



# The Transformational Opportunity of AI on ICT Jobs

JULY 2024

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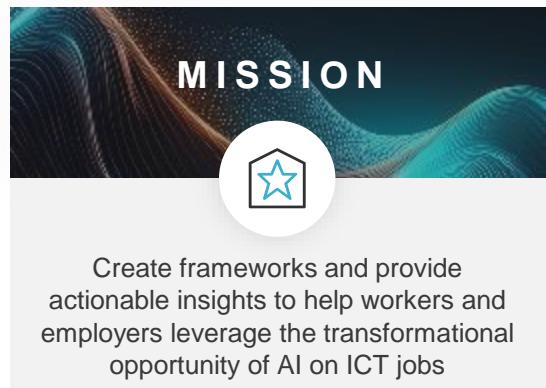
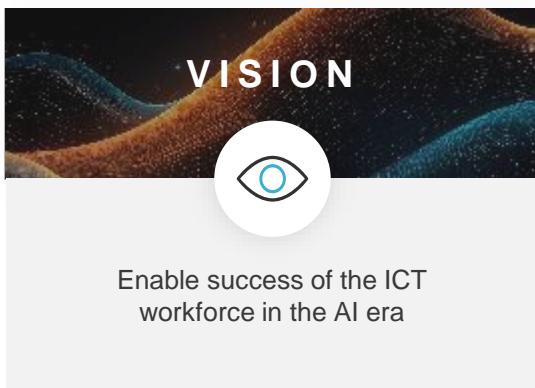
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# About the Consortium

## AI-Enabled Information and Communication Technology Workforce Consortium

On April 4, 2024, a Consortium of nine leading global corporations in collaboration with global advisors embarked on a collaborative endeavor with a singular vision of sharing insights to advance an AI-enabled information and communications technology (ICT) workforce. The Consortium was catalyzed by the work of the U.S.- EU Trade and Technology Council's (TTC) Talent for Growth Task Force, with the goal of exploring AI's impact on ICT job roles and identifying the skills and training workers will need to thrive in an AI-driven future.



Consortium members universally acknowledge the profound benefits of AI and the importance of their combined efforts with the acceleration of AI across all facets of business, while also fulfilling the goal of creating an inclusive workforce with family-sustaining opportunities. Consortium members commit to developing worker pathways particularly in technology focused job sectors that will increasingly integrate artificial intelligence technology. To that end, Consortium members have established forward thinking goals with skills development and training programs to positively impact over 95 million individuals around the world over the next 10 years. Consortium member goals include:

- Cisco to **train 25 million people** with cybersecurity and digital skills by 2032
- IBM to **skill 30 million individuals** by 2030 in digital skills, **including 2 million in AI**
- Intel to empower over **30 million people with AI skills** for current and future jobs by 2030
- Microsoft committed to training and certifying **10 million people** in digital skills by 2025, surpassing this goal by training and certifying **12.6 million people a year ahead of schedule**
- SAP to upskill **2 million people** worldwide by 2025
- Google has recently announced over **\$130 million** in funding to support AI training and skills for people across the US, Europe, Africa, Latin America, and APAC

### CONSORTIUM MEMBERS



### CONSORTIUM ADVISORS



### Catalysts

U.S.-EU Trade and Technology Council's (TTC) Talent for Growth Task Force and U.S. Department of Commerce

# Foreword



**Francine  
Katsoudas**

Executive Vice President and Chief People, Policy, and Purpose Officer Cisco

“

Rarely do we find an opportunity to shape the future through advanced technology and industry stewardship. As we usher in the era of Artificial Intelligence (AI), it is with pride that we unveil an innovative report on the impact of AI on 47 distinct ICT job roles. This marks a significant moment for the AI-Enabled Information and Communication Technology (ICT) Workforce Consortium, setting a standard in our commitment to shaping the future of our industry. We aim to empower professionals and ensure they are equipped to thrive in an AI-driven landscape. This report curates tailored training recommendations to support the professional development of roles disrupted by AI advancements.

In our next phase, we look forward to continued collaboration with G7 governments on the AI Action Plan, as we strive to expand our impact, particularly among women, underrepresented communities, and in developing countries. As technology accelerates and global organizations chart their path forward, we must be intentional in ensuring that we bring everyone along. We recognize that our collective efforts as industry leaders can accomplish more and forge robust public-private partnerships.

I extend my gratitude to the organizations comprising the AI-Enabled ICT Workforce Consortium. Your collaboration, commitment, and insights have been invaluable in helping to shape the future. Cisco's ongoing work is driven by our commitment to a more inclusive future, giving more people access to an AI-fueled world and enabling broader economic opportunity. Understanding how AI intersects with ICT roles is a crucial step in bridging the digital divide, and this report is a testament to a shared responsibility to this mission.



**Ryan Oakes**

Global Health and Public Service Industry Lead, Accenture

“

Generative AI has the potential to reinvent fundamental aspects of our daily lives. Embracing these changes requires a collaborative and dynamic approach, which is why I am honored to be part of a pioneering consortium that includes nine corporations and seven global advisors catalyzed by the US-EU TTC Talent for Growth Task Force. Together, we are tackling the opportunities and challenges that the ICT workforce will face as Generative AI becomes increasingly prevalent.

This report outlines the fundamental skills related to Generative AI that will enhance productivity, foster career growth and spark innovation across sectors. At Accenture, we are committed to the principle that responsible AI usage is imperative for both individuals and organizations. As highlighted in this report, it is essential that AI ethics training is an integral part of the core skill set for every job.

I am optimistic that the consortium's efforts and the insights from this report will exemplify the effectiveness of public-private partnerships aimed at providing workers with a path for rapid upskilling and training opportunities. In the U.S., for instance, the Workforce Innovation and Opportunity Act (WIOA) funded public workforce system is well-positioned to support this upskilling at an accelerated pace and scale in collaboration with businesses such as those leading this consortium.

I look forward to continuing this collaborative journey and extend my gratitude to CISCO for their leadership while broadening global participation.

## SIGNATORIES



## About the Report

The Transformational Opportunity of AI on ICT Jobs report (“the report”) serves as guide for businesses, governments, and workers with actionable insights to navigate the evolving landscape of ICT jobs impacted by AI advancements. By highlighting opportunities for reskilling and upskilling, the report equips organizations with strategies to stay

competitive and helps workers advance in their careers. Training recommendations are tailored to various career levels to ensure both entry level and experienced workers can effectively navigate the transition, fostering a more adaptable and future-ready workforce.

## Report Structure

### Introduction

Provides an overview of job landscape, with a specific focus on ICT roles, highlighting their evolution in the context of AI advancements. It explores the benefits and opportunities arising from these transformations while also outlining the purpose, design approach, rationale, and survey methodology ('Job Transformation Canvas').

### Executive Summary

Presents a summary of the study findings and outlines consortium recommendations along with actionable next steps.

### Analysis Methodology

Details the approach and methodology for analyzing the survey data, using a job categorization framework to classify the 47 ICT jobs that were analyzed into seven clusters ('job family group') based on their functional and technical skillsets.

### Overview of Job Family Groups

Highlights key findings within each job family, as per the categorization framework introduced in 'Analysis Methodology'. Each job family overview provides AI's impact in the functional group and across career levels, identifies emerging skills due to AI transformation, discusses changes in existing skill relevance, and recommends essential core training programs.

### Detailed Job Roles

Lists all the identified jobs, detailing principal skills and tasks, expected AI transformation, key insights, new skill requirements, shifts in current skill relevance, and specific training recommendations tailored to job-specific skills and core skills.

The report concludes with the Appendix, defining the 'Job Transformation Canvas' structure and other relevant information.

# Introduction

The advent of Artificial Intelligence (AI) heralds a new era for organizations across every sector while bringing transformative changes to the Information and Communication Technology (ICT) landscape. As AI evolves, its influence on technology jobs becomes increasingly significant, prompting an urgent need for a comprehensive examination of its impact. Unlike previous technological shifts that primarily impacted manual labour and involved repetitive tasks, AI is now infiltrating roles that demand more advanced levels of cognitive skills.

With the advent of new Generative AI (Gen AI) powered tools such as ChatGPT, Gemini, Claude, Llama, Mistral and others, AI's integration into the ICT sector has the potential to revolutionize job roles, processes, and productivity. By automating routine tasks, enhancing data analysis, and enabling advanced problem-solving capabilities, AI will dramatically reshape traditional job functions and create new opportunities for innovation and growth. The shift also raises critical questions about the employability, skill requirements, and the readiness of the current workforce to adapt to these changes.

The AI-Enabled ICT Workforce Consortium calls for organizations to proactively lean into the transition to support workers who are at the risk of being left behind due to automation and AI. As AI automates routine tasks and transforms job functions, there is a pressing need for a coordinated effort to reskill and upskill the workforce. A 2024 report from the International Monetary Fund (IMF) underscores this reality, highlighting that nearly **40% of global jobs are susceptible to AI-driven changes** (Cazzaniga and others, 2024)<sup>[1]</sup>. Despite this, there is a positive outlook across industries, with analysis suggesting that many roles will remain essential while others evolve to prioritize human creativity, empathy, and strategic thinking. According to the World Economic Forum Future of Jobs Report 2023, **in the next five years, 83 million jobs are projected to be lost and 69 million are projected to be created, constituting a**

**structural labour market churn of 152 million jobs, or 23% of the 673 million jobs reflected in the dataset. This constitutes a reduction in employment of 2% or 14 million jobs** (World Economic Forum, 2023)<sup>[2]</sup>.

By acknowledging and planning for this transition, organizations can mitigate the risks associated with job displacement and create new opportunities for their workers. As the Consortium, we advocate for early and sustained intervention to ensure that all workers can participate in and benefit from the AI-driven economy. According to IBM's Institute Business Value (IBV) survey, **87% of executives expect job roles to be augmented, rather than replaced, by Gen AI** (IBM, 2024)<sup>[3]</sup>, believing these advancements will enhance job quality and work-life balance. Concurrently, a Microsoft study shows that **demand for AI technical talent has increased by 323% in eight years** (Microsoft and LinkedIn, 2024)<sup>[4]</sup>.

With proactive efforts, industry can do more to help workers seize AI work opportunities. The transition offers potential to elevate more people into the middle class through access to good-paying, family-sustaining jobs. When equipped with the right skills, workers can secure positions in the AI-transformed workforce, leading to enhanced job security, and economic stability. By investing in comprehensive training programs and fostering a culture of continuous learning, organizations can unlock the full potential of their current and future workforce, drive inclusive growth, and lift communities at large.

Organizations can augment their training investment by also taking a "**skills-first approach**" (LinkedIn, 2023)<sup>[5]</sup> to hiring as advocated in LinkedIn's Economic Graph: Skills-First 2023 report. Central to this approach is the cultivation of '**AI Literacy**' (Long D, Magerko B, 2020)<sup>[6]</sup> — a set of competencies that enables individuals to critically evaluate AI technologies, communicate and collaborate effectively with AI, and use AI as a tool online, at home, and in the workplace.

Data from LinkedIn reveals a significant global trend, **with a 142x increase** (Microsoft and LinkedIn, 2024)<sup>[7]</sup> **in workers adding AI literacy to their profiles since late 2023.** This upskilling movement extends beyond technical roles, demonstrating a broader recognition of AI's potential benefits across various industries. While new technologies can initially appear complex, the increasing interest in AI literacy highlights the workforce's adaptability and willingness to embrace advancements that can enhance their capabilities.

AI also presents an opportunity to bring along more people through AI-enabled education. AI can help democratize learning, making reskilling and upskilling more efficient, personalized, and productive. By leveraging AI-driven educational tools, we can create learning experiences that cater to individual needs and learning styles. This accelerates the skill acquisition process while ensuring that a broader segment of the population can access high-quality education and training.

### Transforming ICT job landscape: Unveiling benefits and opportunities of AI

The ongoing AI revolution underscores a critical need: workforce upskilling. With foundational training, workers enhance capabilities for higher-value tasks, maximizing AI's potential. Exploring opportunities inclusively ensures diverse talent pools driving innovation and performance. This report focuses on AI-driven transformations in ICT roles, identifying key skills and training needs.

Acquiring these skills helps navigate complexities and leverage AI's advantages. As AI reshapes work methods, proactive strategies and skill reassessments are crucial. Understanding AI's capabilities is key to harnessing its potential in ICT, boosting productivity, innovation, and fostering a fulfilling work environment.

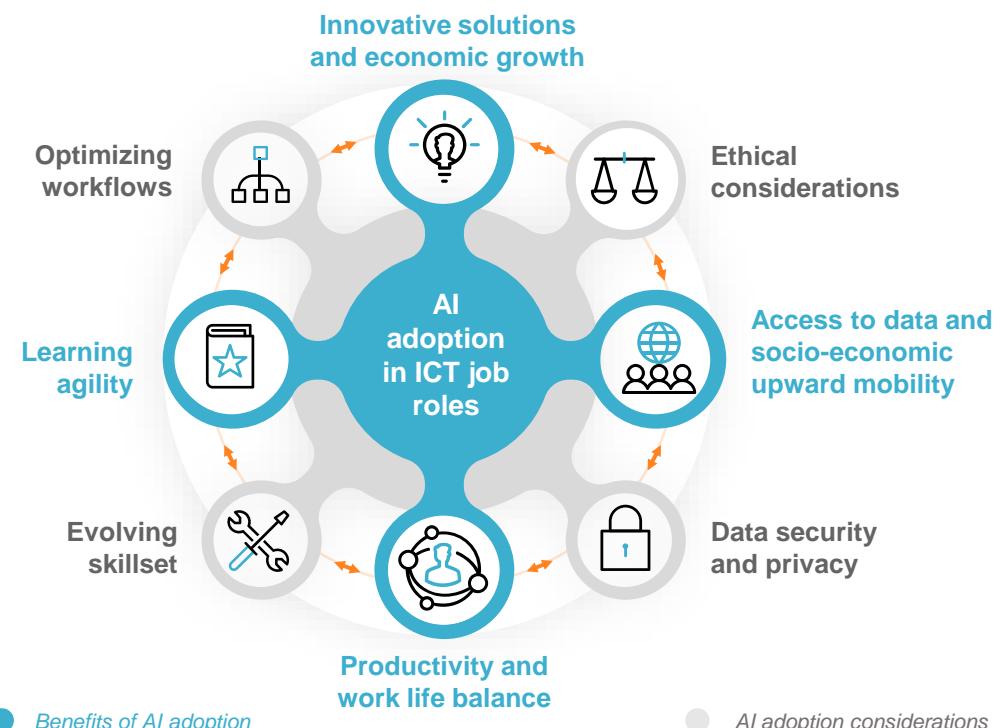


Figure 1: Framework demonstrating the transformation of opportunities into tangible benefits due to AI adoption across ICT jobs

# Unlocking worker potential with AI adoption



## Innovative solutions

Gen AI can automate tasks such as data cleaning, pattern recognition, and content generation, thereby freeing up human expertise for higher-level analysis, interpretation, and innovation. A 2024 report by Accenture (Shook E, Daugherty P, 2024)<sup>[8]</sup> corroborates that most organizations view Gen AI as a pathway to greater innovation, aligning the technology with business goals to enhance efficiency and foster innovation.

Other example is how AI has the power to drive paradigm shifting innovation for accessibility, empowering disabled talent and increasing employment opportunities for people with disabilities. AI-powered features like predictive text, voice recognition, and real-time captioning help break down communication barriers and enable individuals to work more effectively.

## Productivity and work life balance

AI excels at automating repetitive tasks, previously demanding a significant portion of human effort. This liberates ICT workers to focus on areas that leverage their unique human strengths, such as original creativity, critical thinking, and strategic decision-making. This could further lead to increased productivity across the workforce contributing to increased

job satisfaction and improved work-life balance. According to a recent survey by HRD Connect (Tech.co, 2024)<sup>[9]</sup>, there is a positive correlation between AI adoption and job satisfaction, with most senior leaders reporting increased satisfaction post AI integration into their roles.

## Democratize data access to promote inclusivity and socio-economic upward mobility

AI democratizes data access in the workplace by simplifying analytics, enabling all workers to make informed decisions. This accessibility fosters a culture of evidence-based decision-

making and innovation, creating opportunities for workers to contribute meaningfully and advance in their careers, regardless of their technical background.

## Learning agility

The rapid evolution of AI presents a wealth of continuous learning opportunities that will empower individuals to future-proof their careers. Advanced training programs provide personalized learning pathways and AI powered tutors, enhancing the effectiveness of upskilling efforts. Seamless integration of intelligent assistants into workflows enables

real-time access to knowledge and resources fostering a future-proof workforce capable of remaining adaptable and competitive in a dynamic job market. Embracing innovative upskilling initiatives empowers individuals to capitalize on the exciting opportunities that AI unlocks.

## Economic growth

AI adoption, prioritizing both people and innovation, has the potential to unlock significant economic value. According to a recent Accenture report (Shook E, Daugherty P, 2024)<sup>[10]</sup>, organizations can unlock an additional \$10.3 trillion in economic value by

2038 through responsible and scalable adoption of Gen AI. This growth stems from AI's ability to drive innovation, enhance productivity, and streamline processes across sectors like ICT, ultimately contributing to economic expansion.

# AI impact and additional considerations



## Evolving workforce requirements

To fully realize the benefits of AI, employers need to cultivate a workforce with the right skillset. This includes competencies in areas like data analytics and interpretation, AI tool management and implementation, and

effective human to machine calibration. Investing in targeted training programs for these skills will equip workers to leverage AI effectively, optimize workflows, and unlock new opportunities for innovation and growth.

## Data security and privacy

AI thrives on data, so data security and privacy are paramount. Organizations can demonstrate their commitment to responsible data practices and build trust with customers and workers. This can be done by promoting and investing in trainings for their workforce on data governance, privacy regulations, and ethical

considerations in AI development and deployment. Additionally, AI can play a role in strengthening data security through defending against cyber threats by simulating attacks, identifying vulnerabilities, and suggesting solutions.

## Ethical considerations

As AI becomes a cornerstone of decision-making, ensuring fairness, transparency, and accountability takes center stage. This presents a unique opportunity to champion responsible AI practices at the forefront of technological development. By prioritizing ethical considerations throughout the AI

lifecycle, organizations can build trust with stakeholders, solidify their reputation, ensure decisions and outcomes are equitable and justifiable, and avoid harm, while harnessing the power of AI for positive business outcomes such as increased efficiency and reduced repetitive tasks.

## Optimizing workflows

Integrating AI into ICT workflows can streamline operations and enhance efficiency. Success depends on strategic planning, which encompasses training workers for AI collaboration, clear communication, and robust data management. Essential to this integration is human supervision, which ensures

safeguards against errors and biases. With human judgement, AI systems are kept in check, allowing workers to redirect their focus to higher-level tasks. This shift not only boosts productivity but also positions the organization to better compete in the industry.

## Enhancing ICT job roles through a ‘skills-based’ approach in the US and Europe

According to a recent study from the **International Labour Organization** (Gymrek and others, 2023) [11], Gen AI is mostly likely to augment jobs by automating tasks rather than replacing roles, allowing workers to focus on other responsibilities. But how? What new skills will workers need to adapt? How can the private and public sectors meet the challenges and opportunities presented by the AI revolution?

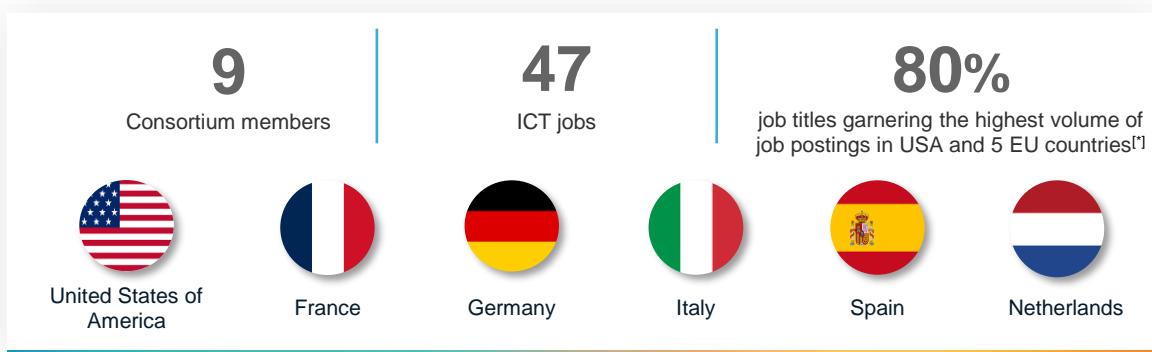
We don't have all the answers due to the rapid evolution of AI and its use cases, but our mission as the Consortium is clear: **Create frameworks and provide actionable insights to help workers and employers leverage the transformational opportunity of AI on ICT jobs.**

To delve deeper into this matter and identify the necessary skill sets and subsequent

trainings needed to develop these skills, we adopted a skills-based approach and designed a survey to capture the transformation, “**Job Transformation Canvas**”. This survey aims to analyze the extent of transformation in ICT job roles and skill sets due to AI advancements

As we embarked on this journey to decode AI's transformation potential on job roles, it was observed that as organizations embrace the transformative potential of AI integration, there emerges an opportunity to cultivate and enhance skill sets that resonate with these advancements. Embracing this revolution can empower businesses and workers worldwide to navigate career development and transitions driven by digitization, robotics, and AI innovations. This is especially important as future AI applications capable of executing intricate tasks gain prominence.

### United States and five of the largest European countries by ICT workforce numbers



[\*] This includes the top 45 ICT job titles garnering the highest volume of job postings for the period February 2023-2024 in the United States and five European countries (France, Germany, Italy, Spain, and the Netherlands) according to Indeed Hiring Lab. Collectively, these countries account for a significant segment of the ICT sector, with a combined total of **10 million ICT workers**.

# EXECUTIVE SUMMARY

# Executive Summary

To understand the far-reaching impact of AI on Information and Communication Technology (ICT) jobs, we analyzed 47 ICT job roles that are most impactful at the **job family level, career level, individual job level, and skill level**, revealing comprehensive insights.

In this section, we will explore how AI is reshaping roles within the ICT sector,

highlighting crucial areas of influence, essential skills required for success, and strategic steps to navigate this transformative landscape. These insights across dimensions offer a holistic view, empowering workers, and businesses to embrace the AI-driven future of work in the ICT industry.

## Every ICT job becomes an AI influenced job

The integration of AI into ICT jobs marks a profound shift, promising substantial gains in efficiency, shift in skillsets for current job roles, the creation of new job roles, and notable technological advancements. Our study reveals the widespread nature of this transformation across the ICT sector, projecting that over **91.5% of ICT job roles analyzed are expected to experience either**

**high or moderate transformation due to advancements in AI**, highlighting its pervasive impact. (AI transformation labeling combines **the opinion of subject matter experts** and the % of the skills impacted. High: more than 70% of the principal skills affected by AI; Moderate: between 50% and 70% of the principal skills affected by AI; Low: Less than 50% of the principal skills affected by AI).

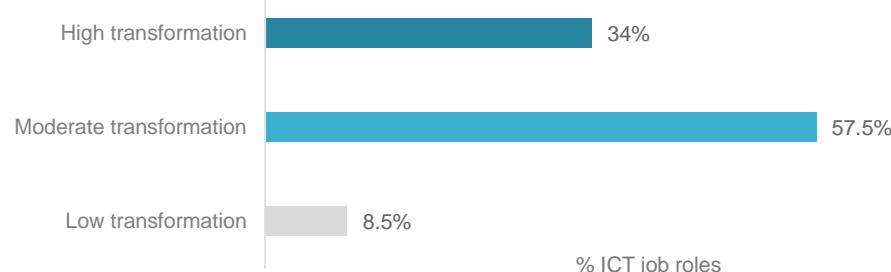


Figure 2: Level of AI Transformation across the 47 ICT job roles

Over the past eight years, there has been a 323% increase in demand (Microsoft and LinkedIn, 2024) [12] for AI technical talent. The introduction of ChatGPT and other Gen AI tools led to rapid AI adoption in ICT industry, since then this demand for new AI skills has increased by **65% over five years according to analysis from Indeed** (Indeed job postings data, 2024) [13].

Furthermore, AI's integration intertwines with other technological domains like IoT and cloud computing, amplifying capabilities in interconnected environments. This synergy emphasizes the imperative for ICT workers to continually update their skills, embracing lifelong learning and adaptability to harness AI's full potential.

## Workers in entry and mid-level job roles have the most opportunities to upskill

In our analysis of career levels, we have observed that entry level and mid-level ICT workers are at the forefront of this transformation as **37% of entry level job roles**

**and 40% of mid-level job roles analyzed, are expected to have high levels of transformation due to AI advancement.**

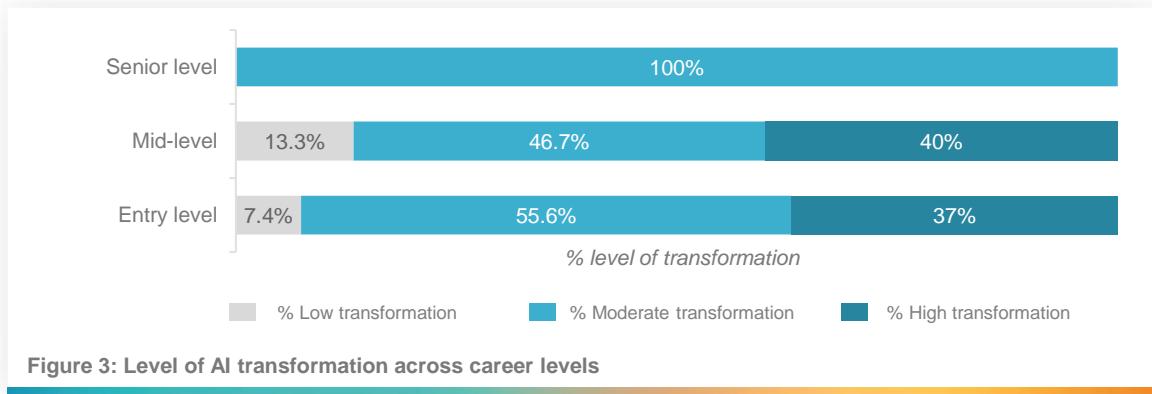


Figure 3: Level of AI transformation across career levels

AI has the potential to empower a broader range of workers to handle more complex tasks sooner. AI tools have demonstrated the ability to assist novice workers in acquiring capabilities comparable to those of experienced agents in just three months rather than 10 (Brynjolfsson and others, 2023)<sup>[14]</sup>, presenting new avenues for career growth. This underscores the importance of reskilling and upskilling at entry and mid-levels.

Simultaneously, senior-level workers must embrace AI's transformative potential. Leading change effectively requires seizing AI opportunities to redefine organizational strategies and operational efficiencies.

Workers across all career stages can tap into AI's potential through specialized training, continuous learning, and collaborations with AI experts. Staying current with technological advancements not only enriches current roles but also ensures long-term career resilience in an increasingly AI-driven landscape. While AI and automation enhances efficiency in these positions, adapting swiftly to the evolving landscape remains crucial for worker growth and success.

## Business and Management roles present the highest potential for transformation

To gain deeper insights into the extent of transformation, we also conducted a detailed examination of job roles at the functional level. These roles were categorized into seven distinct clusters, referred to as 'job family', based on their specific technical and functional

requirements: (i) Business and Management, (ii) Cybersecurity, (iii) Data Science, (iv) Design and User experience, (v) Infrastructure and Operations, (vi) Software Development, and (vii) Testing and Quality Assurance.

