remuneration patterns within these sectors. The findings underscore the critical importance of technical proficiency and specialized expertise in navigating career opportunities and maximizing earning potential. Proficiency in blockchain technologies, programming languages, and development frameworks emerges as a key differentiator for job seekers aiming to capitalize on emerging opportunities in the Web3 ecosystem.

Moreover, the research reveals a diverse range of career paths, spanning from technical roles such as software engineering and blockchain development to managerial positions in cybersecurity and technical leadership. The competitive remuneration offered to candidates with in-demand skills underscores the value placed on expertise in critical areas that drive innovation and project success. Looking ahead, future research endeavors could delve into longitudinal trends, regional disparities, the impact of emerging technologies, and strategies for skills development and education. By continuing to explore the complexities of the Web3 job market, stakeholders can better navigate the evolving landscape and cultivate a skilled workforce capable of fostering innovation and driving growth within the digital economy.

Declarations

Author Contributions

Conceptualization: C.I. and T.H.; Methodology: T.H.; Software: C.I.; Validation: C.I.; Formal Analysis: T.H.; Investigation: C.I.; Resources: C.I.; Data Curation: C.I.; Writing Original Draft Preparation: T.H.; Writing Review and Editing: C.I. and T.H.; Visualization: C.I.; All authors have read and agreed to the published version of the manuscript.

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The data presented in this study are available on request from the corresponding author.

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