## Distribution of the high, moderate, and low transformation among job family groups

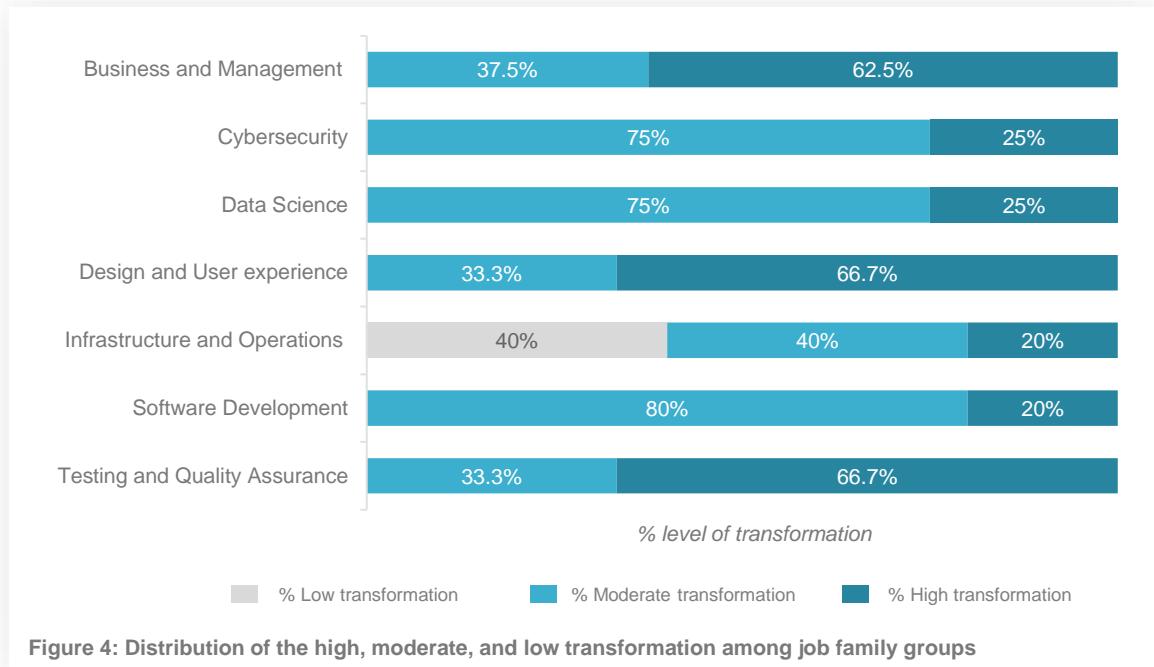


Figure 4: Distribution of the high, moderate, and low transformation among job family groups

Among the seven job family groups analyzed, Business and Management stands out, with 62.5% of job roles classified as high transformation and 37.5% as moderate transformation due to AI integration. This transformation is especially anticipated in entry level job roles such as Business Analyst, Business Intelligence Analyst, Business Systems Analyst, and Customer Service Representative [refer to Table 1 in the Analysis Methodology section]. AI has the potential to revolutionize these roles by enhancing operational efficiencies, facilitating strategic decision-making through data-driven insights, optimizing customer experiences, refining marketing strategies, and improving other functional aspects. Additionally, the Business and Management job family group is leading the pack in share of job postings according to our analysis of Indeed data. Software Development closely follows in second place (Indeed job postings data, 2021-23)<sup>[15]</sup>.

Meanwhile, the Software Development family group has shown significant transformation requirements, with 20% of job roles classified as high transformation and 80% as moderate transformation, highlighting its pivotal role in AI

adoption. According to data from Indeed, **one in 40 job postings for software developers in America mentions skills related to Gen AI** (Indeed job postings data, 2021-23)<sup>[16]</sup>. The introduction of advanced AI tools for code generation and software development lifecycle management has notably reduced time-to-market through precise planning and predictable workflows.

Conversely, all job roles categorized under **low transformation belonged to the Infrastructure and Operations family**, underscoring its relative resilience to current AI advancements despite some roles within the group requiring transformation.

This trend suggests that AI is reshaping certain job family groups more than others, potentially altering the types of skills and roles needed. This may involve refining job requirements to better align with the demands of AI-driven advancements. Therefore, targeted strategies for skills development and adaptation to AI technologies is crucial for staying competitive and relevant in the evolving job market.

## Shift in skillset relevance due to AI transformation

The study highlights the top ten skill sets expected to undergo significant transformation and gain prominence and become increasingly relevant across various job roles, ***along with the percentage of job roles requiring these skills. For instance, 100% of the job roles emphasize the growing importance of AI ethics and responsible AI practices.***

Additionally, we have identified another set of ten skills that may become less relevant due to AI advancements; for example, **31% job roles indicate a reduced need for basic programming and language skills, signaling a shift towards higher-level AI development competencies such as ML and NLP.**

Detailed insights on each of these skillsets are provided in the Appendix.



**Top 10 technical skills expected to increase in relevance (% job roles)**

<b>100%</b>	AI ethics and responsible AI
<b>100%</b>	AI literacy
<b>66%</b>	Prompt engineering
<b>20%</b>	Large Language Models (LLM) architecture
<b>20%</b>	Agile methodologies
<b>20%</b>	Data analytics
<b>11%</b>	Machine learning
<b>11%</b>	Retrieval augmented generation
<b>11%</b>	TensorFlow
<b>9%</b>	Natural language processing

**Top 10 technical skills expected to become less relevant (% job roles)**

<b>31%</b>	Basic programming and languages
<b>18%</b>	Content creation
<b>18%</b>	Data management
<b>16%</b>	Research information
<b>13%</b>	Documentation maintenance
<b>13%</b>	SQL
<b>7%</b>	Manual XML handling
<b>7%</b>	Manual Perl scripting
<b>7%</b>	Integration software
<b>4%</b>	Manual malware analysis

Figure 5: Top 10 technical skills expected to increase in relevance and top 10 technical skills expected to become less relevant (% job roles)

## Key learning recommendations

The study highlights a rapidly transforming job landscape where the required skillsets for ICT roles may undergo significant shifts. This underscores the pressing need for upskilling and reskilling initiatives among workers.

Essential training programs, specifically designed for both foundational and job-specific AI technologies, are crucial to equip the workforce with the necessary skills for future roles.

### Essential common foundational skills needed across ICT job roles for AI preparedness

Based on the key findings of the study, we have identified three essential foundational skills (see below) based on the shifting skill requirements with AI transformation. Moreover, integrating durable skills such as time

management, critical thinking, and effective communication is essential. These skills complement the technical competencies and enhance readiness for evolving worker environments.

<i>AI literacy</i>	<i>Data fundamentals</i>	<i>Prompt engineering</i>
<ul style="list-style-type: none"> <li><i>Critically select and use AI tools for the task</i></li> <li><i>Responsible use of AI tools</i></li> <li><i>Understand ethical aspect of AI</i></li> </ul>	<ul style="list-style-type: none"> <li><i>Data science principles and techniques</i></li> <li><i>Data classification</i></li> <li><i>Basic analytics</i></li> <li><i>Story telling with data</i></li> </ul>	<ul style="list-style-type: none"> <li><i>How to interact with AI system with prompt</i></li> <li><i>Prompting techniques</i></li> <li><i>Potential and limitation of the prompting engineering</i></li> </ul>

### Job specific trainings needed across various ICT job roles

As part of our study, we have also identified target job specific skills and some training programs for each ICT role which are essential for workers to stay updated on AI advancements. These programs equip workers with vital AI-driven skills for ongoing innovation.

For example, few common trainings that are applicable across specific roles include: Machine Learning with Python Foundations, AI Security Nuggets, Python for Data Science, AI & Development, Training Neural Networks in Python or applying Gen AI as a Creative Professional.

## Future growth of ICT job landscape through collaboration

The insights of the study indicate significant transformation in ICT job roles across career levels and job family groups. It is crucial for everyone—businesses, academia,

government, current workers, and future workers—to collaborate and actively participate in this skill development journey.



**Businesses** must invest in AI training to ensure workforce competitiveness and innovation, fostering growth in a technology-driven market. By investing in worker training, employers can attract and retain talent. Employers must take worker training needs and feedback into consideration when developing training programs.



**Government leaders** can advance AI through funding, policies, and partnerships that support effective upskilling and reskilling initiatives, ensuring a skilled workforce ready for technological advancements.



**Academic institutions** can update their curricula to include AI technologies and offer concise certificate programs that contribute to societal impact. By integrating practical, industry-specific AI skills, graduates will be well-prepared for the workforce, facilitating smooth transitions into professional roles. Academic institutions must prioritize investments in work-based learning initiatives, using flexible learning paths, and fostering collaboration with regional secondary education institutions.



**Current workers** should embrace lifelong learning to stay relevant. Proactively seeking reskilling and upskilling opportunities through employer programs, labour-sponsored training implemented by labour unions, online courses, or certifications allowing them to adapt to new roles and responsibilities brought about by AI advancements. Workers can leverage training programs sponsored by companies, academia, non-profits, governments, and labour unions.



**Future workers** should focus on acquiring a strong foundation in AI and related technologies. Internships, mentorships, and hands-on projects help build a robust skill set, positioning them as valuable assets to prospective employers.

The transformation in ICT job roles calls for a unified effort across all sectors. Collaborative initiatives such as industry-academic partnerships, government-funded training

programs, and community-driven learning platforms can accelerate the reskilling and upskilling process, ensuring a resilient workforce equipped for the future.

## Roadmap ahead

As we look to the future, embracing emerging AI technologies will be pivotal in shaping our educational and job landscape. To effectively navigate this transformative era, it is essential for businesses and academic institutions to foster collaborative partnerships and integrate

cutting-edge skills. By prioritizing innovation and inclusivity, we can pave the way for a dynamic learning environment that prepares individuals to thrive in the evolving global economy.

### Skills taxonomy

The Consortium will explore public-private partnerships to contribute to an AI skills taxonomy that provides a reference framework and a common lens through which skills are defined and mapped to corresponding job roles, along with the level of proficiency

required. An AI skills taxonomy would bring clarity and enable a common understanding among the public and private sectors to help frame learning opportunities, workforce development programs, and job requirements.

### AI workforce playbook

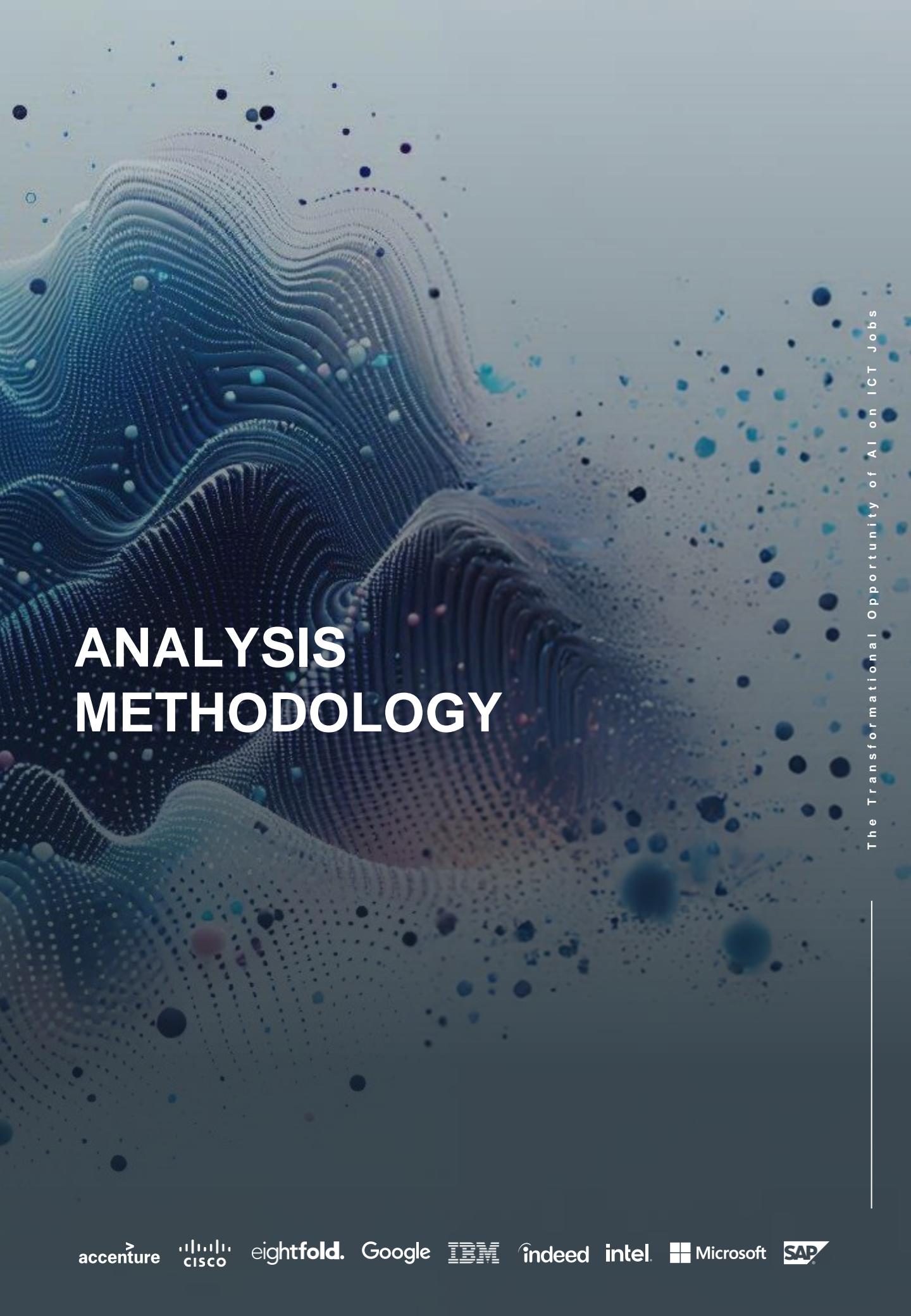
The Consortium plans to introduce an AI Workforce Playbook, designed to empower small and medium sized enterprises and large companies to reskill and upskill their workforce proactively. This playbook may include job evolution and mobility with a focus on reskilling and upskilling initiatives while fostering a culture conducive to AI integration.

Drawing insights from diverse stakeholders such as labour unions, clients, partners,

coalitions, governments, academia, and underserved communities, we will leverage best practices to enhance workforce readiness and adaptability. The playbook may also capture key job roles and success stories of workers navigating and thriving through evolving job landscapes. It will be aimed at serving as a collaborative resource for sharing learnings and strategies that support continuous workforce development in an AI-driven era.

## SUMMARY OF ICT JOB ROLES AND AI TRANSFORMATION

ICT Job Role	Page No.	ICT Job Family	AI Transformation
AI / ML Engineer	133	Software Development	High
Application Developer	136	Software Development	Moderate
Back End Developer	138	Software Development	Moderate
Business Analyst	41	Business and Management	High
Business Intelligence Analyst	44	Business and Management	High
Business Systems Analyst	47	Business and Management	Moderate
Cloud Engineer	140	Software Development	High
Customer Service Representative	50	Business and Management	High
Cybersecurity Analyst	67	Cybersecurity	Moderate
Data Analyst	83	Data Science	Moderate
Database Administrator	105	Infrastructure and Operations	Moderate
Data Engineer	86	Data Science	Moderate
Data Scientist	88	Data Science	High
Data Specialist	92	Data Science	Moderate
Design Engineer	95	Design and User experience	Moderate
Digital Marketing Specialist	52	Business and Management	High
Ethical Hacker	72	Cybersecurity	Moderate
Front End Developer	142	Software Development	Moderate
Full Stack Developer	144	Software Development	Moderate
Help Desk Analyst	107	Infrastructure and Operations	High
Information Security Specialist	76	Cybersecurity	High
IT Manager	110	Infrastructure and Operations	Low
IT Support Technician	112	Infrastructure and Operations	Low
Java Developer	146	Software Development	Moderate
Network Administrator	116	Infrastructure and Operations	Low
Network and IT Automation Engineer	119	Infrastructure and Operations	High
Network Support Technician	122	Infrastructure and Operations	Low
Principal Software Engineer	148	Software Development	Moderate
Product Design Engineer	97	Design and User experience	High
Product Manager	56	Business and Management	Moderate
Project Manager	59	Business and Management	High
Python Developer	152	Software Development	Moderate
Quality Assurance Analyst	174	Testing and Quality Assurance	Moderate
Senior Network Engineer	125	Infrastructure and Operations	Moderate
Senior Product Manager	63	Business and Management	Moderate
Senior Software Development Engineer	155	Software Development	Moderate
Senior Software Engineer	159	Software Development	Moderate
Soc Analyst Level 1	79	Cybersecurity	Moderate
Software Architect	163	Software Development	Moderate
Software Developer	165	Software Development	Moderate
Software Engineer	168	Software Development	High
Software Test and Debug	176	Testing and Quality Assurance	High
Systems Administrator	128	Infrastructure and Operations	Moderate
Systems Analyst	130	Infrastructure and Operations	Moderate
Technical Writer	178	Testing and Quality Assurance	High
UX Designer	101	Design and User experience	High
Web Developer	171	Software Development	Moderate



# ANALYSIS METHODOLOGY

# Analysis Methodology

The report is a new effort to analyze the impact of AI on jobs. It is a qualitative report designed with input from Consortium members. Our goal was to assess AI impact on jobs as well as review related training programs.

To achieve this goal, we requested information from Consortium members about how AI was impacting 47 ICT job roles. For this analysis, we worked closely with top experts and used advanced machine learning tools.

After many individual and group discussions, we agreed to organize the information by seven job family clusters, referred to as 'job family group', and created the 'Job Transformation Canvas'. This framework represents a pioneering effort in job role analysis, developed with input from Consortium members and subject matter experts (SMEs).

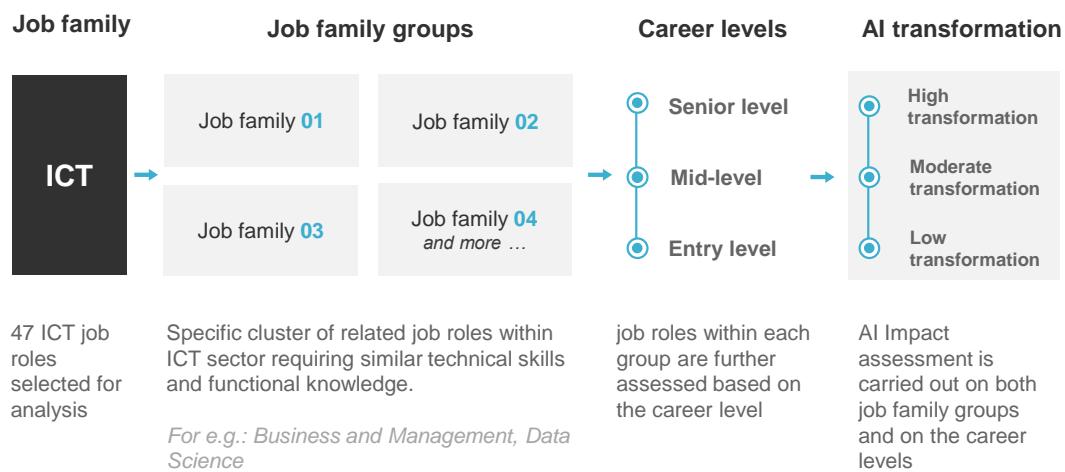
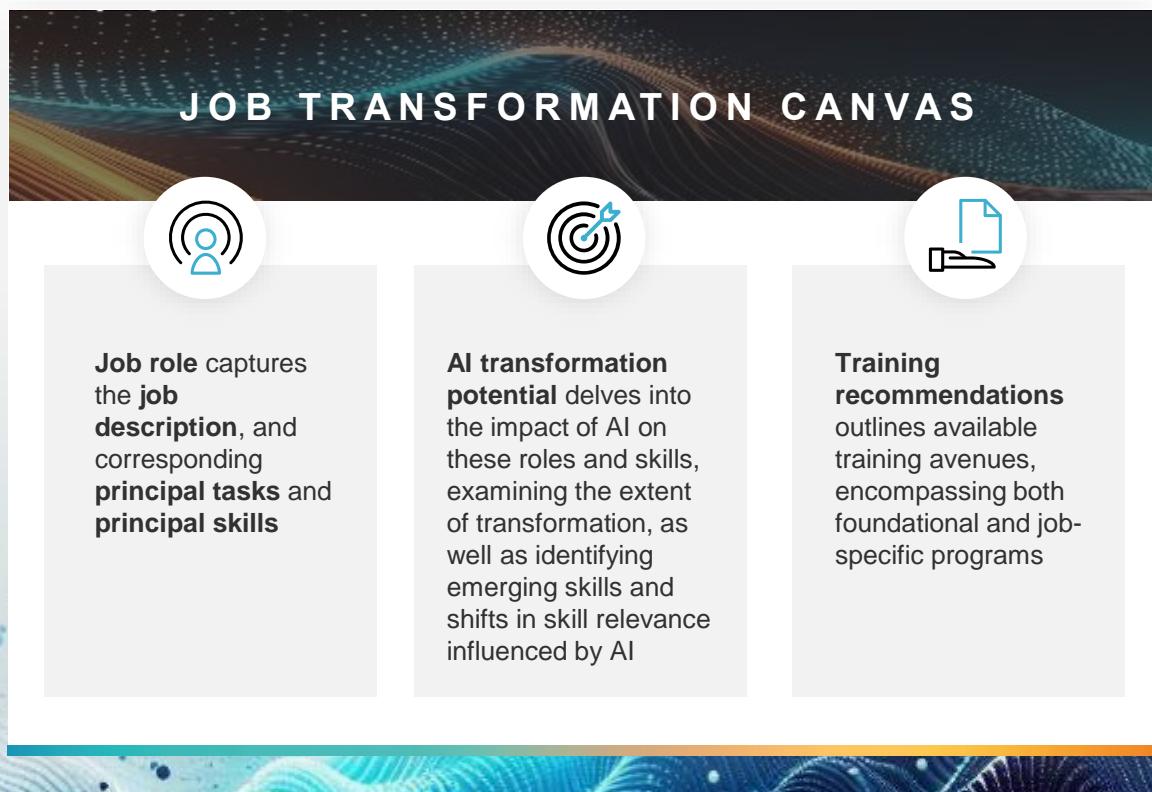


Figure 6: Job categorization framework for clustering the 47 selected ICT job roles which are similar in nature or purpose

The job family groups are further evaluated based on career levels (senior, mid, and entry levels). Additionally, we have analyzed the extent of AI transformation in job roles and assessed the shift in skillsets (new, increasing relevance, stable, and decreasing relevance skills) within each job family across different career levels.

This approach ensures a deep understanding of AI's influence across various job categories and promotes the development of foundational skills essential for workforce adaptability in an evolving technological landscape.



## Audiences

- **Primary audiences:** Businesses, workers, and future workers
- **Other audiences:** Educators, government leaders, journalists etc.



The Job Transformation Canvas is structured around three elements: '**Job Role**', '**AI Transformation Potential**', and '**Training Recommendations**', providing a comprehensive framework for understanding the evolving landscape of ICT job roles. It is designed to offer an overall outlook on the changing job landscape to employers, workers, and future workers. The Job Transformation

Canvas enables workers to understand market expectations and provides avenues for upskilling or reskilling accordingly. With its primary focus on skills, the report aims to address the skill gap in a dynamic, AI-impacted job market. Furthermore, it offers educators and policy influencers a broad view of the expected evolution of job roles and the industry's stance on the matter.

# Job Family Groups

We have organized the job roles into seven job family groups categorized based on the similar technical and functional responsibilities, as shown below:

Job Family	Definition	Job Role
<b>Business and Management</b>	Managing the development, business analysis and marketing of technology products and services	<ul style="list-style-type: none"> <li>Business Analyst</li> <li>Business Intelligence Analyst</li> <li>Business Systems Analyst</li> <li>Customer Service Representative</li> </ul> <ul style="list-style-type: none"> <li>Digital Marketing Specialist</li> <li>Product Manager</li> <li>Project Manager</li> <li>Senior Product Manager</li> </ul>
<b>Cybersecurity</b>	Protecting systems, networks, and data from security breaches and cyberattacks	<ul style="list-style-type: none"> <li>Cybersecurity Analyst</li> <li>Information Security Specialist</li> </ul> <ul style="list-style-type: none"> <li>Ethical Hacker</li> <li>Soc Analyst Level 1</li> </ul>
<b>Data Science</b>	Analyzing and interpreting large sets of data to extract valuable insights	<ul style="list-style-type: none"> <li>Data Analyst</li> <li>Data Engineer</li> </ul> <ul style="list-style-type: none"> <li>Data Scientist</li> <li>Data Specialist</li> </ul>
<b>Design and User Experience</b>	Designing the user experience and interface	<ul style="list-style-type: none"> <li>Design Engineer</li> <li>Product Design Engineer</li> </ul> <ul style="list-style-type: none"> <li>UX Designer</li> </ul>
<b>Infrastructure and Operations</b>	Managing and maintaining computer networks, including installing and configuring network equipment and troubleshooting network issues	<ul style="list-style-type: none"> <li>Database Administrator</li> <li>Help Desk Analyst</li> <li>IT Manager</li> <li>IT Support Technician</li> <li>Network Administrator</li> <li>Network and IT Automation Engineer</li> </ul> <ul style="list-style-type: none"> <li>Network Support Technician</li> <li>Senior Network Engineer</li> <li>Systems Administrator</li> <li>Systems Analyst</li> </ul>
<b>Software Development</b>	Designing, coding, testing, and maintaining software applications and systems	<ul style="list-style-type: none"> <li>AI / ML Engineer</li> <li>Application Developer</li> <li>Back End Developer</li> <li>Cloud Engineer</li> <li>Front End Developer</li> <li>Full Stack Developer</li> <li>Java Developer</li> <li>Principal Software Engineer</li> <li>Python Developer</li> <li>Software Architect</li> </ul> <ul style="list-style-type: none"> <li>Senior Software Development Engineer</li> <li>Senior Software Engineer</li> <li>Software Developer</li> <li>Software Engineer</li> <li>Web Developer</li> </ul>
<b>Testing and Quality Assurance</b>	Providing technical support and assistance to users	<ul style="list-style-type: none"> <li>Software Test and Debug</li> <li>Technical Writer</li> </ul> <ul style="list-style-type: none"> <li>Quality Assurance Analyst</li> </ul>

Table 1: Job roles categorized by technical and functional responsibilities into 'job family' groups



# OVERVIEW OF JOB FAMILY GROUPS



# Business and Management

The role of AI in Business and Management has undergone a profound evolution since IBM's 1979 declaration that "**A computer can never be held accountable; therefore, a computer must never make a management decision.**" Fast forward to today, while AI has made significant strides, human oversight remains paramount.

AI today can help to create product strategies, provide predictive analytics, automate processes, develop reports, manage large-scale projects, and improve customer satisfaction. However, this reliance on AI necessitates robust contingency plans to

**mitigate risks associated with business decisions, system failures or technical glitches.**

The increasing integration of AI underscores the **demand for skilled workers** in the field. Organizations may encounter challenges in recruiting and retaining AI talent, highlighting the need for skill development initiatives.

**Despite AI's capabilities, management decisions ultimately remain within the purview of human expertise and judgment,** even as AI continues to reshape business operations.

“

*AI plays a pivotal role in automating repetitive tasks, ensuring quality assurance, analyzing extensive datasets, providing predictive analytics to uncover trends, and delivering valuable insights. It is essential for managers and workers to cultivate skills in interpreting data and reading in between lines for informed strategic decision-making.*

“

*Job roles within Business and Management family have moderate to high transformative impact due to AI, especially with Gen AI, providing significant opportunities for recalibrating job roles and redesigning the requirements for training programs.*

## Job roles by career level in the Business and Management job family

Job level	Job role	AI transformation
Senior level	<ul style="list-style-type: none"> <li>Senior Product Manager</li> </ul>	<p><i>Moderate transformation is expected at the senior level as high-level business decisions may be complemented with AI but require human expertise</i></p>
Mid-level	<ul style="list-style-type: none"> <li>Digital Marketing Specialist</li> <li>Product Manager</li> <li>Project Manager</li> </ul>	<p><i>Moderate to high transformation is expected at the mid skilled job roles as AI can greatly complement the human skills</i></p>



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# Business and Management

## Job roles by career level in the Business and Management job family

Job level	Job role	AI transformation
Entry level	<ul style="list-style-type: none"> <li>Business Analyst</li> <li>Business Intelligence Analyst</li> <li>Business Systems Analyst</li> <li>Customer Service Representative</li> </ul>	 <p><b>High transformation</b> is expected in these job roles and job structures due to AI</p>

Our comprehensive analysis of job roles within the Business and Management group highlights the varied impacts of AI advancements on skillsets across different

career levels. This section provides an overview of newly identified skills and assesses those that are either increasing or decreasing in relevance due to AI.

## Overview of principal skills impacted by AI

	Senior level	Mid-level	Entry level
New skills	<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>AI-driven competitive analysis</li> <li>AI integration strategies</li> <li>ML literacy</li> </ul>	<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>Digital graphic design</li> <li>ML literacy</li> <li>Managing AI uncertainty</li> <li>Prompt engineering</li> </ul>	<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>Data science</li> <li>Data visualization</li> <li>Explainable AI</li> <li>NLP concepts</li> <li>ML literacy</li> <li>Prompt engineering</li> </ul>
Skills with increasing relevance	<ul style="list-style-type: none"> <li>Agile methodologies</li> <li>Product strategy</li> <li>Process improvement</li> <li>Product development life cycle</li> <li>User experience</li> </ul>	<ul style="list-style-type: none"> <li>Adapting workflows</li> <li>AI tools</li> <li>Budgeting</li> <li>Data-driven insights</li> <li>Predictive analytics</li> <li>Quality assurance</li> </ul>	<ul style="list-style-type: none"> <li>Data driven decision making</li> <li>Data management</li> <li>Output drivers</li> <li>Problems reframing</li> <li>Success KPIs</li> <li>Statistical models</li> </ul>
Skills with decreasing relevance	<ul style="list-style-type: none"> <li>Basic data analysis</li> <li>Manual data cleaning and preparation</li> <li>Task scheduling</li> </ul>		<ul style="list-style-type: none"> <li>Basic report generation</li> <li>Documentation maintenance</li> <li>KPI monitoring</li> </ul>



The importance of soft skills (e.g., problem solving, communication, etc.) will remain stable.



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# Cybersecurity

With the advent of AI, the Cybersecurity job roles have witnessed transition, as 70% of Cybersecurity leaders (CISOs) believe AI gives the advantage to attackers over defenders. However, 35% of the CISOs are already experimenting with it for cyber defense, and 61% of CISOs will likely use it in the next 12 months. Additionally, 86% of CISOs believe that Gen AI will help alleviate skills gaps and talent shortages on the security team (Kovar R, Paine K, 2023)<sup>[17]</sup>.

With the intervention of AI there has been an upgrade to the quality of work. However, many challenges have been identified in Cybersecurity job roles. **Routine tasks are**

**automated such as log analysis and basic threat detection**, potentially reducing the amount of time spent on entry level tasks.

With the application of the right skillset, AI can assist in **automating report generation and malware analysis**, highlighting **critical vulnerabilities and suggesting remediation steps**. It assists the workforce by leveraging tools that **detect anomalies** in the behavior of code running on diverse end devices. Consequently, the **pivot to adoption of relevant new skills** with appropriate trainings for the Cybersecurity workforce is inevitable.

“

*As it is with many ICT based jobs, **Gen AI will drive a significant shift in the focus of Cybersecurity job roles**. With its interjection, essential tasks such as vulnerability detection, predictive analytics and faster incidence response become easier for cybersecurity workers leading to enhanced security position of organizations, products, and infrastructure.*

“

*AI will augment critical aspects of cybersecurity roles, **automating repetitive tasks**; however, it **cannot fully replace the critical human elements of strategic thinking**, problem-solving, communication, and collaboration. In addition, the workforce must deal with high complexities and higher value-added cases.*

## Job roles by career level in the Cybersecurity job family

Job level	Job role	AI transformation
Mid-level	<ul style="list-style-type: none"> <li>Ethical Hacker</li> </ul>	 <p><b>Moderate transformation</b> is expected at the mid skilled job roles as AI can complement the human strategic skills</p>
Entry level	<ul style="list-style-type: none"> <li>Cybersecurity Analyst</li> <li>Information Security Specialist</li> <li>Soc Analyst Level 1</li> </ul>	 <p><b>Moderate to high transformation</b> is expected at the entry level as many tasks may be complemented with AI but require human expertise</p>



# Cybersecurity

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## Overview of principal skills impacted by AI

Our comprehensive analysis of job roles within the Cybersecurity group highlights the varied impacts of AI advancements on skillsets across different career levels. This section provides an

overview of newly identified skills and assesses those that are either increasing or decreasing in relevance due to AI.

	Mid-level	Entry level
<b>New skills</b>	<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>LLM architecture</li> <li>Prompt engineering</li> <li>Retrieval augmented generation</li> </ul>	
<b>Skills with increasing relevance</b>	<ul style="list-style-type: none"> <li>Design the integration of hardware and software solutions</li> <li>Evaluate the adequacy of security designs</li> <li>Security requirement analysis</li> <li>Vulnerability scanning</li> </ul>	<ul style="list-style-type: none"> <li>Critical thinking and problem-solving</li> <li>Information assurance</li> <li>Risk management</li> <li>Risk mitigation</li> <li>Security policies</li> <li>Security requirements analysis</li> <li>Vulnerability scanning</li> </ul>
<b>Skills with decreasing relevance</b>	<ul style="list-style-type: none"> <li>Research information</li> <li>Continuous monitoring</li> <li>Writing</li> </ul>	



The importance of soft skills (e.g., problem solving, communication, etc.) will remain stable.



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# Data Science

Data science leverages advanced statistics and machine learning to tackle business and product challenges through a structured approach encompassing problem identification, data collection, exploration, cleaning, model building, iteration, and communication. In this evolving landscape, the integration of AI marks a transformative shift in business operations and decision-making.

AI technologies like NLP, LLMs, Gen AI, and automated data processing have revolutionized data analysis with complex nonlinear correlations and advanced models. While AI enhances efficiency and accelerates data

processing, it emphasizes the ongoing necessity of human expertise in interpreting results, validating outputs, and making strategic decisions.

Furthermore, AI's integration **democratizes data science, extending sophisticated analytical capabilities beyond traditional workers**. As AI continues to augment efficiency and insight generation, Data Science workers play an increasingly pivotal role in leveraging these technologies for innovation and impactful outcomes, ensuring their indispensable role in guiding businesses towards data-driven success.

“

**Gen AI represents the next transformative wave in Data Science.**  
Its application enables individuals and organizations to streamline data modeling, visualization, automated reporting, and other tasks, thereby unlocking new opportunities to enhance productivity significantly.

“

AI significantly enhances machine learning model construction and optimization, but **human expertise is crucial for model selection, tuning, and understanding domain-specific nuances, marking a high impact on the Data Science roles.**

## Job roles by career level in the Data Science job family

Job level	Job role	AI transformation
Mid-level	<ul style="list-style-type: none"> <li>• Data Engineer</li> <li>• Data Scientist</li> </ul>	<p><b>Moderate transformation</b> is expected at the mid-level jobs, driven by the integration of sophisticated data science with AI technologies</p>
Entry level	<ul style="list-style-type: none"> <li>• Data Analyst</li> <li>• Data Specialist</li> </ul>	<p><b>Moderate transformation</b> is expected at the entry level as AI assumes routine tasks, necessitating job role restructuring and the acquisition of new skill sets.</p>



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# Data Science

## Overview of principal skills impacted by AI

Our comprehensive analysis of job roles within the Data Science group highlights the varied impacts of AI advancements on skillsets across different career levels. This section provides an

overview of newly identified skills and assesses the shift in relevance of existing skills.

	Mid-level	Entry level
<b>New skills</b>	<ul style="list-style-type: none"> <li>• AI ethics and responsible AI</li> <li>• AI literacy</li> <li>• Advanced ML techniques</li> <li>• AI model interpretability</li> <li>• Apache NiFi</li> <li>• LLM architecture</li> <li>• Prompt engineering</li> </ul>	<ul style="list-style-type: none"> <li>• AI ethics and responsible AI</li> <li>• AI literacy</li> <li>• Apache NiFi</li> <li>• LLM capabilities and biases</li> <li>• Prompt engineering</li> </ul>
<b>Skills with increasing relevance</b>	<ul style="list-style-type: none"> <li>• Deep learning</li> <li>• Natural language processing</li> <li>• Predictive analytics</li> </ul>	<ul style="list-style-type: none"> <li>• Analytical skills</li> <li>• Business intelligence</li> <li>• Business strategies</li> </ul>
<b>Skills with decreasing relevance</b>	<ul style="list-style-type: none"> <li>• Data cleaning</li> <li>• Data entry</li> <li>• Data preprocessing</li> </ul>	<ul style="list-style-type: none"> <li>• Data dashboards</li> <li>• Data modeling</li> <li>• Data visualization</li> </ul>

The importance of soft skills (e.g., problem solving, communication, etc.) will remain stable.



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# Design and User Experience

Effective design hinges on understanding human needs and emotions. This user-centric approach is critical for creating products that resonate with users and achieve desired outcomes. The significance of Design and User Experience (UX) skills is further underscored by the World Economic Forum's Future of Jobs Report 2023 (World Economic Forum, 2023)<sup>[18]</sup>. This report identifies Design and UX skills as among the top 10 priorities for reskilling and upskilling the workforce between 2023 and 2027.

The rise of AI in the ICT sector is transforming the UX landscape. AI automates routine tasks within the UX industry, streamlining workflows,

facilitating data analysis through large datasets and creating hyper personalization with Gen AI.

While AI offers significant benefits, the human touch remains essential in design. Empathy and the ability to connect with users on an emotional level are uniquely human capabilities that cannot be fully replicated by AI. Design workers must therefore prioritize these differentiating skills to ensure their work stands out from AI-generated designs.

“

*“Gen AI has revolutionised the **product design segment, reducing time on finite element analysis**, leading to hyper personalization and generation of novel concepts and ideas, sparking creativity.”*

“

*“Job roles within Design and UX family have high transformative impact due to AI, especially with **Gen AI**, providing opportunities such as expanding voice interactions which is **impactful for differently abled individuals**, thus recalibrating the requirements for training programs.”*

## Job roles by career level in the Design and User Experience job family

Job level	Job role	AI transformation
Mid-level	<ul style="list-style-type: none"> <li>Product Design Engineer</li> </ul>	 <p><b>High transformation</b> is expected in these job roles due to the hyper personalization by Gen AI</p>
Entry level	<ul style="list-style-type: none"> <li>Design Engineer</li> <li>UX Designer</li> </ul>	 <p><b>Moderate to high transformation</b> is expected in these job roles with Gen AI design tools and automation of repetitive tasks</p>



# Design and User Experience

## Overview of principal skills impacted by AI

Our comprehensive analysis of three selected roles within the Design and User Experience group highlights the varied impacts of AI advancements on skillsets across different

career levels. This section provides an overview of newly identified skills and assesses the shift in relevance of existing skills.

	Mid-level	Entry level
<b>New skills</b>	<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>Machine learning</li> <li>Prompt engineering</li> </ul>	<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>Ansys</li> <li>Proprietary AI design tool applications</li> <li>Prompt engineering</li> <li>Scikit</li> </ul>
<b>Skills with increasing relevance</b>	<ul style="list-style-type: none"> <li>AI literacy</li> <li>Collaboration and communication</li> <li>Creativity and innovation</li> <li>Data analysis and interpretation</li> <li>Machine learning</li> <li>Strategic thinking</li> </ul>	<ul style="list-style-type: none"> <li>Analytical thinking</li> <li>Data and knowledge driven problem definition and solving</li> <li>Lean manufacturing</li> <li>Product design</li> </ul>
<b>Skills with decreasing relevance</b>	<ul style="list-style-type: none"> <li>Basic coding skills</li> <li>Manual content creation</li> <li>Research information</li> </ul>	

The importance of soft skills (e.g., problem solving, communication, etc.) will remain stable.



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# Infrastructure and Operations

Infrastructure and Operations roles deploy, operate, and manage a company's technology resources. AI is transforming these roles from human-dependent functions to smarter networks for managing configurations, troubleshooting issues, and adapting to changing demands. AI enhances efficiency, resilience, and reliability, advancing digital-era infrastructure.

As per the IBM Global AI Adoption Index 2022 (IBM, 2022)<sup>[19]</sup>, **33% of the organizations use AI to automate IT processes**. This leaves the workers with more time to focus on complex problem solving, strategic decision making and stakeholder management.

“

*Job roles within the Infrastructure and Operations family have a low to moderate transformative impact due to AI. The time-consuming and error-prone tasks of monitoring and maintenance are significantly complemented by AI in most roles within this group. AI-powered monitoring systems enable continuous monitoring of IT infrastructure and facilitate real-time identification and resolution of potential issues*

“

*Adoption of Gen AI tools, especially prompt engineering and data analytics is expected across the career levels of this job family group. Workers are expected to have better understanding of these tools, to manage and properly leverage the AI solutions to excel in their roles.*

## Job roles by career level in the Infrastructure and Operations job family

Job level	Job role	AI transformation
Senior level	<ul style="list-style-type: none"> <li>• Senior Network Engineer</li> </ul>	 <p><b>Moderate transformation</b> is expected at the senior level as high-level business decisions may be complemented with AI but require human expertise</p>
Mid-level	<ul style="list-style-type: none"> <li>• Database Administrator</li> <li>• IT Manager</li> <li>• Network Administrator</li> <li>• Network and IT Automation Engineer</li> <li>• Systems Administrator</li> </ul>	 <p><b>Low to moderate transformation</b> is expected at the mid skilled job roles as AI can greatly complement the human skills</p>



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# Infrastructure and Operations

## Job roles by career level in the Infrastructure and Operations job family

Job level	Job role	AI transformation
Entry level	<ul style="list-style-type: none"> <li>Network Support Technician</li> <li>Systems Analyst</li> <li>IT Support Technician</li> <li>Help desk Analyst</li> </ul>	 <p><b>Low to moderate transformation</b> is expected in these job roles due to AI</p>

Our comprehensive analysis of job roles within the Infrastructure and Operations group highlights the varied impacts of AI advancements on skillsets across different

career levels. This section provides an overview of newly identified skills and assesses those that are either enhanced or decreased in relevance due to AI.

## Overview of principal skills impacted by AI

	Senior level	Mid-level	Entry level
New skills	<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>AI/ML for networking</li> <li>Cloud-native security</li> <li>Data analytics</li> <li>Network telemetry</li> <li>Sustainability practices and metrics</li> <li>SASE</li> </ul>	<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>AI security</li> <li>Cloud AI</li> <li>Data analytics</li> <li>Prompt engineering</li> <li>Retrieval Augmented Generation</li> </ul>	<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>AI system management</li> <li>Automated generation of software documentation</li> <li>Data analytics</li> <li>Prompt engineering</li> <li>Regulations on data protection, safety, and cybersecurity</li> </ul>
Skills with increasing relevance	<ul style="list-style-type: none"> <li>Network security</li> <li>Network monitoring</li> <li>Network management</li> <li>Systems management</li> <li>Software development</li> <li>Workflow management</li> </ul>	<ul style="list-style-type: none"> <li>Automation</li> <li>Cybersecurity</li> <li>Disaster recovery</li> <li>Problem solving</li> <li>Scripting</li> <li>CI/CD, DevOps</li> </ul>	<ul style="list-style-type: none"> <li>Complex problem solving</li> <li>Customer service and communication</li> <li>Risk management</li> <li>Risk mitigation</li> <li>Security policies</li> </ul>
Skills with decreasing relevance	<ul style="list-style-type: none"> <li>Documentation maintenance</li> <li>Test automation</li> <li>Troubleshooting</li> <li>Writing</li> </ul>		<ul style="list-style-type: none"> <li>Active directory</li> <li>Manual knowledge-based maintenance</li> </ul>

The importance of soft skills (e.g., problem solving, communication, etc.) will remain stable.



Please click here to access the list of recommended foundational and job specific trainings.



# Software Development

Software Development is a crucial business element in an **era of rapid digitization and evolving user needs**. The role of AI in this sector has evolved from basic assistance to now helping developers design efficient and adaptive products while ensuring a better user experience. AI tools can augment the work of developers through code suggestions, bug detections and testing capabilities. Specifically, **Gen AI and NLP** have taken the center stage in ensuring **developers have ample support and time to align their focus on broader business requirements**. A Gartner report suggests that by 2025, **more than half of all**

**software engineering leader role descriptions will explicitly require oversight of Gen AI** (Khandabhattu H, Wan D, 2023)<sup>[20]</sup>.

The impact of AI on the skills required for a developer is significant, with Gen AI set to augment around **60% of skills in entry level roles and thereby increasing the demand for developers with creativity and strategic problem-solving capabilities**. Training the workforce in AI tools while ensuring ethical AI and recognizing shortcomings of such tools would be the way forward.

“

*Gen AI is expected to play an augmenting role in the skillset of developers. Across career levels, there is a **need to elevate their current skillsets** while being trained in skills of the future such as Prompt engineering and LLM Architecture.*

“

*AI adoption demands new arena of skill sets in ethics and user privacy across career levels. In Software Development, **cybersecurity skills are paramount due to the user centric and evolving regulations on AI bias and privacy**.*

## Job roles by career level in the Software Development job family

Job level	Job role	AI transformation
Senior level	<ul style="list-style-type: none"> <li>• Principal Software Engineer</li> <li>• Senior Software Development Engineer</li> <li>• Senior Software Engineer</li> </ul>	<p><b>Moderate transformation</b> is expected at the senior level as high-level business decisions may be complemented with AI but require human expertise</p>
Mid-level	<ul style="list-style-type: none"> <li>• Software Architect</li> <li>• Software Developer</li> <li>• Software Engineer</li> </ul>	<p><b>Moderate to high transformation</b> is expected at the mid skilled job roles as AI can greatly complement the human skills</p>



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# Software Development

## Job roles by career level in the Software Development job family

Job level	Job role	AI transformation
Entry level	<ul style="list-style-type: none"> <li>• AI/ML Engineer</li> <li>• Application Developer</li> <li>• Back End Developer</li> <li>• Cloud Engineer</li> <li>• Front End Developer</li> <li>• Full Stack Developer</li> <li>• Java Developer</li> <li>• Python Developer</li> <li>• Web Developer</li> </ul>	 <p><b>High transformation</b> is expected in these job roles and job structures due to AI</p>

Our comprehensive analysis of fifteen selected roles within the Software Development family group highlights the varied impacts of AI advancements on skillsets across different

career levels. This section provides an overview of newly identified skills and assesses the shift in relevance of existing skills.

## Overview of principal skills impacted by AI

	Senior level	Mid-level	Entry level
New skills	<ul style="list-style-type: none"> <li>• AI driven software development</li> <li>• AI ethics and responsible AI</li> <li>• AI literacy</li> <li>• AI security</li> </ul>	<ul style="list-style-type: none"> <li>• AI ethics and responsible AI</li> <li>• AI literacy</li> <li>• LLM architecture</li> <li>• Natural language processing</li> <li>• Prompt engineering</li> </ul>	<ul style="list-style-type: none"> <li>• AI ethics and responsible AI</li> <li>• AI literacy</li> <li>• AI integration and optimization</li> <li>• AI model development</li> <li>• LLM architecture</li> <li>• TensorFlow</li> </ul>
Skills with increasing relevance	<ul style="list-style-type: none"> <li>• AI integration in code generation</li> <li>• Object oriented design</li> <li>• Software design patterns</li> <li>• Scrum, Project management</li> <li>• Test automation</li> <li>• Web services</li> </ul>	<ul style="list-style-type: none"> <li>• Code review</li> <li>• DevOps</li> <li>• Prototyping</li> <li>• Software modeling</li> <li>• Testing methodologies</li> </ul>	<ul style="list-style-type: none"> <li>• Agile methodology</li> <li>• Debugging</li> <li>• JavaScript and react js</li> <li>• Kubernetes and docker</li> <li>• System architecture</li> <li>• Test automation</li> <li>• Web development</li> </ul>
Skills with decreasing relevance	<ul style="list-style-type: none"> <li>• Basic programming</li> <li>• Data engineering</li> <li>• Documentation maintenance</li> <li>• XML, Perl, Shell scripting</li> </ul>		



The importance of soft skills (e.g., problem solving, communication, etc.) will remain stable.



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# Testing and Quality Assurance

Testing and Quality Assurance (QA) workers are crucial for ensuring software reliability and functionality. They plan and execute tests rigorously to detect defects and collaborate with various teams to resolve issues and maintain high-quality standards. AI has transformed these roles with automated tools such as Selenium and Appium, which enhance accuracy and speed in defect identification through advanced algorithms.

With AI's impact on Testing and QA, there is a growing need for workers to upskill. This involves mastering AI-driven automated testing tools, understanding machine learning for predictive analytics, speech recognition algorithms, prompt engineering and interpreting data for actionable insights. Upskilling equips the workers to leverage AI effectively, analyze large datasets for defects, and optimize test coverage, ensuring they remain adept in an evolving technological landscape.

“

*AI-powered testing algorithms revolutionize software testing by leveraging machine learning to **detect complex patterns, anomalies, and correlations**. This enables proactive anomaly detection, predictive analytics for defect forecasting, adaptive testing strategies, and automation of diverse test scenarios.*

“

*While AI has drastically improved testing efficiency and accuracy, reducing manual effort and enabling faster time-to-market for software products, **continuous learning and adaptation to new AI technologies and methodologies are essential for Testing and QA workers.***

## Job roles by career level in the Testing and Quality Assurance job family

Job level	Job role	AI transformation
Entry level	<ul style="list-style-type: none"> <li>• Software Test and Debug</li> <li>• Technical Writer</li> <li>• Quality Assurance Analyst</li> </ul>	<p><b>Moderate to high transformation</b> is expected in Testing and Quality Assurance family group as AI assumes routine tasks like documentation, automated error/ bug detection necessitating job role restructuring and the acquisition of new skill sets.</p>



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# Testing and Quality Assurance

## Overview of principal skills impacted by AI

Our comprehensive analysis of four selected roles within the Testing and Quality Assurance group highlights the varied impacts of AI advancements on skillsets across different

career levels. This section provides an overview of newly identified skills and assesses the shift in relevance of existing skills.

### Entry level

<b>New skills</b>	<ul style="list-style-type: none"> <li>• AI assisted code generation</li> <li>• AI algorithms</li> <li>• AI literacy</li> <li>• AI ethics and responsible AI</li> <li>• AI model development</li> <li>• Automated testing</li> </ul>	<ul style="list-style-type: none"> <li>• Conversational AI</li> <li>• LLM architecture</li> <li>• Prompt engineering</li> </ul>
<b>Skills with increasing relevance</b>	<ul style="list-style-type: none"> <li>• AI based code review</li> <li>• AI based auditing</li> <li>• AI based regulatory compliance</li> <li>• Automated testing</li> <li>• Project management with One point project</li> <li>• Software test automation</li> </ul>	
<b>Skills with decreasing relevance</b>	<ul style="list-style-type: none"> <li>• Documentation maintenance</li> <li>• Research information</li> </ul>	

The importance of soft skills (e.g., problem solving, communication, etc.) will remain stable.



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## JOB SNAPSHTOS\*

	<ul style="list-style-type: none"> <li>Application Developer</li> <li>Database Administrator</li> </ul>	<ul style="list-style-type: none"> <li>Java Developer</li> <li>Quality Assurance Analyst</li> </ul>	<ul style="list-style-type: none"> <li>Technical Writer</li> </ul>
	<p><i>SkyHive in partnership with Accenture performed the initial data analysis.</i></p>		
	<ul style="list-style-type: none"> <li>AI / ML Engineer</li> <li>Cybersecurity Analyst</li> <li>Data Analyst</li> <li>Ethical Hacker</li> <li>Help Desk Analyst</li> </ul>	<ul style="list-style-type: none"> <li>IT Support Technician</li> <li>Network Administrator</li> <li>Network and IT Automation Engineer</li> <li>Network Support Technician</li> </ul>	<ul style="list-style-type: none"> <li>Python Developer</li> <li>Senior Network Engineer</li> <li>SOC Analyst Level 1</li> <li>Systems Administrator</li> </ul>
	<p> eightfold.ai</p> <ul style="list-style-type: none"> <li>Data Scientist</li> <li>Principal Software Engineer</li> </ul> <ul style="list-style-type: none"> <li>Product Manager</li> <li>Senior Product Manager</li> </ul> <ul style="list-style-type: none"> <li>Senior Software Development Engineer</li> <li>Senior Software Engineer</li> </ul>		
	<ul style="list-style-type: none"> <li>Business Intelligence Analyst</li> <li>Business Systems Analyst</li> </ul>	<ul style="list-style-type: none"> <li>Cybersecurity Analyst</li> <li>Digital Marketing Specialist</li> <li>IT Support Technician</li> </ul>	<ul style="list-style-type: none"> <li>Product Design Engineer</li> <li>Project Manager</li> </ul>
	<p></p> <ul style="list-style-type: none"> <li>Business Analyst</li> <li>Information Security Specialist</li> </ul> <ul style="list-style-type: none"> <li>IT Support Technician</li> <li>Project Manager</li> </ul> <ul style="list-style-type: none"> <li>Software Engineer</li> <li>UX Designer</li> </ul>		
	<ul style="list-style-type: none"> <li>Data Scientist</li> <li>Software Architect</li> </ul>	<ul style="list-style-type: none"> <li>Software Developer</li> </ul>	<ul style="list-style-type: none"> <li>Software Test and Debug</li> </ul>
	<p></p> <ul style="list-style-type: none"> <li>Back End Developer</li> <li>Cloud Engineer</li> <li>Data Engineer</li> <li>Data Specialist</li> </ul> <ul style="list-style-type: none"> <li>Design Engineer</li> <li>Front End Developer</li> <li>Full Stack Developer</li> </ul> <ul style="list-style-type: none"> <li>IT Manager</li> <li>Systems Analyst</li> <li>Web Developer</li> </ul>		
	<ul style="list-style-type: none"> <li>Customer Service Representative</li> </ul>	<ul style="list-style-type: none"> <li>IT Support Specialist</li> <li>Project Manager</li> </ul>	<ul style="list-style-type: none"> <li>Software Developer</li> </ul>
	<p><i>*Note: The division outlined here reflects how job role analysis was distributed and completed and does not imply any specific commentary by any of the consortium members on its workers or internal roles.</i></p>		



# BUSINESS AND MANAGEMENT

The Transformational Opportunity of AI on ICT Jobs



# JOB ROLE

## BUSINESS ANALYST



### Job description

Business Analyst identifies business opportunities through data analysis, recommends operational enhancements, and documents detailed requirements. They translate business needs into technical specifications, analyze and refine requirements for business systems and solutions, develop dashboards, and oversee data quality. Additionally, they conduct market research, manage project timelines, and lead change management initiatives for the smooth adoption of new processes and communicate and collaborate with stakeholders to address business needs.

### Principal tasks

- Analyze business processes, workflows, data, and requirements
- Analyze data using statistical methods
- Conduct elicitation sessions with stakeholders to gather requirements
- Coordinate with IT to improve data collection and analysis methods
- Design and manage data analytics and reporting tools for business insights
- Develop dashboards and visualizations for Key Performance Indicators (KPIs)
- Document detailed business, functional, and system requirements
- Ensure alignment with business objectives
- Identify business issues and opportunities using the data analytics
- Lead change management initiatives to ensure smooth adoption of new processes and systems across the organization
- Model and map business processes and data flows
- Oversee data governance and ensure data quality and consistency
- Perform market research and competitive analysis to inform strategy, plan, execute, and oversee project timelines and deliverables
- Recommend changes or enhancements to business operations based on findings from data analysis
- Translate business needs into technical specifications for data projects

### Principal skills

- Communicate findings to stakeholders
- Create and use statistical models
- Critical thinking
- Define and analyze business problems and reframe it as an analytic problem
- Define key metrics for success
- Design and evaluate experiments
- Determine information, analysis, and data required to support decision making and answer the business problem
- Develop a proposed set of drivers and relationships to outputs, assumptions and constraints

# JOB ROLE

## BUSINESS ANALYST

### Principal skills

- Explore, organize, clean, transform and visualize data using Microsoft Excel, SQL, and Tableau
- Identify enhancements based on performance data
- Identify sources, uses, and characteristics of a data set
- Interpret results and draw meaningful conclusions
- Manage and maintain data
- Monitor performance of the solution against predefined KPIs using dashboards
- Problem solving

### Impact of AI

AI tools are poised to drastically change the landscape of business analytics through automation, predictive analysis, and ever improving strategic insights. Larger and larger bodies of data will be processed and cleaned at drastically improved speeds, facilitating real-time analysis that will improve strategic

decision making. AI tools will be able to assist in the structuring of data. Key factors for business analysts will involve data science and advanced math skills, natural language processing, and other core skills that form the foundation of AI proficiency.

### Key insights

- **Automation:** Many facets of business analysis are primed for automation, including data processing, cleaning, and initial analysis, with briefs and reports being created through a blend of data processing AI, like NLP and Gen AI tools
- **Decision making support:** Deeper, more insightful analysis of larger bodies of data will be powered by AI tools, helping analysts produce more insightful recommendations around strategic considerations
- **Predictive analytics:** Pattern recognition and other AI powered tools will allow business analysts to generate more accurate business forecasts further in advance
- **Strategic insight:** As business analysts increasingly rely on AI tools to support their responsibilities, predictive analytics will offer better inferences from which to draw better strategic recommendations

# JOB ROLE

## BUSINESS ANALYST

### Skills impacted by AI

#### New

- AI ethics and responsible AI
- AI frameworks (PyTorch, scikit-learn)
- AI governance and reporting standards
- AI literacy
- Data science
- Data visualization integrations with AI
- NLP concepts

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JOB FAMILY GROUP: BUSINESS AND MANAGEMENT

#### Increasing relevance

- Create and use statistical models
- Critical thinking
- Define and analyze business problems and reframe it as an analytic problem
- Define key metrics for success
- Design and evaluate experiments
- Determine what information, analysis, and data are required to support decision making and answer the business problem
- Develop a proposed set of drivers and relationships to outputs, assumptions and constraints
- Explore, organize, clean, transform and visualize data using Microsoft Excel, SQL, and Tableau
- Identify enhancements based on performance data
- Identify sources, uses, and characteristics of a data set
- Interpret results and draw meaningful conclusions
- Manage and maintain data
- Monitor performance of the solution against predefined KPIs using dashboards
- Problem solving

#### Stable

- Communicate findings to stakeholders

#### Decreasing relevance

- Monitor performance of the solution against predefined KPIs using dashboards



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# JOB ROLE

## BUSINESS INTELLIGENCE ANALYST



### Job description (ONET Data, 2024)<sup>[21]</sup>

Business Intelligence Analyst are required to produce financial and market intelligence by querying data repositories and generating periodic reports. Devise methods for identifying data patterns and trends in available information sources.

### Principal tasks (ONET Data, 2024)<sup>[22]</sup>

- Generate standard or custom reports summarizing business, financial, or economic data for review by executives, managers, clients, and other stakeholders
- Synthesize current business intelligence or trend data to support recommendations for action
- Maintain library of model documents, templates, or other reusable knowledge assets.
- Create business intelligence tools or systems, including design of related databases, spreadsheets, or outputs
- Manage timely flow of business intelligence information to users
- Collect business intelligence data from available industry reports, public information, field reports, or purchased sources
- Analyze competitive market strategies through analysis of related product, market, or share trends
- Maintain or update business intelligence tools, databases, dashboards, systems, or methods
- Identify or monitor current and potential customers, using business intelligence tools
- Disseminate information regarding tools, reports, or metadata enhancements
- Provide technical support for existing reports, dashboards, or other tools
- Identify and analyze industry or geographic trends with business strategy implications
- Communicate with customers, competitors, suppliers, worker organizations, or others to stay abreast of industry or business trends
- Create or review technical design documentation to ensure the accurate development of reporting solutions
- Analyze technology trends to identify markets for future product development or to improve sales of existing products
- Conduct or coordinate tests to ensure that intelligence is consistent with defined needs
- Document specifications for business intelligence or information technology reports, dashboards, or other outputs

### Principal skills (Lightcast™ US Job Postings, 2023)<sup>[23]</sup>

- |                         |                         |                    |
|-------------------------|-------------------------|--------------------|
| • Agile methodology     | • Business process      | • Computer science |
| • Business intelligence | • Business requirements |                    |

# JOB ROLE

## BUSINESS INTELLIGENCE ANALYST

### Principal skills

- Dashboard
- Data analysis
- Data modeling
- Data science
- Data visualization
- Finance
- Machine learning
- Power BI
- Project management
- Python
- R
- SAP applications
- SQL
- Statistics
- Tableau

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JOB FAMILY GROUP: BUSINESS AND MANAGEMENT

### Impact of AI

Gen AI has the potential to have a high transformative impact on Business Intelligence (BI) Analysts. While their core analytical skills will remain essential, AI will automate many routine tasks, enabling BI Analysts to focus on higher-level insights and strategic decision-making. This shift could lead to an evolution of the BI Analyst role, with an emphasis on collaboration with AI tools and interpretation of AI-generated outputs.

### Key insights

#### Potential benefits

- **Automated data preparation and analysis:** AI may allow to automate data cleaning, transformation, and basic analysis, freeing up analysts to focus on more complex tasks and insights
- **Enhanced pattern recognition and anomaly detection:** AI algorithms may identify complex patterns and anomalies in large datasets faster and more accurately than humans, leading to more proactive decision-making
- **Natural language querying:** Gen AI may allow users to interact with data using natural language, making BI tools more accessible to non-technical users and democratizing data insights
- **Automated report generation:** AI may be able to generate reports, summaries, and visualizations based on user queries or pre-defined templates, saving analysts time and effort
- **Predictive analytics and forecasting:** AI may be able to leverage machine learning to forecast future trends and outcomes, helping businesses make more informed decisions

# JOB ROLE

## BUSINESS INTELLIGENCE ANALYST

### Skills impacted by AI

#### New

- **AI ethics and responsible AI**
- **AI model evaluation:** Understanding how to assess the performance and limitations of different AI models will be important for selecting the right tools for specific tasks
- **Explainable AI:** Being able to interpret and explain the reasoning behind AI-generated insights will be crucial for building trust and ensuring transparency

in decision-making

- **Prompt engineering:** Crafting effective prompts to elicit specific insights from AI models will be a valuable skill for BI Analysts

#### Increasing relevance

- **AI/ML literacy:** Understanding AI concepts, algorithms, and the limitations of AI models may facilitate effective collaboration with data scientists and AI specialists
- **Critical thinking and problem-solving:** Business Intelligence Analysts may want to focus on defining complex business problems, interpreting AI-generated insights, and developing actionable recommendations

- **Data storytelling and communication:** Effectively communicating insights and recommendations to stakeholders who may not have a technical background may be helpful
- **Domain expertise:** Deep understanding of the business domain may play a key role in interpreting AI-generated results and identifying relevant insights

#### Stable

- No skills identified

#### Decreasing relevance

- **Basic report generation:** AI may be able to generate reports based on templates and user queries, making manual report creation less critical

- **Manual data cleaning and preparation:** AI tools may be able to automate many of these tasks, reducing the need for manual effort



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# JOB ROLE

## BUSINESS SYSTEM ANALYST



### Job description (ONET Data, 2024)<sup>[24]</sup>

Conduct organizational studies and evaluations, design systems and procedures, conduct work simplification and measurement studies, and prepare operations and procedures manuals to assist management in operating more efficiently and effectively. Includes program analysts and management consultants.

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JOB FAMILY GROUP: BUSINESS AND MANAGEMENT

### Principal tasks (ONET Data, 2024)<sup>[25]</sup>

- Gather and organize information on problems or procedures
- Confer with personnel concerned to ensure successful functioning of newly implemented systems or procedures
- Document the findings of the study and prepare recommendations for the implementation of new systems, procedures, or organizational changes
- Plan study of work problems and procedures, such as organizational change, communications, information flow, integrated production methods, inventory control, or cost analysis
- Interview personnel and conduct on-site observations to ascertain unit functions, work performed, and the methods, equipment, and personnel used
- Prepare manuals and train workers in use of new forms, reports, procedures or equipment, according to organizational policy
- Review forms and reports and confer with management and users about format, distribution, and purpose, identifying problems and improvements
- Develop and implement records management program for filing, protection, and retrieval of records, and assure compliance with program
- Design, evaluate, recommend, and approve changes of forms and reports
- Recommend purchase of storage equipment and design area layout to locate equipment in space available

### Principal skills (Lightcast™ US Job Postings 2023)<sup>[26]</sup>

- |                         |                              |                            |
|-------------------------|------------------------------|----------------------------|
| • Agile methodology     | • Change management          | • Python                   |
| • Automation            | • Data analysis              | • Requirements elicitation |
| • Business analysis     | • Finance                    | • Scrum                    |
| • Business operations   | • Key performance indicators | • SQL                      |
| • Business process      | • Management consulting      | • User story               |
| • Business requirements | • Process improvement        | • Workflow management      |
| • Business strategies   | • Project management         |                            |

# JOB ROLE

## BUSINESS SYSTEM ANALYST

### Impact of AI

Gen AI has the potential to have a moderate transformative impact on Business Systems Analysts (BSA). While the core analysis, problem-solving, and consulting skills of BSAs remain vital, AI can significantly augment their capabilities and streamline many tasks. This shift may necessitate a recalibration of the BSA role, emphasizing the interpretation of AI-generated insights, effective communication,

and strategic decision-making. In conclusion, Gen AI presents both challenges and opportunities for BSAs. By embracing AI as a powerful tool and developing the necessary skills, BSAs can advance the work they are already doing as strategic advisors, driving innovation and efficiency in their organizations.

### Key insights

#### Potential benefits

- Automated data analysis and report generation:** AI may enable the rapid analysis of large datasets, pattern identification, and comprehensive report generation, saving BSAs significant time and effort and allowing them to focus on higher-level analysis and solution design
- Enhanced process optimization:** AI-powered tools may be able to model and simulate various scenarios, helping BSAs identify bottlenecks, inefficiencies, and opportunities for improvement in business processes
- Intelligent recommendations:** AI can analyze data to offer personalized recommendations for process improvements, resource allocation, and technology solutions, enhancing decision-making for both BSAs and management
- Increased efficiency and productivity:** Automating repetitive tasks and streamlining data analysis can significantly improve the speed and efficiency of BSAs' work

### Skills impacted by AI

#### New

- AI ethics and responsible AI:** Understanding the ethical implications of AI and ensuring responsible and fair use of AI in decision-making will be crucial
- AI/ML literacy:** BSAs should develop a foundational understanding of AI/ML concepts and algorithms to effectively collaborate with data scientists and leverage AI tools
- Prompt engineering:** Learning how to frame effective questions and prompts for AI models to extract the most valuable insights will become a valuable skill

# JOB ROLE

## BUSINESS SYSTEM ANALYST

### Skills impacted by AI

#### Increasing relevance

- Critical thinking and problem-solving:** BSAs may need to interpret AI-generated insights, validate findings, and creatively apply them to solve complex business problems
- Communication and stakeholder management:** Effectively communicating AI-driven insights and recommendations to diverse audiences and collaborating with stakeholders will be of greater importance
- Change management:** As AI-driven changes are implemented, BSAs will need to play a key role in facilitating and managing these transitions within the organization
- Data literacy and interpretation:** Understanding the underlying data, evaluating AI outputs for accuracy and bias, and drawing meaningful conclusions will be critical
- Domain expertise:** A deep understanding of the business domain will remain essential for BSAs to identify relevant problems, interpret AI-generated results, and tailor solutions to specific contexts

#### Stable

- No skills identified

#### Decreasing relevance

- Basic report writing:** AI-powered tools can generate reports, making manual report creation less critical
- Manual data collection and analysis:** AI may be able to speed up the execution of manual tasks to the point of automating them

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JOB FAMILY GROUP: BUSINESS AND MANAGEMENT



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# JOB ROLE

## CUSTOMER SERVICE REPRESENTATIVE



### Job description

Customer Service Representative is a highly skilled worker who works alongside AI systems to provide exceptional customer support. Strong interpersonal skills, empathy, and problem-solving abilities are required, complemented by deep understanding of AI technologies. Complex customer interactions are managed, data is analyzed, and informed decisions are made to resolve customer issues efficiently. Collaboration with AI systems is conducted to gather and process customer information, enabling personalized and tailored solutions to be provided. Advanced communication skills are possessed to effectively explain how AI led to an experience, fostering trust and transparency with customers.

### Principal tasks

- Handle complex customer inquiries
- Manages the company's customer facing chatbots
- Provides emotional support to customers
- Builds relationship with customer
- Handles customer escalations
- Continuous re and upskilling

### Principal skills

- |   |                                    |
|---|------------------------------------|
| • Active listening                        | and privacy and security           |
| • Complex problem-solving                 | • Multitasking                     |
| • Conversationalist                       | • Patience                         |
| • Data analysis                           | • Technical proficiency            |
| • Emotional intelligence                  | • Time management                  |
| • Empathy                                 | • Verbal and written communication |
| • Laws and regulations on data protection |                                    |

### Impact of AI

The rise of chatbots has transformed customer service, allowing AI to handle basic inquiries and lighten the workload of human representatives. Looking ahead, most companies will automate the work of CSRs, but

those who wish to differentiate will still have human CSRs whose work will be augmented. Future CSRs must adapt to interacting with machine customers and have higher interpersonal skills.

# JOB ROLE

## CUSTOMER SERVICE REPRESENTATIVE

### Impact of AI

With increased reliance on AI, concerns about data privacy and cybersecurity also rise. CSRs must ensure robust security measures are in

place to protect customers and their company and stay updated on the latest advancements in cybersecurity.

### Key insights

- One of three customers will try using a digital assistant to interact with customer service on their behalf (Gartner, 2022) [27]
- Almost three fourth of customers will call customer service teams and support due to loneliness (Gartner, 2021) [28]

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>Basic understanding data privacy and security laws (including cybersecurity)</li> <li>Emotional intelligence</li> <li>Interact with machines acting on behalf of customer</li> <li>Prompt engineering</li> </ul>	<ul style="list-style-type: none"> <li>Active listening</li> <li>Conversationalist</li> <li>Laws and regulations on data protection and privacy and security</li> <li>Patience</li> <li>Responding to customer problems or inquiries using AI prompt engineering</li> <li>Verbal and written communication</li> </ul>	<ul style="list-style-type: none"> <li>Complex problem-solving</li> <li>Data analysis</li> <li>Multitasking</li> <li>Technical proficiency</li> <li>Time management</li> </ul>	<ul style="list-style-type: none"> <li>No skills identified</li> </ul>



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# JOB ROLE

## DIGITAL MARKETING SPECIALIST



### Job description (ONET data, 2024) [29]

Digital Marketing Specialists plan, direct, or coordinate marketing policies and programs, such as determining the demand for products and services offered by a firm and its competitors and identify potential customers. They develop pricing strategies with the goal of maximizing the firm's profits or share of the market while ensuring the firm's customers are satisfied and oversee product development or monitor trends that indicate the need for new products and services.

### Principal tasks (ONET data, 2024) [30]

- Identify, develop, or evaluate marketing strategy, based on knowledge of establishment objectives, market characteristics, and cost and markup factors
- Formulate, direct, or coordinate marketing activities or policies to promote products or services, working with advertising or promotion managers
- Evaluate the financial aspects of product development, such as budgets, expenditures, research and development appropriations, or return-on-investment and profit-loss projections
- Develop pricing strategies, balancing firm objectives and customer satisfaction
- Compile lists describing product or service offerings
- Direct the hiring, training, or performance evaluations of marketing or sales staff and oversee their daily activities
- Consult with product development personnel on product specifications, such as design, color, or packaging
- Use sales forecasting or strategic planning to ensure the sale and profitability of products, lines, or services, analyzing business developments and monitoring market trends
- Negotiate contracts with vendors or distributors to manage product distribution, establishing distribution networks or developing distribution strategies
- Coordinate or participate in promotional activities or trade shows, working with developers, advertisers, or production managers, to market products or services.
- Initiate market research studies or analyze their findings
- Confer with legal staff to resolve problems, such as copyright infringement or royalty sharing with outside producers or distributors
- Consult with buying personnel to gain advice regarding the types of products or services expected to be in demand
- Consult with buying personnel to gain advice regarding environmentally sound or sustainable products
- Conduct economic or commercial surveys to identify potential markets for products or services



# JOB ROLE

## DIGITAL MARKETING SPECIALIST

### Principal tasks

- Recommend modifications to products, packaging, production processes, or other characteristics to improve the environmental soundness or sustainability of products
- Advise business or other groups on local, national, or international factors affecting the buying or selling of products or services
- Select products or accessories to be displayed at trade or special production shows.
- Develop business cases for environmental marketing strategies
- Integrate environmental information into product or company marketing strategies, policies, or activities

### Principal skills (Lightcast™ US Job Postings 2023)<sup>[31]</sup>

- |                                    |                    |                        |
|------------------------------------|--------------------|------------------------|
| • Business development             | • Leadership       | • Problem solving      |
| • Communication                    | • Management       | • Project management   |
| • Customer relationship management | • Marketing        | • Research information |
| • Customer service                 | • Microsoft office | • Sales                |
| • Detail oriented                  | • Microsoft excel  | • Self-motivation      |
| • Digital marketing                | • Planning         | • Social media         |
|                                    | • Presentations    | • Writing              |

### Impact of AI

Gen AI may have a transformative impact on Digital Marketing Specialists. By speeding up content creation, personalizing customer interactions, and providing data-driven insights, AI may fundamentally change how marketing strategies are conceived and executed. This technology may significantly enhance efficiency and open up new creative

possibilities, which may also necessitate a shift in the skills required for success in this field. By understanding the potential impact of Gen AI and adapting their skillset accordingly, Digital Marketing Specialists can leverage this technology to revolutionize their strategies, achieve greater efficiency, and deliver more impactful results.

### Key insights

#### Potential benefits

- **Enhanced content creation:** AI can generate diverse marketing materials such as ad copy, social media posts, blog

articles, and email campaigns, drastically reducing the time and resources required for content production



# JOB ROLE

## DIGITAL MARKETING SPECIALIST

### Key insights

- **Data-driven decision making:** AI-powered analytics may be able to identify patterns and trends in customer behavior, market conditions, and campaign performance, which may lead to make more informed and effective decisions
- **Improved customer service:** AI chatbots can handle routine customer inquiries, freeing up human agents to focus on complex issues and provide more personalized support
- **New creative opportunities:** AI can generate novel ideas and concepts, sparking creativity and pushing the boundaries of traditional marketing approaches
- **Hyper-personalization:** AI can analyze customer data to create highly personalized marketing messages and experiences, leading to increased engagement and conversion rates

### Skills impacted by AI

#### New

- **AI ethics and responsible AI:** Developing frameworks for the ethical use of AI in marketing and ensuring compliance with regulations will be essential
- **Prompt engineering:** Crafting effective prompts to guide AI tools and extract desired outputs will be a valuable skill

# JOB ROLE

## DIGITAL MARKETING SPECIALIST

### Skills impacted by AI

#### Increasing relevance

- **AI/ML literacy:** Understanding AI models, their limitations, and how to leverage them effectively may become a core competency for marketers
- **Creativity and innovation:** While AI can generate AI-generated ideas, human creativity will be essential for evaluating, refining, and implementing those ideas effectively
- **Data analysis and interpretation:** Analyzing AI-generated insights, understanding customer data, and extracting actionable recommendations will be crucial
- **Ethical decision-making:** navigating the ethical implications of AI in marketing and ensuring responsible use of data and algorithms will be increasingly important
- **Strategic thinking:** With AI handling execution, marketers will need to focus on developing high-level strategies, setting objectives, and understanding the broader business context

#### Stable

- No skills identified

#### Decreasing relevance

- **Manual data cleaning and preparation:** AI tools may be able to speed up or automate many of these tasks, reducing the need for manual effort
- **Traditional market research:** AI can provide faster and more comprehensive insights than traditional research methods



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# JOB ROLE

## PRODUCT MANAGER



### Job description

A Product Manager leads the development and lifecycle of a product, defining vision, strategy, and roadmap. Responsibilities include market research, stakeholder collaboration, prioritizing features, ensuring alignment with business goals, and overseeing product launch and performance. Strong communication, analytical, and problem-solving skills are essential.

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JOB FAMILY GROUP: BUSINESS AND MANAGEMENT

### Principal tasks

- Coordinate and lead scrum meetings to ensure effective project management and collaboration
- Manage software project lifecycles, from planning to delivery, ensuring milestones are met
- Implement agile methodologies to adapt to changing requirements and improve team productivity
- Oversee quality assurance processes to maintain product reliability and user satisfaction
- Conduct data analysis to derive insights into user behavior and inform product decisions
- Provide team leadership and guidance to foster a collaborative and productive work environment

### Principal skills

- |                         |                       |                           |
|-------------------------|-----------------------|---------------------------|
| • Agile methodologies   | • Problem solving     | • SQL                     |
| • Business intelligence | • Process improvement | • Strategic planning      |
| • Competitive analysis  | • Product design      | • User acceptance testing |
| • Data analysis         | • Scrum               | • User experience         |

### Impact of AI

AI impact on the Product Manager role might be moderate. Product Managers might focus on upskilling skills like strategic planning and client relationship management. While skills in

data analysis and quality assurance remain relevant, their demand for Product Managers will decline due to AI-assisted automation and optimization.

# JOB ROLE

## PRODUCT MANAGER

### Key insights

- The Product Manager role involves strategic, analytical, and interpersonal tasks requiring human judgment, creativity, and interaction
- Scrum and agile methodologies:** AI can optimize workflows but lacks leadership capabilities (moderate impact)
- Software project management:** AI manages tasks and resources but can't handle negotiation or decision-making in ambiguity (moderate impact)
- SaaS integration:** AI analyzes and recommends solutions but can't assess strategic fit or negotiate terms (moderate impact)
- Client relationship management:** AI can interact and gather feedback but can't build deep relationships (low impact)
- Quality assurance and data analysis:** AI excels in automation and analysis (high impact)
- SQL and JavaScript:** AI assists with coding but lacks complex problem-solving (high impact)
- Team leadership and user experience:** AI can't lead or design holistic experiences (low to moderate impact)
- Overall, AI can augment but not fully replace the human elements essential for success in this role

### Skills impacted by AI

#### New

- AI-driven competitive analysis:** Leveraging AI tools to perform comprehensive competitive analysis will be essential for staying ahead in the market.

- AI ethics and responsible AI**
- AI literacy**

#### Increasing relevance

- Agile methodologies:** AI can help in adapting workflows to changing requirements, improving team productivity
- Business intelligence:** AI can process and analyze vast amounts of data to provide actionable business intelligence
- Data analysis:** AI will enhance the ability to process and analyze large datasets, providing deeper insights and aiding in better decision-making

- Problem solving:** AI can offer data-driven recommendations, enhancing problem-solving capabilities
- Process improvement:** AI can identify bottlenecks and inefficiencies, suggesting improvements for processes
- Product design:** AI tools can assist in generating design options and analyzing user feedback to improve product design

# JOB ROLE

## PRODUCT MANAGER

### Skills impacted by AI

#### Increasing relevance

- **Quality assurance:** AI-assisted testing will improve the efficiency and effectiveness of quality assurance processes, identifying issues faster
- **Scrum:** AI tools can assist in tracking and optimizing workflows, enhancing the effectiveness of scrum practices
- **Strategic planning:** AI can provide data-driven insights and forecasts, augmenting strategic planning and decision-making capabilities
- **User acceptance testing:** ai-assisted testing can improve the efficiency and coverage of user acceptance testing
- **User experience:** AI can provide data-driven insights to enhance user experience design, making it more tailored and effective

#### Stable

- No skills identified

#### Decreasing relevance

- **Basic manual data reporting:** AI can significantly enhance the efficiency and effectiveness of data reporting by automating repetitive tasks, ensuring data accuracy, providing advanced analytical capabilities, generating detailed and personalized reports, and offering real-time insights. Human analysts will then focus on interpreting the results and making strategic decisions based on the data
- **Basic client interactions:** AI chatbots and automated systems will handle routine client interactions, allowing product managers to focus on strategic client relationship management
- **SQL:** AI will automate the extraction and reporting of data, reducing the need for manual SQL queries and data manipulation



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# JOB ROLE

## PROJECT MANAGER



### Job description (ONET data, 2024)<sup>[32]</sup>

An entry level IT Project Manager is responsible for planning and executing projects within defined scope, timelines, and budgets. They coordinate and communicate with team members, stakeholders, and clients, ensuring project objectives are met. They also manage risks, resolve issues, and produce deliverables.

### Principal tasks

- Analyze and coordinate the schedule, timeline, procurement, staffing, and budget of a product or service on a per project basis
- Lead and guide the work of technical staff
- Serve as a point of contact for the client or customer
- Communicate with key stakeholders to determine project requirements and objectives
- Assign duties or responsibilities to project personnel
- Confer with project personnel to identify and resolve problems
- Create project status presentations for delivery to customers or project personnel
- Develop or update project plans including information such as objectives, technologies, schedules, funding, and staffing
- Identify project needs such as resources, staff, or finances by reviewing project objectives and schedules
- Identify, review, or select vendors or consultants to meet project needs
- Monitor costs incurred by project staff to identify budget issues
- Monitor project milestones and deliverables
- Monitor the performance of project team members to provide performance feedback
- Negotiate with project stakeholders or suppliers to obtain resources or materials
- Plan, schedule, or coordinate project activities to meet deadlines
- Prepare and submit budget estimates, progress reports, or cost tracking reports
- Produce and distribute project documents
- Propose, review, or approve modifications to project plans
- Recruit or hire project personnel
- Report project status, such as budget, resources, technical issues, or customer satisfaction, to managers
- Request and review project updates to ensure deadlines are met
- Schedule or facilitate project meetings
- Submit project deliverables to clients, ensuring adherence to quality standards



# JOB ROLE

## PROJECT MANAGER

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JOB FAMILY GROUP: BUSINESS AND MANAGEMENT

### Principal skills

- Agile methodology
- Change management
- Communication/active listening
- Data analysis
- Finance and budgeting
- Presentation skills
- Problem solving
- Process improvement
- Procurement and purchasing
- Project coordination
- Project documentation
- Project implementation
- Project management
- Project management software
- Project planning and developing
- Project risk management
- Project schedules
- Project scoping
- Resource and workflow management
- Stakeholder management
- Teamwork and collaboration

### Impact of AI

AI may transform IT project manager roles by streamlining processes, planning, reporting, and the resourcing of IT projects, allowing project managers to focus on more strategic activities. Robust groups of tasks will be assisted or automated while being overseen by IT project managers. Every stage of an IT project's lifecycle will be affected by AI advancements and tools. Planning, estimates, and resourcing will be impacted with the use of AI-enhanced requirement and predictive

analysis. AI tools will assist IT project managers in the day-to-day tracking and reporting of project life cycles, while automating many aspects of communication across stakeholders. AI will not replace creativity, negotiation, coaching, team building, collaboration, and other soft skills that are critical to the success of a project. **AI will be a high-value tool within the Project Manager's toolbox.**

### Key insights

#### Potential benefits:

- **Streamlined task management:** AI has the potential to streamline the execution of routine tasks such as scheduling, resource allocation, and progress tracking, freeing up project managers to focus on more strategic aspects of the project
- **Enhanced risk management:** AI can analyze historical project data to identify potential risks and suggest mitigation strategies, improving project outcomes
- **Improved communication:** AI-powered tools can facilitate communication within the project team, generating reports, summaries, and even translating documents in real-time
- **Data-driven decision making:** AI can provide insights based on project data, helping project managers make informed decisions about resource allocation, timeline adjustments, and risk mitigation
- **Virtual assistants:** AI-powered virtual assistants may be able to handle administrative tasks, schedule meetings, and provide project updates, improving efficiency and productivity

# JOB ROLE

## PROJECT MANAGER

### Skills impacted by AI

#### New

- AI ethics and responsible AI:** Understanding the ethical implications of AI in project management and ensuring responsible use of the technology will be crucial
- AI literacy:** Understanding AI concepts, algorithms, and limitations will be necessary for effective collaboration with AI tools and data scientists

- Automation through new project management software
- Digital graphic design
- Machine learning
- Prompt Engineering:** Learning how to craft effective prompts to guide AI models and extract the most valuable insights will become a valuable skill

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JOB FAMILY GROUP: BUSINESS AND MANAGEMENT

#### Increasing relevance

- Agile methodology
- Change management
- Communication/active listening
- Data analysis
- Finance
- Process improvement
- Project management
- Project management software
- Project planning and developing
- Project risk management
- Resource and workflow management

#### Stable

- Presentation skills
- Problem solving
- Project coordination
- Stakeholder management
- Teamwork and collaboration

# JOB ROLE PROJECT MANAGER

## Skills impacted by AI

### Decreasing relevance

- **Basic data analysis:** AI can handle basic data analysis tasks, freeing up project managers to focus on more complex interpretation and decision-making
- **Task management:** With AI automating many routine tasks, the need for manual scheduling, tracking, and reporting will diminish
- Project documentation



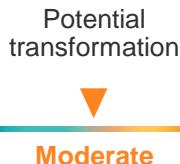
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# JOB ROLE

## SENIOR PRODUCT MANAGER



### Job description

A Senior Product Manager oversees the development and lifecycle of multiple products, defining vision, strategy, and roadmap. Responsibilities include advanced market research, strategic stakeholder collaboration, prioritizing features, ensuring alignment with business goals, and leading product launch and performance. Exceptional leadership, strategic thinking, and communication skills are essential.

### Principal tasks

- Develop and refine product strategies to align with market demands and business objectives
- Perform user acceptance testing to validate product functionality and user experience
- Identify areas for process improvement and implement initiatives to streamline workflows
- Explore business development opportunities and partnerships to expand product reach
- Implement agile methodologies to facilitate iterative development and enhance team agility
- Utilize SQL queries to extract and analyze data for insights into user behavior and market trends
- Gather and prioritize requirements from stakeholders to drive product development efforts
- Enhance user experience through iterative design and usability testing
- Manage software development life cycle processes to ensure timely delivery and quality
- Conduct data analysis to identify trends and opportunities for product enhancement

### Principal skills

- Agile methodologies
- Business development: AI can greatly enhance efficiency and provide valuable insights in business development by automating routine tasks like lead generation, market research, and sales forecasting, while the human role remains crucial for tasks requiring emotional intelligence, complex negotiations, creative problem-solving, and strategic decision-making
- Cross functional team leadership
- Data analysis
- JIRA
- Problem solving
- Process improvement
- Product development life cycle
- Product strategy
- Quality assurance
- SaaS
- SQL
- User acceptance testing
- User experience

# JOB ROLE

## SENIOR PRODUCT MANAGER

### Impact of AI

AI impact on the Senior Product Manager role might be moderate. Senior Product Managers might focus on upskilling skills like strategic planning and client relationship management. While skills in data analysis and quality

assurance remain relevant, their demand for Senior Product Managers will decline due to AI-assisted automation and optimization.

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### Key insights

- Senior Product Manager role involves strategic, analytical, and interpersonal tasks requiring human judgment, creativity, and interaction
- **Scrum and agile methodologies:** AI can optimize workflows but lacks leadership capabilities (moderate impact)
- **Advanced market research:** AI can process large datasets for market trends but cannot fully grasp nuanced market dynamics or strategic implications (moderate impact)
- **Strategic stakeholder collaboration:** AI can assist in communication but cannot build and maintain the deep, strategic relationships needed (low impact)
- **Feature prioritization:** AI can suggest prioritization based on data, but human insight is needed for strategic alignment and trade-off decisions (moderate impact)
- **Client relationship management:** AI can interact and gather feedback but can't build or sustain deep, trust-based client relationships (low impact)
- **Quality assurance and data analysis:** AI excels in automation and data analysis, enhancing tasks significantly (high impact)
- **SQL and advanced analytics:** AI assists with data extraction and analysis but cannot handle all complex problem-solving scenarios (high impact)
- **Strategic planning:** AI can provide data-driven insights and forecasts, augmenting but not replacing human strategic thinking. (Moderate impact)
- **Team leadership and user experience:** AI cannot lead teams or design holistic user experiences that require empathy and creativity (low to moderate impact)
- Overall, AI can augment many aspects of the senior product manager role but cannot fully replace the essential human elements of strategic thinking, leadership, and deep interpersonal relationships

### Skills impacted by AI

#### New

- **AI-driven competitive analysis:** Leveraging AI tools to perform comprehensive competitive analysis will be essential for staying ahead in the market
- **AI ethics and responsible AI:** Understanding and ensuring the ethical

use of AI in product management will become increasingly important

- **AI integration:** Developing strategies for integrating AI into various aspects of product management
- **AI literacy**

# JOB ROLE

## SENIOR PRODUCT MANAGER

### Skills impacted by AI

#### Increasing relevance

- **Agile methodologies:** AI can help adapt workflows and improve team productivity
- **Business development:** AI can greatly enhance efficiency and provide valuable insights in business development by automating routine tasks like lead generation, market research, and sales forecasting, while the human role remains crucial for tasks requiring emotional intelligence, complex negotiations, creative problem-solving, and strategic decision-making
- **Cross-functional team leadership:** AI tools can assist in tracking and optimizing team workflows
- **Data analysis:** AI enhances the ability to process and analyze large datasets
- **JIRA:** AI can optimize task management and project tracking within JIRA
- **Problem solving:** AI can offer data-driven recommendations, aiding in problem-solving
- **Process improvement:** AI can identify bottlenecks and suggest process optimizations
- **Product development life cycle:** AI tools can streamline various stages of the product development life cycle
- **Product strategy:** AI can provide data-driven insights to enhance strategic decision-making
- **Quality assurance:** AI-assisted testing enhances efficiency and effectiveness
- **SaaS:** AI can analyze and recommend SaaS solutions, improving functionality
- **User acceptance testing:** AI-assisted testing improves efficiency and coverage
- **User experience:** AI can provide data-driven insights to enhance UX design

#### Stable

- No skills identified

#### Decreasing relevance

- **SQL:** AI will automate the extraction and reporting of data, reducing the need for

manual SQL queries and data manipulation



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# CYBERSECURITY

# JOB ROLE

## CYBERSECURITY ANALYST



### Job description

Cybersecurity Analysts are responsible for developing and implementing security measures to protect computer systems and networks. They monitor for security breaches, investigate violations, and update security systems to prevent future incidents. They also conduct risk assessments, document security policies and procedures, and educate users about security best practices.

### Principal tasks

- Develop plans to safeguard computer files against accidental or unauthorized modification, destruction, or disclosure and to meet emergency data processing needs
- Monitor current reports of computer viruses to determine when to update virus protection systems
- Encrypt data transmissions and erect firewalls to conceal confidential information as it is being transmitted and to keep out tainted digital transfers
- Perform risk assessments and execute tests of data processing system to ensure functioning of data processing activities and security measures
- Modify computer security files to incorporate new software, correct errors, or change individual access status
- Review violations of computer security
- procedures and discuss procedures with violators to ensure violations are not repeated
- Document computer security and emergency measures policies, procedures, and tests
- Confer with users to discuss issues such as computer data access needs, security violations, and programming changes
- Monitor use of data files and regulate access to safeguard information in computer files
- Coordinate implementation of computer system plan with establishment personnel and outside vendors
- Train users and promote security awareness to ensure system security and to improve server and network efficiency

### Principal skills

- |                             |                             |                         |
|-----------------------------|-----------------------------|-------------------------|
| • Access controls           | • Continuous monitoring     | • Governance            |
| • Authorization (computing) | • Coordinating              | • Incident response     |
| • Communication             | • Cyber threat intelligence | • Information assurance |
| • Configuration management  | • Encryption                |                         |
|                             | • Firewall                  |                         |

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# JOB ROLE

## CYBERSECURITY ANALYST

### Principal skills

- Information systems security
- Investigation
- Manual malware analysis
- Network security
- Operating systems
- Penetration testing
- Planning
- Presentations
- Project management
- Research information
- Risk analysis
- Risk management
- Risk mitigation
- Scripting
- Security awareness
- Security controls
- Security information and event management
- Security policies
- Security requirements analysis
- Training and development
- Vulnerability assessments
- Vulnerability management
- Vulnerability scanning
- Writing

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### Impact of AI

Gen AI may drive a significant shift in the focus of Cybersecurity Analysts. Cybersecurity Analysts may need to adopt new skills related to prompt engineering, LLM architecture, and Retrieval-Augmented Generation (RAG) while enhancing existing skills in information assurance, risk management, and security policy analysis. They should be aware of which skills which may be streamlined by use of AI (such as writing and malware analysis) and place greater focus on skills that require human oversight, critical thinking, and decision making.

Looking ahead, direct human involvement will still be crucial for over half of the Cybersecurity Analyst skills to ensure the effective application and monitoring of Gen AI tools.

The emphasis will be on understanding and integrating Gen AI technologies, ensuring Cybersecurity Analysts can effectively defend against advanced threats and enhance their operational efficiency. AI will augment many aspects of the Cybersecurity Analyst role, significantly improving efficiency and effectiveness.

However, it cannot fully replace the critical human elements of strategic thinking, problem-solving, communication, and collaboration. The Cybersecurity Analyst role will probably evolve to become more strategic, proactive, and focused on complex problem-solving, while AI handles more routine and repetitive tasks.

# JOB ROLE

## CYBERSECURITY ANALYST

### Key insights

- Almost half of the skills of a Cybersecurity Analyst may benefit from integration with Gen AI technologies in the short term
- In the long run more and more tasks may benefit from automation, but the human oversight will remain critical creating a situation where more than half of the current skills will be augmented by AI
- Cybersecurity Analysts will need to understand LLM architecture to protect against new Gen AI-powered attacks as well as leverage Gen AI for defense purposes
- In Real-Time Monitoring and Incident Management, Gen AI can be integrated into systems to analyze system logs, user activities, and network traffic in real-time to automatically identify potential security incidents and categorize them based on severity, type, and exploited vulnerability, prioritizing critical violations for prompt review. The systems can automate personalized communication to violators, providing immediate feedback on the specific nature and potential impact of their violation.
- In Security Documentation, Gen AI can automate the generation of initial drafts for security policies and procedures based on industry standards, regulations, and best practices, customized to reflect organizational specifics.
- Understanding of integration and security concerns of GAI technologies and hands-on guidance for LLMs are critical for successful deployment
- AI will progressively transform the role of Cybersecurity Analysts by augmenting and automating tasks such as vulnerability assessments and security monitoring. This will free up time for workers to focus on

higher-level tasks, such as contributing to risk analysis. As a result, critical thinking will become an increasingly vital skill, allowing analysts to interpret AI-generated data and insights and strategize more effectively against emerging threats, including those posed by threat actors using AI

- Log Analysis and Alert Triage:** AI excels at automating the analysis of large volumes of security logs and prioritizing alerts, significantly enhancing these tasks.
- Threat Intelligence and Malware Analysis:** AI can automate the collection and analysis of threat intelligence data, as well as perform basic manual malware analysis, freeing up analysts to focus on more complex and emerging threats. (High Impact)
- Threat Hunting and Incident Investigation:** While AI can automate basic triage and analysis, Cybersecurity Analysts will focus on more complex threat hunting and in-depth investigation, requiring human intuition, creativity, and experience to connect the dots and uncover hidden patterns.
- Security Awareness and Training:** AI can help personalize training and deliver relevant security information, but analysts will continue to play a vital role in developing and delivering engaging security awareness programs that foster a culture of security within organizations. (Low Impact)
- Collaboration and Communication:** AI can assist in communication and data sharing, but human interaction and collaboration will remain essential for building trust, fostering relationships with stakeholders, and effectively coordinating incident response efforts (Low Impact)

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# JOB ROLE

## CYBERSECURITY ANALYST

### Key insights

#### Potential benefits:

- **Enhanced threat detection:** Gen AI can analyze vast datasets and identify patterns indicative of potential security threats much faster than humans, leading to proactive defense measures.
- **Automated incident response:** AI-powered tools can automate parts of the incident response process, such as isolating infected systems and generating reports, allowing for quicker containment and recovery.
- **Vulnerability assessment and patching:** AI can simulate attacks and identify system weaknesses, suggesting potential patches and fixes, streamlining the vulnerability management process.
- **Enhanced security awareness training:** AI can create realistic phishing simulations and tailor educational content to individual users, improving overall security awareness within organizations.

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### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>• <b>AI ethics and responsible AI:</b> Understanding the ethical implications of AI in cybersecurity and mitigating potential biases in AI-generated outputs is crucial</li> <li>• AI literacy</li> </ul>	<ul style="list-style-type: none"> <li>• AI/ML and data science</li> <li>• Cloud security</li> <li>• Critical thinking and problem-solving</li> <li>• Information assurance</li> </ul>	<ul style="list-style-type: none"> <li>• Access controls</li> <li>• Communication</li> <li>• Configuration management</li> <li>• Coordinating</li> <li>• Encryption</li> <li>• Firewall</li> <li>• Governance</li> <li>• Information systems security</li> <li>• Incident response</li> </ul>	<ul style="list-style-type: none"> <li>• Authorization (computing)</li> <li>• Basic incident response</li> <li>• Continuous monitoring</li> <li>• Cyber threat intelligence</li> </ul>

# JOB ROLE

## CYBERSECURITY ANALYST

### Skills impacted by AI

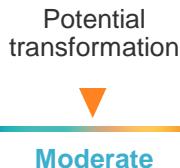
New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>• LLM architecture</li> <li>• Prompt engineering</li> <li>• Retrieval augmented generation (RAG)</li> </ul>	<ul style="list-style-type: none"> <li>• Risk management</li> <li>• Risk mitigation</li> <li>• Security policies</li> <li>• Security requirements analysis</li> <li>• Threat hunting and intelligence</li> <li>• Vulnerability scanning</li> </ul>	<ul style="list-style-type: none"> <li>• Investigation</li> <li>• Operating systems</li> <li>• Planning</li> <li>• Penetration testing</li> <li>• Presentations</li> <li>• Project management</li> <li>• Risk analysis</li> <li>• Scripting</li> <li>• Security awareness</li> <li>• Training and development</li> <li>• Vulnerability assessments</li> <li>• Vulnerability management</li> </ul>	<ul style="list-style-type: none"> <li>• Manual malware analysis</li> <li>• Manual log analysis</li> <li>• Network security</li> <li>• Research information</li> <li>• Security controls</li> <li>• Security information and event management (SIEM)</li> <li>• Writing</li> </ul>



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# JOB ROLE

## ETHICAL HACKER



### Job description

Ethical Hackers assess and audit the security of servers, systems, and networks to identify vulnerabilities. They develop and execute tests simulating cyber threats, and design security solutions to known vulnerabilities, all while adhering to ethical guidelines and authorized parameters. They also investigate security incidents, maintain knowledge of hacking trends, and deliver specialized security awareness training.

### Principal tasks

- Assess the holistic security of servers, systems, or network devices, including vulnerability to temperature, vandalism, or natural disasters, ensuring a comprehensive understanding of physical and environmental security
- Collect stakeholder data to evaluate risk and to develop mitigation strategies
- Conduct network and security system audits, using established criteria
- Configure information systems to incorporate principles of least functionality and access
- Design security solutions to address known device vulnerabilities
- Develop and execute tests that simulate the techniques of known cyber threat actors
- Develop infiltration tests that ethically exploit device vulnerabilities, adhering to authorized testing methodologies and ethical hacking guidelines
- Develop presentations on threat intelligence
- Conduct penetration tests against systems and networks and design innovative processes pertaining wireless deployments, data networks and telecommunication protocols.
- Discuss security solutions with information technology teams or management
- Evaluate vulnerability assessments of local computing environments, networks,
- infrastructures, or enclave boundaries
- Gather cyber intelligence on modern threats and research weaponizable vulnerabilities
- Identify new threat tactics, techniques, or procedures used by cyber threat actors
- Identify security system weaknesses, using ethical hacking techniques
- Investigate security incidents, using computer forensics, network forensics, root cause analysis, or malware analysis
- Maintain up-to-date knowledge of hacking trends
- Prepare and submit reports describing the results of security fixes
- Test the security of systems by conducting authorized assessments to identify vulnerabilities, attempting to gain access to networks, web-based applications, or computers
- Update corporate policies to improve cybersecurity
- Write audit reports to communicate technical and procedural findings and recommend solutions
- Perform targeted social engineering assessments to evaluate human vulnerabilities and awareness
- Deliver Specialized Security Awareness Training tailored to the organization's unique threats and vulnerabilities

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# JOB ROLE

## ETHICAL HACKER

### Principal skills

- Application security
- Auditing and reporting
- Automation
- Burp suite
- Communication
- Cybersecurity
- Ethical hacking
- Gap analysis
- Information processing
- Management
- Metasploit
- Network infrastructure
- NIST 800-53
- Offensive security
- Open web application security project
- Operations
- Penetration testing
- Personnel procedures
- Presentations
- Process improvement
- Python
- Research information
- Risk analysis
- Scripting
- Security controls
- Security requirements analysis
- Social engineering
- Test tools
- Vulnerability assessments
- Vulnerability management
- Vulnerability scanning
- Web applications
- White box testing
- Writing

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### Impact of AI

Gen AI will significantly impact Ethical Hackers' skillsets. Key areas like vulnerability scanning and environmental threat monitoring stand to benefit from ai-powered tools, enabling automatic detection of vulnerabilities and assessing environmental risks to servers and networks. However, human supervision remains crucial in half of the skillset, requiring Ethical Hackers to understand and integrate Gen AI technologies effectively. The job's focus will shift towards leveraging Gen AI to identify

vulnerabilities efficiently, demanding expertise in Gen AI's capabilities rather than just technical proficiency. Additionally, while some skills like process improvement and security requirements analysis will be augmented, others like writing and research face displacement risks. This underscores the need for Ethical Hackers to adapt to emerging AI technologies and evolving job demands to remain effective in their roles.

### Key insights

- About half of the skills of an Ethical Hacker are impacted by Gen AI. The other half will still require human oversight
- More than one third of the skills can be already augmented by Gen AI
- In vulnerability scanning, Gen AI-powered tools can automatically scan servers,

systems, and network devices for known vulnerabilities. By continuously updating their database with the latest threat intelligence, these tools can identify potential weaknesses before they are exploited, aiding Ethical Hackers in their vulnerability assessment processes

# JOB ROLE

## ETHICAL HACKER

### Key insights

- In environmental threat monitoring, Gen AI can be integrated with environmental monitoring tools to assess the vulnerability of servers and network devices to environmental threats such as temperature fluctuations, humidity, water damage, or power outages
- **Security auditing and reporting:** AI can help automate report generation and analysis, highlighting critical vulnerabilities and suggesting remediation steps. This improves efficiency and consistency (high impact)
- **Security recommendations and remediation:** While AI can offer suggestions, the final decision-making on remediation strategies often requires human judgment and always understanding of the organization's specific context (moderate impact)
- **Social engineering assessment:** AI can assist in analyzing communication patterns and identifying potential social engineering attempts, but human insight is crucial for interpreting nuanced social cues and understanding the psychological aspects (moderate impact)
- **Security research and tool development:** AI can aid in security research by analyzing large datasets of vulnerabilities and identifying trends. However, developing new tools and techniques still requires human creativity and expertise (moderate impact)
- **Security awareness training:** AI can personalize training materials and simulations, making them more effective. However, the human element of building rapport and addressing specific concerns remains essential (moderate impact)
- **Incident response support:** AI can help in analyzing incident data, identifying patterns, and suggesting containment strategies. However, human intervention is necessary for decision-making and communication during crisis situations (moderate impact)
- Ethical hackers will need to stay abreast of **new Gen AI technologies and capabilities**, and how to leverage them to exploit vulnerabilities. They will need to understand integration concepts to identify potential areas of vulnerability. They may not need technical expertise, but they will need deep expertise in what Gen AI technologies are capable of and where any weaknesses may lie
- **Technical expertise:** While technical skills remain crucial, Ethical Hackers will increasingly need to develop expertise in ai and machine learning to leverage ai-powered tools effectively
- **Data analysis and pattern recognition:** These skills will become even more important as Ethical Hackers interpret and validate AI generated findings
- **Critical thinking and problem solving:** Ethical Hackers will need to exercise critical thinking to evaluate ai recommendations and make informed decisions



# JOB ROLE

## ETHICAL HACKER

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>• AI ethics and Responsible AI</li> <li>• AI literacy</li> <li>• LLM capabilities and biases</li> <li>• Prompt engineering</li> <li>• Retrieval augmented generation</li> </ul>	<ul style="list-style-type: none"> <li>• Auditing and reporting</li> <li>• Automation</li> <li>• Burp suite</li> <li>• Critical thinking</li> <li>• Metasploit</li> <li>• Offensive security</li> <li>• Penetration testing</li> <li>• Presentations</li> <li>• Process improvement</li> <li>• Python</li> <li>• Scripting</li> <li>• Security requirements analysis</li> <li>• Vulnerability scanning</li> </ul>	<ul style="list-style-type: none"> <li>• Communication</li> <li>• Cybersecurity</li> <li>• Ethical hacking</li> <li>• Gap analysis</li> <li>• Management</li> <li>• Network infrastructure</li> <li>• NIST 800-53</li> <li>• Operations</li> <li>• Personnel procedures</li> <li>• Risk analysis</li> <li>• Security controls</li> <li>• Social engineering</li> <li>• Test tools</li> <li>• Vulnerability assessments</li> <li>• Web applications</li> <li>• White box testing</li> </ul>	<ul style="list-style-type: none"> <li>• Research information</li> <li>• Writing</li> </ul>

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ACCESS TRAINING  
RECOMMENDATIONS



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# JOB ROLE

## INFORMATION SECURITY SPECIALIST



### Job description

The entry level Information Security Specialist enforces security policies, documents system security operations, implements cybersecurity measures, conducts security reviews, identifies, and mitigates risks, and develops risk management plans. They assess security controls, monitor trends, resolve incidents, ensure compliance, provide leadership recommendations, and contribute to disaster recovery and continuity plans.

### Principal tasks

- Analyze and report organization and system security posture trends
- Apply security policies to meet security objectives of the system
- Assess and monitor cybersecurity related to system implementation and testing practices
- Assess the effectiveness of security controls
- Ensure all systems security operations and maintenance activities are properly documented and updated as necessary
- Implement measures to resolve vulnerabilities, mitigate risks, and recommend changes to system or system components as needed
- Implement specific cybersecurity countermeasures for systems and/or applications
- Perform security reviews, identify gaps in security architecture, and develop a security risk management plan
- Provide advice and input for disaster recovery, contingency, and continuity of operations plans
- Provide cybersecurity recommendations to leadership based on significant threats and vulnerabilities
- Resolve computer security incidents and vulnerability compliance
- Verify minimum security requirements are in place for all applications

### Principal skills

- Apply cybersecurity and privacy principles to organizational requirements
- Assess security controls based on cybersecurity principles and tenets
- Assess security systems designs
- Design the integration of hardware and software solutions
- Determine how a security system should work and how changes will affect outcomes
- Develop and apply security system access controls
- Evaluate the adequacy of security designs
- Recognize vulnerabilities in security systems
- Write code in a currently supported programming language

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# JOB ROLE

## INFORMATION SECURITY SPECIALIST

### Impact of AI

Information And Cybersecurity Specialists will benefit from advances in artificial intelligence-fueled tools that can help better meet the demands of these roles. Realtime network traffic analysis at scale coupled with predictive analytics based on models trained on relevant historical data will create new requirements to recontextualize legacy knowledge and skills.

Where contemporary malware detection

matches software signatures against constantly updated databases, Information Security Specialists will leverage tools that detect anomalies in the behavior of code running on diverse end devices. The ensuing technological arms race between malicious actors and Information Security Specialists will demand agility, tenacity, and curiosity.

2 / 3



### Key insights

- Advancing threat detection:** Predictive analytics tools, deployed on local hardware, servers, and network devices will require new and augmented sets of skills. These AI-enhanced, pattern recognition tools will help identify threats at the earliest stages of their deployment
- Faster incident response:** Aspects of isolating and shutting down a threat once detected will become automated, speeding up security outcomes by freeing up

Information Security Specialists to focus on identifying measures of remediation

- Vulnerability detection and management:** Automated audits of systems, networks, and software, powered by AI, will help Information Security Specialists further enhance the security position of organizations, products, and infrastructure by identifying existing vulnerabilities early and kicking off the process of correcting them

### Skills impacted by AI

#### New

- AI ethics and responsible AI
- AI literacy
- Apply predictive models to network traffic analysis
- Contextualization of AI and machine

- learning models and algorithms to cyber
- Data analysis
- Integration of artificial intelligence tools with adherence to cyber standards, frameworks, and compliance requirements
- Python and Data Visualization

#### Increasing relevance

- Assess security controls based on cybersecurity principles and tenets
- Assess security systems designs
- Design the integration of hardware and software solutions

- Evaluate the adequacy of security designs
- Recognize vulnerabilities in security systems

# JOB ROLE

## INFORMATION SECURITY SPECIALIST

### Skills impacted by AI

#### Stable

- Apply cybersecurity and privacy principles to organizational requirements
- Determine how a security system should work and how changes will affect outcomes

#### Decreasing relevance

- Develop and apply security system access controls
- Write code in a currently supported programming language

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ACCESS TRAINING  
RECOMMENDATIONS



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# JOB ROLE

## SOC ANALYST LEVEL 1



### Job description

A SOC Analyst – Level 1 is responsible for monitoring and analyzing security events and incidents within an organization's network. They respond to alerts, perform initial investigations, and escalate issues as needed, while also maintaining and implementing security measures to detect and respond to threats.

### Principal tasks

- Develop and implement immediate operational plans for safeguarding computer files against unauthorized access or breaches
- Monitor current reports of computer viruses to determine when to update virus protection systems
- Monitor and respond to alerts related to encryption and firewall events to ensure the concealment of confidential information and prevent digital threats
- Perform risk assessments and execute tests of data processing system to ensure functioning of data processing activities and security measures
- Review violations of computer security procedures and engage with violators to ensure violations are not repeated
- Engage with users during incident response
- and security violations to address immediate access issues and concerns
- Monitor use of data files and regulate access to safeguard information in computer files
- Coordinate activities within incident response and ongoing monitoring to ensure the effective implementation of security measures
- Continuously monitor security alerts, logs, and events, focusing on indicators of compromise, anomalous activities, and known attack patterns to identify potential security incidents
- Analyze and categorize incidents
- Understand criteria for incident escalation, ensuring a comprehensive grasp of when and how to escalate issues to higher levels or other teams within the organization

### Principal skills

- |  |  |  |
|--|--|--|
| <ul style="list-style-type: none"> <li>• Communication</li> <li>• Coordinating</li> <li>• Customer service</li> <li>• Cyber threat intelligence</li> <li>• Cybersecurity</li> <li>• Endpoint detection and response</li> <li>• Firewall</li> </ul> | <ul style="list-style-type: none"> <li>• Incident management</li> <li>• Incident response</li> <li>• Intrusion detection and prevention</li> <li>• Investigation</li> <li>• Log analysis</li> <li>• Manual malware analysis</li> <li>• Operations</li> </ul> | <ul style="list-style-type: none"> <li>• Penetration testing</li> <li>• Security controls</li> <li>• Security information and event management</li> <li>• Standard operating procedure</li> <li>• Triage</li> <li>• Troubleshooting</li> <li>• Vulnerability management</li> </ul> |
|--|--|--|

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# JOB ROLE

## SOC ANALYST LEVEL 1

### Impact of AI

Gen AI has the potential to transform the role of SOC Analyst Level 1 in cybersecurity through several key advancements. It enhances threat detection by creating sophisticated models that evolve to identify new cyber threats, requiring analysts to interpret these findings. Automated responses to common threats shift the role towards overseeing AI systems. Gen AI aids in data

synthesis for training and testing without real threats. It generates actionable threat intelligence, reduces false positives, and simulates adversarial attacks, enhancing security robustness. Continuous learning, ethical considerations, prompt engineering and understanding methods for grounding the model (e.g., RAG) define the evolving responsibilities of SOC Analysts

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### Key insights

- About half of the skills are exposed to Gen AI today, but human oversight will remain critical
- The remaining half of the skills would be highly prioritized by SOC Analysts due to the high consequences of security errors
- In impact assessment and escalation guidance, AI algorithms can predict and categorize the potential impact of an incident on business operations, reputation, and compliance. LLM-integrated systems can provide entry level SOC Analysts with security criteria to decide whether to escalate the incident and prioritize incidents based on their severity and urgency
- **Shifting focus:** As AI takes over more routine tasks, SOC Analysts will increasingly focus on higher-level analysis, incident investigation, threat hunting, and strategic planning.
- **New skills and expertise:** Analysts will need to develop skills in working with AI tools, interpreting AI-generated results, and understanding the limitations of AI in security contexts
- **Emphasis on collaboration:** Effective collaboration between humans and AI will be essential for maximizing the benefits of AI in the SOC
- **Alert monitoring and triage:** AI-powered SIEM systems and threat detection
- platforms can automate the initial analysis of security alerts, significantly reducing the time and effort required for this task (high)
- **Log analysis:** AI-driven log analysis tools can quickly sift through massive amounts of log data to identify patterns and anomalies, reducing the need for manual analysis (high)
- **Vulnerability scanning:** AI can automate vulnerability scanning and assessment, providing quicker and more comprehensive results than manual processes (high)
- **Threat intelligence analysis:** AI can rapidly process and analyze threat intelligence feeds, identifying relevant information and alerting analysts to emerging threats (high)
- **Incident response:** AI can assist in incident response by automating data collection, suggesting containment actions, and generating initial reports. However, human analysts will still be needed to make critical decisions, investigate complex incidents, and communicate with stakeholders (moderate)
- **Threat hunting:** AI can help identify potential threats by analyzing patterns in security data, but human analysts are still needed to develop hunting hypotheses, investigate leads, and make strategic decisions (moderate)

# JOB ROLE

## SOC ANALYST LEVEL 1

### Key insights

- Communication and collaboration:** Effective communication with stakeholders, both technical and non-technical, remains crucial. AI cannot replace the human element in building relationships, explaining complex technical issues, and providing reassurance during security incidents (Low Impact)
- Critical thinking and problem solving:** AI can assist in identifying potential threats, but human analysts are still needed to apply critical thinking, interpret data in context, and develop creative solutions to complex security problems (Low Impact)
- Decision making and judgment:** AI can provide recommendations, but ultimately, human analysts are responsible for making critical decisions during incident response and other security operations (Low Impact)
- SOC Analysts** – Level 1 will need to understand prompt engineering and how to translate AI-generated output into action

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>• AI ethics and responsible AI</li> <li>• AI literacy</li> <li>• Prompt engineering</li> <li>• LLM architecture and frameworks</li> <li>• Retrieval augmented generation</li> </ul>	<ul style="list-style-type: none"> <li>• Cyber threat intelligence</li> <li>• Incident response</li> <li>• Intrusion detection and prevention</li> <li>• Log analysis</li> <li>• Network security</li> <li>• Security information and event management</li> </ul>	<ul style="list-style-type: none"> <li>• Communication</li> <li>• Coordinating</li> <li>• Customer service</li> <li>• Cybersecurity</li> <li>• Firewall</li> <li>• Incident management</li> <li>• Investigation</li> <li>• Operations</li> <li>• Penetration testing</li> <li>• Standard operating procedure</li> <li>• Triage</li> <li>• Troubleshooting</li> <li>• Vulnerability management</li> </ul>	<ul style="list-style-type: none"> <li>• Endpoint detection and response</li> <li>• Manual malware analysis</li> <li>• Security controls</li> </ul>



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# DATA SCIENCE

# JOB ROLE

## DATA ANALYST



### Job description

Data Analysts synthesize and analyze data to generate reports for stakeholders, providing insights and recommendations based on current trends. They maintain a library of reusable assets, create business intelligence tools, and ensure timely delivery of analytical information. Additionally, they collect, validate, and update data while staying updated on industry advancements, collaborating with stakeholders to define meaningful key performance indicators (KPIs) aligned with organizational goals.

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### Principal tasks

- Generate standard or custom reports summarizing data for review by executives, managers, clients, and other stakeholders
- Synthesize current trend data to support recommendations for action
- Maintain library of model documents, templates, or other reusable knowledge assets
- Create business intelligence tools or systems, including design of related databases, spreadsheets, or outputs
- Manage timely flow of analytical information to users
- Collect data from available industry reports, public information, field reports, or purchased sources
- Maintain or update data analysis tools, databases, dashboards, systems, or methods
- Provide training sessions to enhance data literacy among stakeholders, enabling them to interpret and leverage data for informed decision-making
- Provide technical support for analytical reports, dashboards, or other tools
- Identify and analyze industry or geographic trends with business strategy implications
- Continuously monitor and assess new tools and techniques in the data analysis field, ensuring the adoption of best practices and staying abreast of industry advancements
- Create or review technical design documentation to ensure the accurate development of reporting solutions
- Analyze technology trends to identify markets for future product development or to improve sales of existing products
- Create and implement procedures to validate the accuracy and reliability of data
- Clean and preprocess data before analysis, ensuring data quality and relevance
- Explore datasets using statistical and visual methods to identify patterns, trends, and outliers
- Develop scripts or programs to automate repetitive data-related tasks, enhancing efficiency and reducing manual effort in data analysis workflows
- Collaborate with stakeholders to define and establish meaningful KPIs based on data insights, aligning with organizational goals
- Document specifications for data analysis reports, dashboards, or other outputs

# JOB ROLE

## DATA ANALYST

### Principal skills

- Analytical skills
- Auditing
- Business intelligence
- Business requirements
- Business strategies
- Communication
- Data cleansing
- Data collection
- Data dashboards
- Data governance
- Data management
- Data modeling
- Data preprocessing
- Data quality
- Data visualization
- Data warehousing
- Decision making
- Descriptive statistics
- Innovation
- Microsoft Excel
- Operations
- Presentations
- Python
- R

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### Impact of AI

The role of Data Analysts is shifting towards leveraging Gen AI for enhanced efficiency and insight generation, while still requiring human oversight and validation, especially in critical areas where errors could have significant consequences. Key areas include effective prompt engineering, understanding LLM

capabilities and biases. This shift will require Data Analysts to focus more on complex, strategic, and analytical skills, such as auditing, decision making, and innovation, while routine data tasks that require coding could be automated or augmented.

### Key insights

- More than half of the skills will likely be impacted by Gen AI in the near term, with a notable fraction being augmented to boost efficiency
- In the long run, a further portion of skills could be automated, but the high consequence of errors associated with this work will still necessitate direct human involvement in a notable fraction of skills. These skills could be augmented with advanced Gen AI
- Data Analysts will need to understand effective prompt engineering, as Gen AI technologies can be of great aid in their work analyzing, synthesizing and visualizing results from large datasets
- Gen AI is particularly useful as an analytic and search tool for textual data analysis. However, experts emphasize human validation and review of AI-generated insights, especially for tasks requiring high accuracy
- Integrating Python sandboxes (code interpreter) with Large Language Models (LLMs) enhances data analysis. However, human inspection and oversight of code and processes are essential for accuracy and reliability
- Understanding the biases of LLMs will be critical for these workers, as they will need to be able to interpret, validate, and effectively implement Gen AI outputs in the context of their business use case

# JOB ROLE

## DATA ANALYST

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>• AI ethics and responsible AI</li> <li>• AI literacy</li> <li>• Prompt engineering</li> <li>• LLM capabilities and biases</li> </ul>	<ul style="list-style-type: none"> <li>• Analytical skills</li> <li>• Business intelligence</li> <li>• Business strategies</li> <li>• Communication</li> <li>• Presentations</li> </ul>	<ul style="list-style-type: none"> <li>• Auditing</li> <li>• Business requirements</li> <li>• Data governance</li> <li>• Data management</li> <li>• Data modeling</li> <li>• Data warehousing</li> <li>• Decision making</li> <li>• Innovation</li> <li>• Microsoft office</li> <li>• Operations</li> <li>• Relational databases</li> </ul>	<ul style="list-style-type: none"> <li>• Data cleansing</li> <li>• Data collection</li> <li>• Data Dashboards</li> <li>• Data Preprocessing</li> <li>• Data quality</li> <li>• Data visualization</li> <li>• Descriptive statistic</li> <li>• Python</li> <li>• R</li> <li>• Research</li> <li>• SQL</li> <li>• Writing</li> </ul>



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# JOB ROLE

## DATA ENGINEER



### Job description

Data Engineers are responsible for designing, constructing, and maintaining scalable data pipelines that ensure the efficient extraction, transformation, and loading (ETL) of data from various sources to data warehouses or lakes. They collaborate with data scientists, analysts, and other stakeholders to integrate data from disparate systems, ensuring data quality, consistency, and security throughout the data lifecycle. They also optimize data processing workflows for performance and scalability while automating repetitive tasks to enhance the overall efficiency and reliability of the data infrastructure.

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### Principal tasks

- **Building and maintaining ETL processes:** Developing and managing Extract, Transform, Load (ETL) processes to ensure that data is accurately and efficiently transferred from source systems to data storage solutions, such as data warehouses or data lakes
- **Ensuring data quality and integrity:** Implementing data validation and cleaning procedures to ensure the accuracy, consistency, and reliability of data throughout its lifecycle, including monitoring and troubleshooting data issues as they arise
- **Optimizing data infrastructure:** Continuously optimizing the data architecture for performance, scalability, and cost-efficiency, including the use of indexing, partitioning, and other techniques to enhance data processing speed and storage utilization

### Principal skills

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Apache spark</li> <li>• Azure Databricks</li> <li>• Extract, transform, load</li> <li>• Hadoop</li> <li>• Hive</li> </ul> | <ul style="list-style-type: none"> <li>• PySpark</li> <li>• Python</li> <li>• Scala</li> <li>• Snowflake cloud</li> </ul> |
|--|---|

# JOB ROLE

## DATA ENGINEER

### Impact of AI

Gen AI may be able to help accomplish many of the tasks for which this role is responsible, leaving more time for people in this role to focus on higher value-added complementary

skills. Specifically for Data Engineers, this may mean understanding how to use Gen AI to increase productivity when developing ETL processes.

### Key insights

Workers in this role can enhance their productivity by leveraging Gen AI for data modeling, optimizing workflows with Apache

Airflow and Tableau, therefore dedicating more time to data engineering tasks.

2 / 2



### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>Apache NiFi</li> <li>Prompt engineering</li> </ul>	<ul style="list-style-type: none"> <li>Apache Airflow</li> <li>Tableau</li> </ul>	<ul style="list-style-type: none"> <li>AWS</li> <li>Big data</li> <li>Data engineering</li> </ul>	<ul style="list-style-type: none"> <li>Data modeling</li> <li>Extract, transform, load (ETL)</li> </ul>



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# JOB ROLE

## DATA SCIENTIST



### Job description

A Data Scientist analyzes complex data sets to derive actionable insights and build predictive models. Responsibilities include data cleaning, statistical analysis, machine learning, and communicating findings to stakeholders. Proficiency in programming, data visualization, and strong analytical skills are essential.

### Principal tasks

- Utilize Python libraries and frameworks for data manipulation, analysis, and modeling
- Conduct statistical analysis to extract insights and identify patterns in large datasets
- Develop and implement machine learning algorithms for predictive modeling and analysis
- Create data visualizations to communicate findings and insights to stakeholders
- Apply R programming for statistical analysis and data visualization tasks
- Utilize Tableau for interactive data visualization and dashboard creation
- Perform data mining techniques to discover actionable insights from structured and unstructured data
- Design and implement statistical models for predictive analytics and forecasting
- Utilize Hadoop for distributed storage and processing of large-scale datasets
- Apply natural language processing techniques for text mining and sentiment analysis tasks
- Drives the design, development and optimization of AI/ML frameworks

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JOB FAMILY GROUP: DATA SCIENCE

### Principal skills

- |                           |                               |                        |
|---------------------------|-------------------------------|------------------------|
| • Apache spark            | • Hadoop                      | • Predictive analytics |
| • Artificial intelligence | • Hive                        | • Predictive modeling  |
| • Big data                | • Machine learning            | • Python               |
| • Data analytics          | • Natural language processing | • R                    |
| • Data mining             | • NumPy                       | • Statistical modeling |
| • Data visualization      | • Pandas                      | • Tableau              |
| • Deep learning           |                               | • TensorFlow           |

# JOB ROLE

## DATA SCIENTIST

### Impact of AI

AI will significantly impact the Data Scientist role by automating data cleaning, analysis, and model building. Data Scientists will need to focus on upskilling in areas like AI model interpretability, advanced machine learning

techniques, and domain-specific knowledge. While AI can handle many routine tasks, human expertise in strategic decision-making and communication remains essential.

### Key Insights

- The Data Scientist role involves data analysis, machine learning, and deriving actionable insights from complex datasets, requiring human judgment, creativity, and strategic thinking
- **Data cleaning:** AI can automate data cleaning processes, significantly reducing the time spent on this task (high impact)
- **Statistical analysis:** AI can perform statistical analyses quickly and accurately, but human oversight is needed to ensure appropriate methods and interpretations (moderate impact)
- **Machine learning:** AI can build and optimize machine learning models, but human expertise is needed for model selection, tuning, and understanding domain-specific nuances (high impact)
- **Data visualization:** AI tools can create visualizations, but human insight is needed to design effective and meaningful representations (moderate impact)
- **Communication of findings:** AI can generate reports, but the ability to communicate complex findings to non-technical stakeholders requires human skills (low impact)
- **Strategic decision-making:** AI can provide data-driven insights, but strategic decisions require human judgment and contextual understanding (low impact)
- Overall, AI will augment many technical aspects of the Data Scientist role, automating routine tasks and enhancing analytical capabilities. However, human expertise in strategic thinking, model interpretation, and effective communication remains crucial for success

### Skills Impacted by AI

#### New

- **Advanced machine learning techniques:** Leveraging the latest advancements in machine learning and AI
- **AI ethics and responsible AI**

- **AI model interpretability:** Understanding and explaining AI models to stakeholders
- **Domain-specific knowledge:** Applying data science techniques within specific industries or fields



# JOB ROLE

## DATA SCIENTIST

### Skills impacted by AI

#### Increasing relevance

- **Apache spark:** AI can optimize spark job management and data processing, enhancing efficiency
- **AI literacy:** AI advancements will augment AI capabilities, but human oversight is necessary for ethical considerations and strategic implementation
- **Big data:** AI can assist in managing and analyzing big data, but human expertise is needed for strategic insights and decisions
- **Data analytics:** AI will enhance data analysis capabilities, but human expertise is necessary for interpreting results and making strategic decisions
- **Deep learning:** AI tools can automate parts of deep learning model creation, but human expertise is required for designing and fine-tuning models
- **Data mining:** AI can automate many aspects of data mining, enhancing the ability to uncover patterns and insights from large datasets
- **Data visualization:** AI can create sophisticated visualizations, but human insight is needed to design effective and meaningful representations
- **Hadoop:** AI can optimize data processing tasks in Hadoop, but human expertise is needed for architecture and complex query handling
- **Machine learning:** AI can assist in model building and optimization, but human expertise is needed for model selection, tuning, and understanding domain-specific nuances
- **Natural language processing:** AI advancements will augment NLP capabilities, but human input is necessary for nuanced understanding and interpretation
- **NumPy:** AI can optimize numerical computations with NumPy, but human expertise is needed for complex mathematical problems
- **Pandas:** AI can automate data manipulation tasks using pandas, increasing efficiency
- **Predictive analytics:** AI can enhance predictive analytics by automating analysis and forecasting, but human oversight is needed for contextual understanding
- **Predictive modeling:** AI can enhance the creation and validation of predictive models, but human insight is required for interpretation and strategic application
- **Python:** AI tools will enhance coding efficiency, provide code suggestions, and automate routine tasks, but human expertise is required for complex problem-solving and algorithm development
- **Statistical modeling:** AI can perform advanced statistical analyses quickly, but human oversight is necessary to ensure appropriate methods and interpretations
- **TensorFlow:** AI can automate aspects of TensorFlow model development, but human expertise is crucial for designing and optimizing models

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# JOB ROLE

## DATA SCIENTIST

### Skills impacted by AI

#### Stable

- **Device drivers:** While AI can assist, the development and troubleshooting of low-level hardware-software interactions are complex and require deep human expertise
- **Embedded systems:** AI can optimize certain tasks, but the development of embedded systems often require human expertise for hardware-software integration
- **Tableau:** AI can assist in creating visualizations, but the tool's usage remains largely manual and user-driven

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#### Decreasing relevance

- **HIVE:** AI can automate many aspects of HIVE query optimization and data processing, reducing the need for manual intervention
- **R:** AI tools may reduce the demand for manual R programming as automated solutions become more prevalent



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# JOB ROLE

## DATA SPECIALIST



### Job description

Data Specialists ensure the accuracy, integrity, and quality of data by implementing data validation protocols, managing data cleansing processes, and maintaining comprehensive data documentation. They perform detailed data analysis and reporting to generate actionable insights, creating reports and visualizations to support business decision-making and strategic planning. They also integrate data from various sources and collaborate with cross-functional teams to support data-driven projects and initiatives, ensuring effective data utilization across the organization.

1 / 2



### Principal tasks

- Data management and quality assurance:** Ensure the accuracy, integrity, and quality of data by implementing data validation protocols, managing data cleansing processes, and maintaining comprehensive data documentation
- Data analysis and reporting:** Perform detailed data analysis to generate actionable insights, creating reports and visualizations to support business decision-making and strategic planning
- Data integration and collaboration:** Integrate data from various sources and collaborate with cross-functional teams to support data-driven projects and initiatives, ensuring effective data utilization across the organization

### Principal skills

- |                      |                        |           |
|----------------------|------------------------|-----------|
| • Data analytics     | • Microsoft Power BI   | • R       |
| • Data visualization | • Microsoft SQL server | • SQL     |
| • Java               | • Python               | • Tableau |

# JOB ROLE

## DATA SPECIALIST

### Impact of AI

Gen AI may be able to help accomplish many of the tasks for which this role is responsible, leaving more time for people in this role to focus on higher value-added complementary

skills. Specifically for Data Specialists, this may mean understanding how to use Gen AI to increase productivity when analyzing and visualizing data.

### Key insights

Workers in this role can enhance their productivity by leveraging Gen AI for data entry automation, optimizing workflows with Tableau

and Apache, and dedicating more time to data engineering tasks.

2 / 2



### Skills impacted by AI

#### New

- AI ethics and responsible AI
- AI literacy
- Apache NiFi
- Prompt engineering

#### Increasing relevance

- Machine learning
- Tableau

#### Stable

- AWS
- Big data
- Data engineering

#### Decreasing relevance

- Data modeling
- Extract, transform, load (ETL)



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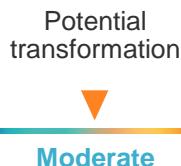


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# DESIGN AND USER EXPERIENCE

# JOB ROLE

## DESIGN ENGINEER



### Job description

Design Engineers develop and modify product designs by creating detailed prototypes, performing rigorous testing, and ensuring adherence to engineering principles and client requirements. They collaborate with cross-functional teams, including manufacturing and senior engineers, to oversee the entire lifecycle of a project from conceptualization to final production. Also, they are responsible to maintain comprehensive documentation of design processes, project schedules, and budget compliance while staying updated with the latest technological advancements and design trends.

### Principal tasks

- Collaboration and documentation:** Working closely with other engineers and departments to meet project requirements and timelines while maintaining detailed documentation of design processes and progress, ensuring all designs comply with safety standards and regulatory requirements
- Product and component design:** Creating new products or improving existing ones across various sectors, including mechanical, structural, and

electrical design, and managing the entire lifecycle of a project from conceptualization through to testing and manufacturing

- Prototype development and testing:** Conducting research, designing, and prototyping products, all while adhering to engineering principles, performing product testing, and modifying designs to enhance functionality and effectiveness

### Principal skills

- CAD
- CATIA
- Finite element analysis
- Geometric dimensioning
- MATLAB
- Mechanical engineering
- PTC Creo
- Siemens NX
- SolidWorks



# JOB ROLE

## DESIGN ENGINEER

### Impact of AI

Gen AI may be able to help accomplish many of the tasks for which this role is responsible, leaving more time for people in this role to focus on higher value-added complementary skills.

Specifically for Design Engineers, this may mean understanding how to use Gen AI to iterate prototypes, particularly by accelerating finite element analysis and other modeling exercises.



### Key insights

Workers in this role can enhance their productivity by leveraging Gen AI for finite element analysis automation, optimizing

product design workflows and dedicating more time to engineering management processes.

### Skills impacted by AI

#### New

- AI ethics and responsible AI
- AI literacy
- Ansys
- Prompt engineering
- Scikit

#### Increasing relevance

- Lean manufacturing
- Product design

#### Stable

- Engineering management
- Mechanical engineering

#### Decreasing relevance

- Finite element analysis



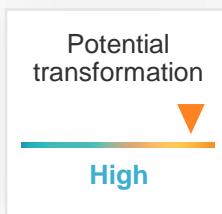
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# JOB ROLE

## PRODUCT DESIGN ENGINEER



### Job description (ONET data, 2024)<sup>[33]</sup>

Designs digital user interfaces or websites. Develop and test layouts, interfaces, functionality, and navigation menus to ensure compatibility and usability across browsers or devices. May use web framework applications as well as client-side code and processes. May evaluate web design following web and accessibility standards and may analyze web use metrics and optimize websites for marketability and search engine ranking. May design and test interfaces that facilitate the human-computer interaction and maximize the usability of digital devices, websites, and software with a focus on aesthetics and design. May create graphics used in websites and manage website content and links.

### Principal tasks (ONET data, 2024)<sup>[34]</sup>

- Collaborate with management or users to develop e-commerce strategies and to integrate these strategies with websites
- Collaborate with web development workers, such as front-end or back-end developers, to complete the full scope of web development projects
- Communicate with network personnel or web site hosting agencies to address hardware or software issues affecting websites
- Conduct user research to determine design requirements and analyze user feedback to improve design quality
- Confer with management or development teams to prioritize needs, resolve conflicts, develop content criteria, or choose solutions
- Create searchable indices for web page content
- Create web models or prototypes that include physical, interface, logical, or data models
- Design, build, or maintain web sites, using authoring or scripting languages, content creation tools, management tools, and digital media
- Develop and document style guidelines for web site content
- Develop new visual design concepts and modify concepts based on stakeholder feedback
- Develop or implement procedures for ongoing website revision
- Develop system interaction or sequence diagrams
- Develop website maps, application models, image templates, or page templates that meet project goals, user needs, or industry standards
- Develop, validate, and document test routines and schedules to ensure that test cases mimic external interfaces and address all browser and device types
- Maintain understanding of website technologies or programming practices through continuing education, reading, or participation in professional conferences, workshops, or groups
- Perform or direct website updates
- Perform website tests according to planned schedules, or after any website or product revision



# JOB ROLE

## PRODUCT DESIGN ENGINEER

### Principal tasks

- Provide clear, detailed descriptions of website specifications, such as product features, activities, software, communication protocols, programming languages, and operating systems software and hardware
- Register websites with search engines to increase website traffic
- Research and apply innovative solutions for product design, visuals, and user experience to meet the needs of individual web development projects
- Research, document, rate, or select alternatives for web architecture or technologies
- Respond to user email inquiries or set up automated systems to send responses
- Select programming languages, design tools, or applications
- Write and edit technical documentation for digital interface products and designs, such as user manuals, testing protocols, and reports
- Write supporting code for web applications or websites
- Direct and execute pre-production activities, such as creating mood boards or storyboards and establishing a project timeline
- Document technical factors such as server load, bandwidth, database performance, and browser and device types
- Identify or maintain links to and from other websites and check links to ensure proper functioning
- Identify problems uncovered by testing or customer feedback, and correct problems or refer problems to appropriate personnel for correction
- Incorporate technical considerations into website design plans, such as budgets, equipment, performance requirements, or legal issues including accessibility and privacy



JOB FAMILY GROUP: DESIGN AND USER EXPERIENCE

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### Principal skills (Lightcast™ US Job Postings, 2023) [35]

- |                           |                           |                        |
|---------------------------|---------------------------|------------------------|
| • Communication           | • Mechanical engineering  | • Project management   |
| • Detail oriented         | • New product development | • Prototyping          |
| • Figma (design software) | • Operations              | • Research information |
| • Innovation              | • Planning                | • Sales                |
| • Leadership              | • Presentations           | • Self-motivation      |
| • Management              | • Problem solving         | • User experience      |
| • Marketing               | • Product design          |                        |

# JOB ROLE

## PRODUCT DESIGN ENGINEER

### Impact of AI

Gen AI has the potential to significantly impact Product Designers. AI tools can significantly augment the design process by automating repetitive tasks, generating design variations, and even assisting in prototyping and user testing. While this can lead to significant efficiency gains, it also presents challenges for designers, requiring them to adapt their skillset and focus on higher-level creative and strategic

aspects of their work. By embracing AI as a collaborative tool and developing the necessary skills, designers can unlock new levels of creativity, efficiency, and innovation, ultimately creating better products for users.

### Key insights

#### Potential benefits:

- **Rapid prototyping:** AI can generate multiple design iterations quickly based on given parameters, allowing designers to streamline the execution of a wider range of ideas and concepts in a shorter time frame
- **Enhanced user research:** AI can analyze user data and provide insights into user behavior, preferences, and pain points, helping designers make more informed decisions
- **Streamlined design tasks:** Gen AI can streamline design of repetitive tasks such as creating layouts, generating icons, or optimizing images, freeing up designers to focus on higher-level design challenges
- **Improved accessibility:** AI tools can assist in designing interfaces that are accessible to users with disabilities, ensuring a broader audience can use the product
- **Personalized experiences:** AI can help create dynamic interfaces that adapt to individual user preferences and behavior, enhancing user satisfaction of IT support operations



# JOB ROLE

## PRODUCT DESIGN ENGINEER

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### Skills impacted by AI

#### New

- **AI ethics and responsible AI**
- **AI literacy:** Understanding AI concepts, algorithms, and the capabilities and limitations of AI design tools may be a key advantage for product designers
- **Data analysis:** Understanding user data and interpreting AI-generated insights will be necessary for making data-driven design decisions

- **Prompt engineering:** Drafting effective prompts to elicit specific insights from AI models will be a valuable skill for BI analysts

#### Increasing relevance

- **Collaboration and communication:** Collaborating with AI specialists and effectively communicating design concepts to stakeholders will become increasingly important
- **Creative vision and strategy:** As AI handles more technical aspects, designers will need to focus on the bigger picture, defining the product vision and developing overarching design strategies

- **Critical thinking and evaluation:** Assessing AI-generated designs, identifying their strengths and weaknesses, and making informed decisions about their implementation will be essential
- **User research and empathy:** Understanding user needs and motivations will be crucial for guiding AI tools and ensuring designs resonate with the target audience

#### Stable

- No skills identified

#### Decreasing relevance

- **Manual design production:** As AI may be able to offer support for repetitive tasks such as layout creation, icon design, and

image optimization, the need for those skills may decrease



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# JOB ROLE

## UX DESIGNER



### Job description

An entry level UX Designer enhances product usability, researches user behavior, and compiles audience insights. They develop and test design models, create accessible website layouts, and prototype interfaces using HTML/CSS. Additionally, they gather requirements, refine specifications, evaluate existing designs, and present design strategies and improvement recommendations and/or updates to stakeholders, ensuring alignment with business and user needs.

### Principal tasks

- Articulate design decision by presenting strategy and concepts to key stakeholders
- Assist with technology design to make products easier to use
- Compile information about audience for a site
- Design and technology features that improve accessibility and value for users
- Determine user preferences and assess process followed to access product functions
- Develop website layout
- Develop and test new design models and incorporate findings to improve product design
- Experiential and business from stakeholders
- Gather and refine specifications and requirements based on design
- Prototype website layout and user interfaces using HTML/CSS
- Research the behavior of internet users and consumers

### Principal skills

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Analytical thinking</li> <li>• Benchmarking/ data/ metrics</li> <li>• Conduct usability tests and incorporate results into design process</li> <li>• Create personas</li> <li>• Create prototype</li> <li>• Data and knowledge driven problem definition and solving</li> <li>• Describe scenarios</li> <li>• Develop user flows</li> </ul> | <ul style="list-style-type: none"> <li>• Make iterations</li> <li>• Presentation</li> <li>• Research information</li> <li>• Strong communication</li> <li>• Translate user problems into practical design solutions</li> <li>• Understand and synthesize technology into meaningful human experiences</li> <li>• Validate design solutions</li> </ul> |
|--|---|



# JOB ROLE

## UX DESIGNER

### Impact of AI

Design ideation, design processes, and design output. UX Designers will be able to create and facilitate more personalized experiences, leverage and incorporate data analytics to improve design decisions, and

more efficiently develop tangible concepts. The outcomes of these changes can improve user satisfaction and accessibility, as well as business outcomes through a more efficient design process.

### Key insights

- User impact and outcomes:** UX Designers will need to create designs that allow for bespoke experiences within discrete sections or modules of an application. Additionally, expanding voice interactions and other emerging user input/output paradigms will require a shift in some of the ways user interactions are facilitated. This can be especially impactful for differently abled users who will experience expanded accessibility in several ways
- Solution design and development:** Refined user research and insights based on large scale real and synthetic user

persona data will fuel designed solutions to user problems of all sizes. These developments will benefit users and businesses alike. Some of these insights will facilitate automated design generation and simulated testing solutions

- Design deliverables:** Accelerated design iterations with Gen AI tools that can draft testable, high-fidelity prototypes in the time it may currently take designers to create paper sketches of wireframes. As new tools are created, design and testing will become faster, with some aspects of design iteration automated

### Skills impacted by AI

#### New

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• AI ethics and responsible AI</li> <li>• AI literacy</li> <li>• Data analysis</li> </ul> | <ul style="list-style-type: none"> <li>• Data refinement</li> <li>• Prompt engineering</li> <li>• Proprietary AI design tool applications</li> </ul> |
|--|--|



# JOB ROLE

## UX DESIGNER

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### Skills impacted by AI

#### Increasing relevance

- Analytical thinking
- Benchmarking/data/metrics
- Conduct usability tests and incorporate results into design process
- Create personas
- Create prototype
- Data and knowledge driven problem definition and solving
- Describe scenarios
- Develop user flows
- Research information
- Translate user problems into practical design solutions
- Understand and synthesize technology into meaningful human experiences
- Validate design solutions

#### Stable

- Make iterations
- Presentation
- Strong communication

#### Decreasing relevance

- No skills identified



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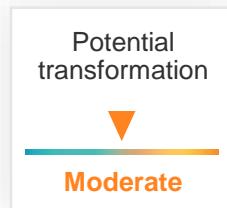


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# INFRASTRUCTURE AND OPERATIONS

# JOB ROLE

## DATABASE ADMINISTRATOR



### Job description

A Database Administrator (DBA) is responsible for managing and maintaining an organization's database systems. They ensure data integrity, security, and performance, as well as troubleshoot any issues that may arise.

### Principal tasks

- **Data backup and disaster recovery:** Develop and implement data backup procedures to prevent data loss and configure disaster recovery plans to ensure database availability and continuity
- **Database design and modeling:** Design and model databases according to organizational needs and industry best practices to support efficient data storage, processing, and retrieval
- **Database installation and maintenance:** Install, configure, update, and maintain database systems and software to ensure smooth operations
- **Database security management:** Implement and maintain robust security measures to protect databases from unauthorized access and ensure data integrity
- **Database troubleshooting:** Identify and resolve issues related to database performance, accessibility, and functionality
- **Performance monitoring and tuning:** Monitor database performance and configure databases for optimal efficiency and speed
- **SQL query optimization:** Write and optimize SQL queries to improve database performance and response times
- **System integration:** Integrate database systems with other software applications and ensure seamless data interchange and functionality across platforms
- **Technical documentation and reporting:** Create detailed reports and maintain documentation for database specifications, configurations, and performance metrics
- **User access management:** Manage user access and authentication to ensure database security and compliance with data protection regulations

### Principal skills

- |  |   |   |
|--|---|---|
| <ul style="list-style-type: none"> <li>• Cloud computing</li> <li>• Communication</li> <li>• Database design</li> <li>• Demonstrating responsibility</li> <li>• Disaster recovery</li> </ul> | <ul style="list-style-type: none"> <li>• Documentation maintenance</li> <li>• Enterprise software</li> <li>• Interpersonal collaboration</li> <li>• Leadership demonstration</li> <li>• Microsoft SQL server</li> </ul> | <ul style="list-style-type: none"> <li>• Network disaster recovery</li> <li>• Performance tuning</li> <li>• Problem solving</li> <li>• Systems requirement</li> <li>• Time management</li> <li>• Troubleshooting</li> </ul> |
|--|---|---|



# JOB ROLE

## DATABASE ADMINISTRATOR

### Impact of AI

AI impact on the Database Administrator role might be moderate. While documentation and performance tuning can be highly automated, skills like troubleshooting, systems management, and database design are less affected. Database Administrators should focus

### Key insights

- Impact on number of hours:** Gen AI can automate some tasks like documentation and performance tuning, but the overall impact on working hours may be limited
- New skills:** Database Administrators will need to acquire skills in AI security, TensorFlow, neural networks, and image signal processing to adapt to the changing

on upskilling in areas like disaster recovery and enterprise software, where AI can complement their work. Technical skills like Microsoft SQL server and cloud computing are moderately to highly susceptible to AI automation.

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>AI security</li> <li>Cloud AI</li> <li>Neural networks</li> <li>TensorFlow</li> </ul>	<ul style="list-style-type: none"> <li>Database design</li> <li>Disaster recovery</li> <li>Enterprise software</li> <li>Microsoft SQL server</li> <li>Network disaster recovery</li> <li>Problem solving</li> <li>Systems management</li> <li>Troubleshooting</li> </ul>	<ul style="list-style-type: none"> <li>Communication</li> <li>Demonstrating responsibility</li> <li>Interpersonal collaboration</li> <li>Leadership demonstration</li> <li>Time management</li> </ul>	<ul style="list-style-type: none"> <li>Cloud computing</li> <li>Documentation maintenance</li> <li>Performance tuning</li> </ul>



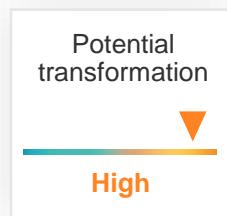
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# JOB ROLE

## HELP DESK ANALYST



### Job description

Help Desk Analysts are the first line of technical support for computer users. They provide assistance via phone or electronically, troubleshooting hardware, software, and network issues. These workers translate technical jargon into user-friendly solutions, guiding individuals through problem-solving steps. Help Desk Analysts combine technical knowledge with strong communication skills to ensure a positive user experience, resolving issues efficiently and effectively.

### Principal tasks

- Diagnose and troubleshoot
- Provide technical support
- Install and configure
- Educate and train
- Document and track
- Escalate complex problems
- Test and evaluate
- Monitor system performance
- Create and update knowledge base
- Prioritize and manage requests
- Collaborate with IT teams
- Maintain security standards
- Stay updated on technology
- Communicate effectively
- Provide excellent customer service

### Principal skills

- Ability to explain technical concepts clearly to non-technical users
- Ability to think creatively and adapt to different situations
- Ability to work under pressure and meet deadlines
- Active listening
- Analytical skills to identify root causes of issues
- Computer hardware (desktops, laptops, peripherals)
- Documentation maintenance
- Excellent verbal and written communication
- Help desk software (ServiceNow, Zendesk, etc.)
- Implementing solutions and workarounds
- Microsoft Office suite (Word, Excel, Outlook, PowerPoint)
- Networking fundamentals (LAN, Wi-Fi)
- Operating systems (Windows 10, macOS, potentially Linux)
- Patience and ability to handle difficult situations
- Prioritization and multitasking
- Strong customer focus and empathy



# JOB ROLE

## HELP DESK ANALYST

### Impact of AI

Gen AI is set to revolutionize the Help Desk Analyst role, automating routine tasks, and enabling a shift towards proactive problem prevention and enhanced customer service. While the demand for analysts handling basic issues may decrease, skilled workers who can

leverage AI tools, tackle complex problems, and foster strong customer relationships will be highly sought after. To thrive in this evolving landscape, Help Desk Analysts must embrace AI, upskill in strategic areas, and adopt a proactive approach to IT support.

### Key insights

- Tier-1 support and initial troubleshooting:** AI chatbots can handle routine inquiries, password resets, and basic troubleshooting, freeing up analysts for more complex issues
- Knowledge base creation and maintenance:** AI can automatically generate, and update knowledge articles based on resolved tickets and user interactions
- Data analysis and reporting:** AI can analyze help desk data to identify trends, predict potential problems, and suggest improvements to processes
- Complex troubleshooting:** AI can suggest solutions based on past cases and knowledge articles, assisting analysts in diagnosing and resolving complex problems faster
- Customer communication:** AI powered tools can help analysts communicate more effectively by suggesting responses, translating technical jargon, and personalizing interactions

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>Prompt engineering</li> </ul>	<ul style="list-style-type: none"> <li>Ability to explain technical concepts clearly to non-technical users</li> <li>Ability to think creatively and adapt to different situations</li> </ul>	<ul style="list-style-type: none"> <li>Ability to work under pressure and meet deadlines</li> <li>Active listening</li> <li>Patience and ability to handle difficult situations</li> </ul>	<ul style="list-style-type: none"> <li>Computer hardware (desktops, laptops, peripherals)</li> <li>Documentation maintenance</li> </ul>



# JOB ROLE

## HELP DESK ANALYST

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
	<ul style="list-style-type: none"> <li>• Analytical skills to identify root causes of issues</li> <li>• Excellent verbal and written communication</li> <li>• Implementing solutions and workarounds</li> <li>• Prioritization and multitasking</li> <li>• Strong customer focus and empathy</li> </ul>	<ul style="list-style-type: none"> <li>• Networking fundamentals (LAN, Wi-Fi)</li> <li>• Operating systems (Windows 10, macOS, potentially Linux)</li> </ul>	<ul style="list-style-type: none"> <li>• Help desk software (ServiceNow, Zendesk, etc.)</li> <li>• Microsoft office suite (word, excel, outlook, PowerPoint)</li> </ul>



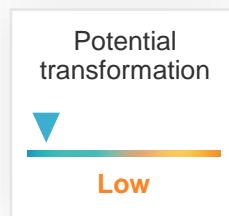
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# JOB ROLE

## IT MANAGER



### Job description

IT Manager oversees IT Infrastructure and Operations. They manage and maintain the organization's IT infrastructure, ensuring all systems, networks, and hardware operate efficiently and securely. They lead and develop IT Teams, providing guidance, training, and support to ensure the team meets organizational goals and technological demands. Furthermore, they develop strategic plans for IT projects, align IT initiatives with business goals, and manage the IT budget to optimize costs and investments.

### Principal tasks

- **Infrastructure management:** Maintaining essential IT infrastructure, such as operating systems, security tools, applications, servers, email systems, and both software and hardware, ensuring everything is up to date and functioning efficiently
- **Project leadership:** Overseeing significant projects within the organization and ensuring they align with larger business initiatives, which requires handling business-critical IT tasks and systems administration
- **Technology evaluation and training:** IT Managers continuously research and evaluate emerging technologies to recommend and implement effective solutions and upgrades. Additionally, they provide necessary training to staff, enhancing the overall tech proficiency within the organization

### Principal skills

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• Active directory</li> <li>• Cybersecurity</li> <li>• Disaster recovery</li> <li>• IT strategy</li> <li>• Microsoft exchange</li> </ul> | <ul style="list-style-type: none"> <li>• Network administration</li> <li>• Vendor management</li> <li>• VMware</li> <li>• Windows server</li> </ul> |
|---|---|



# JOB ROLE

## IT MANAGER

### Impact of AI

Gen AI may be able to assist in a few of the tasks for which this role is responsible, but the core skills for the role are likely to remain unaffected by Gen AI in the near-term. However, IT Managers may be able to leverage

### Key insights

In thinking about professional development and upskilling plans, people currently in this role might consider how to use Gen AI to dramatically reduce time spent troubleshooting

Gen AI to accelerate and standardize troubleshooting procedures and will need to consider how their teams use and support AI tools.

how to leverage Gen AI to increase productivity working with cybersecurity features, and how to spend more time developing IT strategies.

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>Codex</li> <li>Prompt engineering</li> </ul>	<ul style="list-style-type: none"> <li>Cybersecurity</li> <li>System administration</li> </ul>	<ul style="list-style-type: none"> <li>IT strategy</li> <li>Program management</li> </ul>	<ul style="list-style-type: none"> <li>Active directory</li> <li>Troubleshooting</li> </ul>



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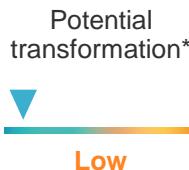


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# JOB ROLE

## IT SUPPORT TECHNICIAN



### Job description

IT Support Technicians monitor and maintain computer systems, install, and set up equipment and software for users, and troubleshoot technical issues. They collaborate with staff to determine system requirements, maintain records of transactions and activities. They also evaluate and recommend software or hardware improvements, develop training materials, and supervise workers on special projects.

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### Principal tasks

- Conduct office automation feasibility studies, including workflow analysis, space design, or cost comparison analysis.
- Set up equipment for worker use, performing or ensuring proper installation of cables, operating systems, or appropriate software.
- Read technical manuals, confer with users, or conduct computer diagnostics to investigate and resolve problems or to provide technical assistance and support.
- Answer user inquiries regarding computer software or hardware operation to resolve problems.
- Install and perform minor repairs to hardware, software, or peripheral equipment, following design or installation specifications.
- Confer with staff, users, and management to establish requirements for new systems or modifications.
- Enter commands and observe system functioning to verify correct operations and detect errors.
- Hire, supervise, and direct workers engaged in special project work, problem-solving, monitoring, and installation of data communication equipment and software.
- Maintain records of daily data communication transactions, problems and remedial actions taken, or installation activities.
- Prepare evaluations of software or hardware and recommend improvements or upgrades.
- Develop training materials and procedures, or train users in the proper use of hardware or software.
- Inspect equipment and read order sheets to prepare for delivery to users.
- Read trade magazines and technical manuals or attend conferences and seminars to maintain knowledge of hardware and software.
- Modify and customize commercial programs for internal needs.
- Oversee the daily performance of computer systems.

### Principal skills

- |                 |                            |                   |
|-----------------|----------------------------|-------------------|
| • Adaptability  | • Computer hardware        | • Debugging       |
| • Automation    | • Critical problem solving | • Detail oriented |
| • Communication | • Customer service         |                   |

\*Based on our analysis, the transformation is projected to be low to moderate within the next 12-18 months. Beyond this timeframe, the transformation is expected to be more significant, with a moderate to high impact anticipated after 18 months.

# JOB ROLE

## IT SUPPORT TECHNICIAN

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### Principal skills

- Detail oriented
- End-user training
- Help desk support
- Information technology
- Interpersonal communications
- Issue tracking
- Knowledge base maintenance
- Leadership
- Management
- Microsoft office
- Microsoft windows
- Operating systems
- Operations
- Organizational skills
- Peripheral devices
- Planning
- Project management
- Research information
- Software installation
- Technical support
- Testing methodologies
- Troubleshooting
- Virtual private networks
- Windows servers
- Writing

### Impact of AI

Gen AI may have a moderate to transformative impact on IT Support Technicians. While human interaction and problem-solving skills will remain crucial, AI-powered tools have the potential to streamline many routine tasks and enhance the efficiency of issue resolution. Gen AI may increasingly assist with tasks such as question handling, initial responses, case status summarization, recommending knowledge articles, software patching, resolution summarization, and lower complexity ticket resolution. IT Support Technicians will need to adapt by developing

new skills in AI tool utilization and focusing on complex troubleshooting and customer service interactions. Overall, AI can help IT Support Technician become even more strategic and customer centric. By embracing AI as a collaborative tool and developing the necessary skills, IT workers can provide better support experiences, solve more complex problems, and ultimately enhance the value they bring to their organizations. Understanding integration capabilities of Gen AI into existing systems will also be important for this role.

### Key insights

#### Potential benefits:

- More than one out of ten skills will have increased relevance while a similar number may decrease the in relevance in the near future.
- While IT Support Technicians perform essential tasks, the repetitive nature of nearly half of these duties means they could be automated in the long term with AI advancements. As technology evolves, the remaining one third of tasks requiring human presence could be augmented.

# JOB ROLE

## IT SUPPORT TECHNICIAN

### Key insights

- AI-assistance may become more frequent in IT Support. Early use-cases include question handling, crafting initial responses, real-time case status summarization, recommending knowledge articles, resolution summarization, and lower complexity ticket resolution, among others
- The initial steps of troubleshooting can be handled by a network of artificial intelligence solutions. Gathering information from users can be handled by conversational AI tools, while Gen AI tools will be able to infer the issue, determine a probable cause, and offer an initial action plan an individual can then test and further develop as necessary until a solution is fully implemented
- LLM-integrated backend systems and logs may be able to assist with system performance monitoring. Vision-based AI models could assist in physical inspection of equipment
- IT Support workers shift their focus to high-complexity cases, while validating output from Gen AI assistants on lower complexity issues. They will also need to understand integration capabilities of Gen AI technologies into existing systems to regulate access to such tools for other workers
- Gen AI can create and maintain comprehensive knowledge bases by automatically extracting information from various sources, making it easier for IT Support Technicians to access relevant information quickly
- AI-powered tools can guide users through self-service solutions, reducing the number of support tickets and improving user autonomy

### Skills impacted by AI

#### New

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• AI ethics and responsible AI</li> <li>• AI literacy</li> <li>• AI system management</li> <li>• Cybersecurity</li> <li>• Data analysis</li> </ul> | <ul style="list-style-type: none"> <li>• Infrastructure and integration capabilities of Gen AI</li> <li>• LLM architecture</li> <li>• Prompt engineering</li> <li>• Retrieval augmented generation</li> </ul> |
|---|---|

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# JOB ROLE

## IT SUPPORT TECHNICIAN

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### Skills impacted by AI

#### Increasing relevance

- Customer service
- Communication
- End-user training
- Help desk support

#### Stable

- Adaptability
- Automation
- Computer hardware
- Critical problem solving
- Debugging
- Detail oriented
- Domain / solution expertise
- Effective verbal and written communication.
- End-user training and support
- Information technology
- Leadership
- Management
- Microsoft office
- Microsoft windows
- Network troubleshooting
- Operating systems
- Operations
- Organizational skill
- Peripheral devices
- Planning
- Problem solving
- Project management
- Software installation
- Technical support
- Testing methodologies
- Virtual private networks
- Windows servers

#### Decreasing relevance

- Issue tracking
- Manual knowledge base maintenance
- Research information
- Troubleshooting
- Writing (documentation)



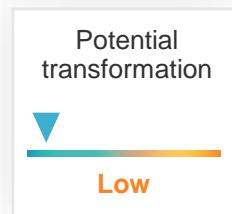
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# JOB ROLE

## NETWORK ADMINISTRATOR



### Job description

Network Administrators install, configure, and maintain an organization's network infrastructure, including routers, switches, and wireless access points. They monitor network performance, troubleshoot issues, and ensure security by managing access controls and applying updates. Additionally, they develop disaster recovery plans, provide technical support, train users, and document network configurations. They also stay updated on technological advancements and ensure compliance with organizational policies and legal regulations.

### Principal tasks

- Install and configure network equipment, including routers, switches, and wireless access points
- Develop plans and execute procedures for the disaster recovery/back up
- Diagnose, troubleshoot, and resolve hardware, software, or other network and system problems
- Managing access controls and network permissions for users
- Regularly monitor the health and performance of the network, troubleshoot connectivity and performance problems, and provide ongoing optimization of the network
- Analyze equipment performance records to determine the need for repair or replacement.
- Assist users with network-related inquiries and provide technical support to users for network-related issues
- Perform routine network maintenance tasks and apply software updates and patches and firmware upgrades
- Provide basic IT-related training to internal/external users on network use and security practices
- Create and maintain detailed documentation related to network configurations
- Gather data pertaining to customer needs, and use the information to identify, predict, interpret, and evaluate system and network requirements
- Coordinate with vendors and with company personnel to facilitate purchases
- Ensure that all network activities are compliant with organizational policies and legal regulations
- Maintain an inventory of parts for emergency repairs
- Keep abreast of technological advancements and integrate relevant updates into the network infrastructure



# JOB ROLE

## NETWORK ADMINISTRATOR

### Principal skills

- Auditing
- Backup devices
- CLI configuration
- Communication
- Coordinating
- Customer service
- Detail oriented
- Disaster recovery
- Help desk support
- Information technology
- Local area networks
- Management
- Network infrastructure
- Network monitoring
- Network performance management
- Network protocols
- Network routing
- Network security
- Network switches
- Operating systems
- Planning
- Problem solving
- Research information
- System administration
- Technical support
- Troubleshooting
- WAN protocols
- Writing

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### Impact of AI

Early Gen AI use-cases in Network Administration include documentation, help desk support, and network performance monitoring, help in configuration generation and validation, and disaster recovery. Network Administrators will need to develop AI literacy and prompt engineering to enhance traditional skills such as help desk support, IT knowledge, problem-solving, and technical support. Skills

related to Command Line (CLI) Configuration, performance management, and writing may be automated. The job focus will shift towards higher-level tasks requiring human judgment on the network infrastructure, leveraging Gen AI for routine tasks, necessitating continuous learning and adaptation to new AI technologies.

### Key insights

- In the immediate term, about one out of three skills are impacted by AI, with the majority being augmented rather than automated
- In the long run, an additional quarter of skills could be automated, but the interactive and manual nature of the role will still require direct human involvement in nearly half of the skills
- Early use-cases of Gen AI include documentation, help desk support, and integrating/embedding Gen AI technologies into the network for monitoring network performance, among others

# JOB ROLE

## NETWORK ADMINISTRATOR

### Key insights

- LLMs can be integrated in systems to generate configurations and validate existing configurations, analyze logs, monitor performance and detect potential network and system problems to invoke Disaster Recovery (DR) protocols
- Network Administrators will need to cultivate awareness of Gen AI technologies, as well as be equipped with strong prompt engineering skills to effectively interact with AI assistants

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>• AI ethics and responsible AI</li> <li>• AI literacy</li> <li>• Prompt engineering</li> </ul>	<ul style="list-style-type: none"> <li>• Help desk support</li> <li>• Information technology</li> <li>• Problem solving</li> <li>• Research information</li> <li>• Technical support</li> </ul>	<ul style="list-style-type: none"> <li>• Auditing</li> <li>• Backup devices</li> <li>• Communication</li> <li>• Coordinating</li> <li>• Customer service</li> <li>• Detail oriented</li> <li>• Disaster recovery</li> <li>• Local area networks</li> <li>• Management</li> <li>• Network infrastructure</li> <li>• Network monitoring</li> <li>• Network protocols</li> <li>• Network routing</li> <li>• Network security</li> <li>• Network switches</li> <li>• Networking hardware</li> <li>• Operating systems</li> <li>• Planning</li> <li>• System administration</li> <li>• Troubleshooting</li> </ul>	<ul style="list-style-type: none"> <li>• CLI configuration</li> <li>• Network infrastructure</li> <li>• Network performance management</li> <li>• Writing</li> </ul>



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# JOB ROLE

## NETWORK AND IT AUTOMATION ENGINEER



### Job description

A Network and IT Automation Engineer is responsible for designing, implementing, and maintaining automated solutions to optimize network and IT operations. They collaborate with teams to select and integrate appropriate automation technologies, ensuring stability, security, and scalability of systems. Their role involves evaluating emerging technologies, developing automated testing and security measures, and establishing standards to meet organizational requirements. Additionally, they create application-specific automation scripts, monitor network performance, and implement Continuous Integration/Continuous Deployment (CI/CD) pipelines to streamline software delivery and infrastructure changes. Overall, their work aims to enhance efficiency, reliability, and responsiveness within network and IT environments.

### Principal tasks

- Verify stability, interoperability, portability, security, or scalability of network and IT automation architecture
- Collaborate with engineers or software developers to select and implement appropriate automation solutions or ensure the compatibility of automated components
- Identify system data, hardware, or software components required to meet user needs
- Communicate with staff or clients to understand specific system requirements
- Automate testing to verify proper functioning of software patches and fixes
- Develop and implement automated security measures
- Design, document, and direct automated deployment processes
- Develop automated systems for monitoring network performance, detecting anomalies, and triggering automated responses
- Evaluate current or emerging technologies for network and IT automation, considering factors such as cost, portability, compatibility, or usability
- Establish functional or system standards to address operational requirements, quality requirements, and design constraints
- Investigate system component suitability for specified purposes and make recommendations regarding component use
- Complete models and simulations, using automated tools, to analyze or predict system performance under different operating conditions
- Develop efficient and effective network automation controllers
- Evaluate existing systems to determine effectiveness and suggest changes to meet organizational requirements
- Develop and maintain automated solutions for configuring and managing network devices
- Develop application-specific automation scripts and software
- Implement CI/CD pipelines and collaborate with DevOps teams to automate software delivery and infrastructure changes



# JOB ROLE

## NETWORK AND IT AUTOMATION ENGINEER

### Principal skills

- Automation
- Ci/CD
- Communication
- Configuration management
- DevOps
- Innovation
- Management
- Network automation
- Network engineering
- Network infrastructure
- Network monitoring
- Network security
- Networking hardware
- Operating systems
- Operations
- Planning
- Scalability
- Scripting
- Software development
- Test automation
- Troubleshooting
- Workflow management

### Impact of AI

Gen AI will significantly enhance the role of Network and IT Automation Engineers by helping in creating and optimizing automation scripts, improving security measures, and advancing CI/CD pipelines. AI-driven monitoring and predictive maintenance will boost network performance and reliability. AI Assistants and AI RAG-based systems are crucial, aiding engineers in decision-making and troubleshooting. Leveraging Gen AI to

automate routine tasks and initial development efforts will allow these engineers to focus more on complex problem-solving, strategic planning and innovation. Maintaining and developing a deep understanding of business use cases to ensure the successful application of automated solutions will be an area for workers in this role to focus on.

### Key insights

- Two-thirds of the skills are exposed to Gen AI, with the majority of them being augmented by AI tools
- In the long run, an additional small fraction of skills could be automated, but the high consequence of errors associated with this work will still necessitate direct human involvement in nearly a quarter of the skills. These could be augmented with advanced Gen AI
- Gen AI can help Network and IT Automation Engineers streamline processes and enhance efficiency, including summarizing data sheets and finding solutions that align with pre-defined requirements and generating stater code or component piece to reduced initial coding effort. If integrated in the appropriate systems, LLMs can help with path verification, test development and execution



# JOB ROLE

## NETWORK AND IT AUTOMATION ENGINEER

### Key insights

- Network and IT Automation Engineers will need to be equipped with strong prompt engineering skills to effectively interact with AI assistants as well as understand how Gen AI can be leveraged in generating scripts and code snippets for automation

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>• AI ethics and responsible AI</li> <li>• AI literacy</li> <li>• Prompt engineering</li> <li>• Retrieval augmented generation</li> </ul>	<ul style="list-style-type: none"> <li>• Automation</li> <li>• CI/CD</li> <li>• Configuration management</li> <li>• DevOps</li> <li>• Network automation</li> <li>• Network engineering</li> <li>• Network infrastructure</li> <li>• Network monitoring</li> <li>• Network security</li> <li>• Networking hardware</li> <li>• Scalability</li> <li>• Scripting</li> <li>• Software development</li> <li>• Troubleshooting</li> <li>• Workflow management</li> </ul>	<ul style="list-style-type: none"> <li>• Communication</li> <li>• Innovation</li> <li>• Management</li> <li>• Operating systems</li> <li>• Operations</li> <li>• Planning</li> </ul>	<ul style="list-style-type: none"> <li>• Test automation</li> </ul>

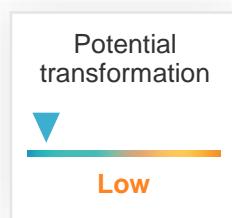


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# JOB ROLE

## NETWORK SUPPORT TECHNICIAN



### Job description

Network Support Technicians ensure the effective operation and security of computer networks by conducting regular updates, monitoring performance, and responding to alerts. They provide technical support and basic training to users, perform routine maintenance and repairs, and handle the installation and configuration of network hardware and software. Additionally, they contribute to document technical solutions, work within compliance and security standards, and generate reports to keep stakeholders informed about network status and issues.

### Principal tasks

- Conduct regular updates and patching of software and systems, checking for vulnerabilities to maintain security and functionality
- Utilize network monitoring tools to evaluate and analyze network performance and respond to network alerts
- Contribute to document technical solutions and troubleshooting procedures to resolve issues
- Install network software, including security or firewall software
- Provide technical support for computers and associated networks, including troubleshooting and resolving hardware, software, and network issues
- Provide direct support to users, including on-site and remote assistance
- Perform routine maintenance and standard repairs on network equipment such as routers, switches, modems, cables, and peripheral devices
- Install and configure hardware or software systems or components, ensuring integration with existing network systems
- Install or repair network cables, including fiber optic cables
- Contribute to create and update technical documentation for network installations or changes to existing installations
- Train users on basic procedures related to network applications software or related systems.
- Test repaired items to ensure proper operation
- Install and configure wireless networking equipment
- Generate reports on network status, incident management, and resolution outcomes to keep stakeholders informed
- Utilize ticketing systems to log, track, and manage issues. Review the trouble ticket queue to identify issues that need to be addressed and provide timely updates in the ticketing system of the work performed
- Create or revise user instructions, procedures, or manuals
- Monitor and manage compliance with relevant security standards, ensuring that network activities meet required security benchmarks



# JOB ROLE

## NETWORK SUPPORT TECHNICIAN

### Principal skills

- Communication
- Computer hardware
- Computer networks
- Customer service
- Detail oriented
- Help desk support
- Issue tracking
- Local area networks
- Management
- Network monitoring
- Network routing
- Network switches
- Networking hardware
- Operating systems
- Peripheral devices
- Technical support
- Wide area networks edge connectivity
- Writing

### Impact of AI

Gen AI has a limited impact on the skillsets of Network Support Technicians in the near term, as the role still involve many interactive and manual tasks. In the long run, AI technology maturity can significantly impact this role by automating away many manual and repetitive tasks. Currently, routine tasks like integration

could extend to test building, network monitoring, and security compliance. The job focus will shift from routine tasks to managing Gen AI technologies in the workflows, requiring technicians to develop AI literacy and prompt engineering skills to interact effectively with AI assistants.

### Key insights

- Currently about 1 out of 10 skills are likely to be impacted by Gen AI in the near term
- Due to the low barriers to adoption, about two out of three skills could be automated in the long run as Gen AI technologies advance. However, the interactive and manual nature of the role will still require direct human involvement in nearly one out of five skills
- Early use-cases of Gen AI include automating email responses to issues, issue

tracking, and generating documentation of issue resolution, among others

- Network Support Technicians will need to cultivate awareness of Gen AI technologies, as well as be equipped with strong prompt engineering skills to effectively interact with AI assistants

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# JOB ROLE

## NETWORK SUPPORT TECHNICIAN

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>• AI ethics and responsible AI</li> <li>• AI literacy</li> <li>• Critical thinking</li> <li>• Prompt engineering</li> </ul>	<ul style="list-style-type: none"> <li>• Customer service management</li> </ul>	<ul style="list-style-type: none"> <li>• Communication</li> <li>• Computer hardware</li> <li>• Computer networks</li> <li>• Detail oriented</li> <li>• Firewall</li> <li>• Help desk support</li> <li>• Local area networks</li> <li>• Network infrastructure</li> <li>• Network routing</li> <li>• Network support</li> <li>• Network switches</li> <li>• Networking hardware</li> <li>• Operating systems</li> <li>• Peripheral devices</li> <li>• Technical support</li> <li>• Wide area networks edge connectivity</li> </ul>	<ul style="list-style-type: none"> <li>• Issue tracking</li> <li>• Network monitoring</li> <li>• Writing</li> </ul>



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# JOB ROLE

## SENIOR NETWORK ENGINEER



### Job description

Senior Network Engineer designs, implements, and maintains optimal network infrastructures and are skilled in networking technologies, hardware, and software. Their tasks include configuring network equipment, troubleshooting, optimizing performance, and ensuring security. They work with virtual servers, cloud technologies, and emerging standards. They collaborate with teams, leads junior engineers, and stays updated on technological advancements and fosters a culture of innovation and automation.

### Principal tasks

- Collaborate with architects to design and implement efficient networks
- Build and maintain robust network infrastructure
- Manage alignment of network infrastructure with technical requirements
- Develop and verify disaster recovery plans
- Maintain network compliance with industry standards
- Review and implement updates and patches for network systems
- Delegate and oversee network maintenance tasks
- Provide technical advice on network equipment procurement
- Implement automation workflows for network issues
- Oversee development and maintenance of LAN/WAN and other services
- Evaluate new technologies for network enhancement
- Prepare and execute network test plans
- Implement network security measures
- Troubleshoot and resolve network technical problems
- Review and ensure compliance with information security policies
- Mentor junior engineers

### Principal skills

- |                        |                                  |                     |
|------------------------|----------------------------------|---------------------|
| • Automation           | • Network engineering            | • Problem solving   |
| • Communication        | • Network infrastructure         | • Python            |
| • Firewall             | • Network management             | • Routing protocols |
| • Innovation           | • Network monitoring             | • Sd-wan            |
| • Leadership           | • Network performance management | • Scripting         |
| • Management           | • Network quality of service     | • Troubleshooting   |
| • Network architecture | • Network security               |                     |
| • Network design       |                                  |                     |



# JOB ROLE

## SENIOR NETWORK ENGINEER

### Impact of AI

The role of Senior Network Engineers will increasingly incorporate AI-driven tools for network monitoring, troubleshooting, configuration management, and security. AI will automate routine tasks like anomaly detection, log analysis, and generating network configurations, shifting the focus to higher-level strategic roles. Skills in Gen AI, predictive data analytics (ML), and cybersecurity will become vital. Cloud technologies and virtualization will continue to be essential, enhanced by AI's optimization capabilities. AI-assisted configuration will progressively aid in creating

and maintaining network and security configurations. Senior Network Engineers must understand the capabilities and limitations of various AI models and balance automation benefits with accurate risk evaluation and management. Learning agility will be key to keeping up with rapid AI advancements. Knowledge in responsible AI use and governance is necessary to ensure secure AI deployment. Overall, the role will emphasize strategic thinking, ethical oversight, and innovative problem-solving while maintaining core networking expertise.

### Key insights

- **Network monitoring and alerting**  
(Transformation potential: High): AI-powered anomaly detection and predictive network analytics excel at continuously monitoring network traffic and identifying potential issues, often before they escalate into major problems
- **Configuration management**  
(Transformation potential: High): AI can automate the generation and validation of network configurations, reducing the potential for human error and saving significant time. However, human oversight is crucial for important decision-making and ensuring ethical and responsible AI use
- **Network security** (Transformation potential: High): AI can bolster network security by rapidly identifying threats, analyzing vulnerabilities, and even automating some aspects of incident response while keeping human oversight for nontrivial use-cases
- **Troubleshooting and incident response**  
(Transformation potential: Moderate): While AI can assist with log analysis and suggest solutions, human expertise is still crucial for

complex troubleshooting, especially when dealing with novel issues or system interactions not previously encountered

- **Network optimization** (Transformation potential: Moderate): AI can analyze network traffic patterns and suggest optimization strategies, but human judgment is needed to evaluate trade-offs and make informed decisions aligned with business goals
- **Research and development**  
(Transformation potential: Moderate): AI can assist in literature reviews and data analysis, but the creative process of exploring new technologies and developing innovative solutions remains largely a human endeavor
- **Team leadership and mentorship**  
(Transformation potential: Low): Human connection and guidance is necessary for effective team leadership and mentorship of junior engineers



# JOB ROLE

## SENIOR NETWORK ENGINEER

### Key insights

- Strategic network planning**

(Transformation potential: Low): AI can provide data-driven insights for capacity planning and forecasting, but the overall strategic vision for network architecture and evolution requires human expertise and understanding of business objectives

- Vendor management and communication**

(Transformation potential: Low): AI may assist with basic communication and data analysis, but the nuances of vendor relationships, negotiations require human interpersonal skills and understanding of business context

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>AI ethics and Responsible AI</li> <li>AI/ML for networking</li> <li>AI literacy</li> <li>Cloud-native security</li> <li>Data analysis</li> <li>Digital experience assurance</li> <li>ML training and inference workloads</li> <li>Network telemetry</li> <li>SASE (secure access service edge)</li> <li>Sustainability metrics</li> <li>Sustainability practices</li> </ul>	<ul style="list-style-type: none"> <li>Automation</li> <li>Network management</li> <li>Network monitoring</li> <li>Network performance management</li> <li>Network security</li> <li>Scripting</li> <li>Sd-wan</li> </ul>	<ul style="list-style-type: none"> <li>Network architecture</li> <li>Network engineering</li> <li>Network infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Firewall</li> <li>Network quality of service (QoS)</li> <li>Network troubleshooting</li> <li>Python</li> <li>Routing protocols</li> </ul>



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# JOB ROLE

## SYSTEMS ADMINISTRATOR



### Job description

A Systems Administrator (SysAdmin) manages and maintains an organization's IT infrastructure, including hardware, software, and networks. They ensure system efficiency, perform upgrades, provide technical support, manage security protocols, and resolve IT issues to keep operations running smoothly. Their role is crucial for stable and secure IT functionality.

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### Principal tasks

- Maintain and administer systems
- Performance monitoring and optimization
- User access and permissions management
- System troubleshooting
- Network and system security
- Security threat monitoring
- Data backup and disaster recovery
- Technical support
- Hardware and software management
- Automation of routine tasks
- Infrastructure change management
- Documentation maintenance and compliance
- Resource planning and capacity management
- Vendor and third-party coordination

### Principal skills

- Access management (Active directory, LDAP, IAM)
- Backup devices
- Cloud service (e.g., Microsoft Azure, AWS)
- Configuration management (Ansible, Terraform, Puppet, Chef)
- Cybersecurity
- Disaster recovery
- Local area networks (LANs)
- Managing Linux and Windows servers
- Operating systems (Linux, Windows 10; Unix)
- Scripting (Python, PowerShell, Bash)
- SQL
- System administration
- TCP/IP
- Technical support
- Virtualization

# JOB ROLE

## SYSTEMS ADMINISTRATOR

### Impact of AI

AI empowers Systems Administrators by automating routine tasks like log analysis and providing intelligent insights for faster problem resolution. However, human expertise remains essential for complex troubleshooting, critical decision-making in incidents, and innovative

solutions to unforeseen challenges. While AI enhances efficiency, it's the combination of human and AI capabilities that ensures the smooth operation and security of IT systems.

### Key insights

- Gen AI will significantly automate routine tasks like log analysis, script generation, and basic troubleshooting. This will free up Systems Administrators from mundane work and allow them to focus on more complex and strategic issues
- AI can analyze vast amounts of data and provide insights that help Systems Administrators make better decisions about

system configuration, capacity planning, and security

- The role of Systems Administrators will likely evolve into a more strategic and collaborative position, requiring a deeper understanding of business goals and the ability to leverage AI effectively to achieve them

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>AI model management</li> <li>Learning agility</li> </ul>	<ul style="list-style-type: none"> <li>Cloud services</li> <li>Configuration management</li> <li>Cyber security</li> <li>Scripting</li> </ul>	<ul style="list-style-type: none"> <li>Access management (AD, etc.)</li> <li>Disaster recovery</li> <li>Technical support</li> <li>Virtualization</li> </ul>	<ul style="list-style-type: none"> <li>Backup devices</li> <li>Local area networks (LANs)</li> <li>Managing Linux and windows servers</li> <li>Operating systems</li> <li>SQL</li> <li>TCP/IP</li> </ul>



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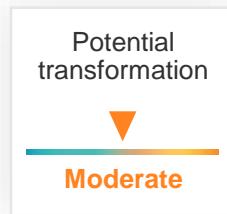


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# JOB ROLE

## SYSTEMS ANALYST



### Job description

Systems Analysts evaluate current IT systems to ensure they meet business and technical requirements, identifying areas for troubleshooting, upgrading, and maintenance. They design and deploy software solutions that enhance workflow and productivity, collaborating closely with developers and other IT workers. Systems Analysts ensure clear communication of system changes to workers and provide training and support to facilitate smooth adoption of new technologies.

### Principal tasks

- **System evaluation and improvement:** Analyzing existing IT systems and business models, identifying inefficiencies or needs, and developing solutions to enhance business processes and system functionality
- **Technology integration and deployment:** Designing, testing, and implementing new system solutions and overseeing the configuration and deployment of these solutions to ensure they meet business requirements
- **Ongoing system maintenance and support:** Managing routine system maintenance, providing ongoing support, and troubleshooting, and updating systems as necessary to adapt to changing business conditions and technology advancements

### Principal skills

- Active directory
- Business analysis
- Microsoft SQL server
- SharePoint
- Software development cycle
- Software documentation
- SQL
- Visio
- Windows server



# JOB ROLE

## SYSTEMS ANALYST

### Impact of AI

Gen AI may be able to help accomplish many of the tasks for which this role is responsible, leaving more time for people in this role to focus on higher value-added complementary

### Key insights

In thinking about professional development and upskilling plans, people currently in this role might consider how to use Gen AI to dramatically reduce time spent troubleshooting, how to leverage Gen AI to increase productivity

skills. Specifically for Systems Analysts, this may involve leveraging Gen AI to draft documentation and accelerate troubleshooting processes.

working with SQL, and how to spend more time specializing with specific types of data systems (e.g., healthcare data, etc.).

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>Automated generation of software documentation</li> <li>Prompt engineering</li> </ul>	<ul style="list-style-type: none"> <li>Agile Methodologies</li> <li>SQL</li> </ul>	<ul style="list-style-type: none"> <li>Industry specific IT system needs</li> <li>Systems analysis</li> </ul>	<ul style="list-style-type: none"> <li>Documentation maintenance</li> <li>Troubleshooting</li> </ul>



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# SOFTWARE DEVELOPMENT

The Transformational Opportunity of AI on ICT Jobs



# JOB ROLE

## AI ML ENGINEER



### Job description

AI/ML Engineers analyze large datasets using statistical software, apply ML techniques to predict outcomes, and propose data-driven solutions to business problems. The role includes tasks such as cleaning and manipulating data, comparing models, creating visualizations to convey results, and presenting findings to stakeholders. Additionally, the role involves developing, deploying, and optimizing ML models, staying updated on advancements in the field

### Principal tasks

- Analyze, manipulate, or process large sets of data using statistical software
- Apply feature selection algorithms to models predicting outcomes of interest, such as sales, attrition, and healthcare use
- Clean and manipulate raw data using statistical software
- Compare models using statistical performance metrics, such as loss functions or proportion of explained variance
- Create graphs, charts, or other visualizations to convey the results of data analysis using specialized software
- Deliver oral or written presentations of the results of mathematical modeling and data analysis to management or other end users
- Identify business problems or management objectives that can be addressed through data analysis
- Identify relationships and trends or any factors that could affect the results of research
- Identify solutions to business problems, such as budgeting, staffing, and marketing decisions, using the results of data analysis
- Propose solutions in engineering, science, and other fields using mathematical theories and techniques
- Read scientific articles, conference papers, or other sources of research to identify emerging analytic trends and technologies
- Recommend data-driven solutions to key stakeholders
- Test, validate, and reformulate models to ensure accurate prediction of outcomes of interest
- Write new functions or applications in programming languages to conduct analyses
- Deploy and maintain ML models in production environments
- Optimize and fine-tune ML models for performance
- Implement and manage version control for ML models
- Collaborate with software engineers and IT teams for seamless integration of ML solutions
- Stay updated on advancements in ML frameworks, libraries, and tools
- Conduct feasibility studies for the implementation of new ML technologies



# JOB ROLE

## AI ML ENGINEER

### Principal skills

- Algorithms
- Artificial intelligence
- Big data
- C++
- Collaboration
- Communication
- Data analysis
- Data engineering
- Data pipelines
- Data science
- Data visualization
- Feature selection
- Hyperparameter optimization
- Innovation
- Java
- Machine learning
- Management
- Mathematics
- Operations
- Presentations
- Problem solving
- Python
- R
- Research information
- Software engineering
- SQL
- Statistics
- Version control
- Workflow management
- Writing

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### Impact of AI

The impact of Gen AI on the skillsets of AI/ML Engineers is significant. Gen AI will play a key role in code-writing assistance, experiment and research result summarization, report writing, and creating frameworks for feasibility studies. However, AI/ML Engineers will still need to validate and implement Gen AI's code output, highlighting the importance of maintaining a deep technical understanding. AI/ML Engineers

will need to adapt to a future where Gen AI plays a significant role in code-writing and task automation. This requires a shift in focus towards higher-level problem-solving, prompt engineering, and a deep understanding of LLM architecture to build AI tools or leverage them effectively while maintaining the integrity and quality of their work.

### Key insights

- Approximately two-thirds of the skills will be impacted by Gen AI, with around half potentially becoming less relevant due to the possibility of automation
- In the long run, another small fraction of skills may be automated, but a significant portion will still require a deep understanding of the business context, necessitating direct human involvement. These skills can be further enhanced with advanced Gen AI
- AI/ML Engineers will need a deep, technical understanding of LLM architecture as they will be part of the teams building these models in the future
- AI/ML Engineers will need to be wary of risks of skill erosion, while Gen AI will be able to write code for them, they will still need to be able to validate and appropriately implement Gen AI's code output

# JOB ROLE

## AI ML ENGINEER

### Key insights

- Gen AI can provide significant help with code-writing assistance, especially for tasks like implementing algorithms and models. Other use cases include summarizing experiment and research results, writing

reports, creating framework for feasibility studies, providing initial ideas on potential approaches to problems

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### Skills impacted by AI

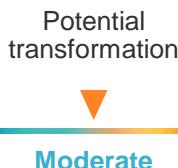
New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>LLM architecture and frameworks</li> <li>Prompt engineering</li> </ul>	<ul style="list-style-type: none"> <li>Data analysis</li> <li>Operations</li> <li>Software engineering</li> <li>Workflow management</li> </ul>	<ul style="list-style-type: none"> <li>Artificial intelligence</li> <li>Collaboration</li> <li>Communication</li> <li>Data pipelines</li> <li>Innovation</li> <li>Management objectives</li> <li>Mathematics</li> <li>Presentations,</li> <li>Problem solving</li> <li>Writing</li> </ul>	<ul style="list-style-type: none"> <li>Big data</li> <li>C++</li> <li>Data engineering</li> <li>Data science</li> <li>Data visualization</li> <li>Feature selection</li> <li>Hyperparameter optimization</li> <li>Java, machine learning</li> <li>Python</li> <li>R</li> <li>Research information</li> <li>SQL</li> <li>Statistics</li> <li>Version control</li> </ul>



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# JOB ROLE

## APPLICATION DEVELOPER



### Job description

Application developers are responsible for designing, coding, and testing software applications for various platforms such as mobile, web, or desktop. They collaborate with other team members to ensure the functionality and usability of the applications meet the requirements and deliver a seamless user experience.

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### Principal tasks

- **Agile methodology:** Employing agile methodologies such as scrum or kanban to manage the software development lifecycle and improve development processes
- **Communication:** Effectively communicating project status, proposals, and technical issues to team members and stakeholders in a clear and understandable manner
- **Documentation maintenance:** Creating and maintaining system and user documentation, ensuring that documentation is updated with each software or system change
- **Interpersonal collaboration:** Working with other developers, IT staff, and external stakeholders to ensure successful project outcomes while facilitating effective team collaboration
- **Project management:** Managing timelines, resources, and stakeholder expectations for application development projects while ensuring that deadlines and budget constraints are met
- **Software architecture design:** Designing and implementing robust software architecture to support enterprise or client-specific applications
- **Software development:** Writing, modifying, and debugging software for client applications using source debuggers and visual development environments to develop software baselines
- **System integration:** Integrating various software components and systems to work together seamlessly, ensuring system interoperability and functionality
- **Technical knowledge application:** Applying deep technical knowledge of programming languages, frameworks, and development tools to solve complex development challenges
- **Testing and troubleshooting:** Testing software to identify and resolve issues, bugs, and integration challenges, and enhancing application performance based on testing results

### Principal skills

- |   |   |   |
|---|---|---|
| <ul style="list-style-type: none"> <li>• Agile methodology</li> <li>• Communication</li> <li>• Demonstrating responsibility</li> <li>• Development design</li> <li>• Documentation maintenance</li> </ul> | <ul style="list-style-type: none"> <li>• Integration software</li> <li>• Interpersonal collaboration</li> <li>• Java</li> <li>• Problem solving</li> <li>• Project team management</li> <li>• Software development</li> </ul> | <ul style="list-style-type: none"> <li>• Software product management</li> <li>• System architecture</li> <li>• Testing</li> <li>• Time management</li> <li>• Web development</li> </ul> |
|---|---|---|

# JOB ROLE

## APPLICATION DEVELOPER

### Impact of AI

AI impact on the Application Developer role might be moderate to high. While skills like testing and project team management remain less affected, AI can significantly automate documentation and assist with system architecture. Application Developers should

focus on upskilling in areas like development design and software product management, where AI can complement their work. Key technical skills like integration software, software development, Java, and JavaScript are highly susceptible to AI automation.

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### Key insights

- Impact on number of hours:** Gen AI can potentially automate a significant portion of an Application Developer's tasks, particularly in areas like documentation and software development
- New skills:** Application Developers will need to develop skills in AI-related technologies such as TensorFlow, image signal processing, Azure Cognitive Services, AI model development, machine vision, and AI integration to stay competitive
- Skills in demand:** Despite AI's growing role, the importance of soft skills such as demonstrating responsibility, communication, and interpersonal collaboration will remain high, as these are crucial for effective teamwork and project management

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI integration</li> <li>AI literacy</li> <li>AI model development</li> <li>Azure cognitive services</li> <li>Image signal processing</li> <li>Machine vision</li> <li>TensorFlow</li> </ul>	<ul style="list-style-type: none"> <li>Agile methodology</li> <li>Development design</li> <li>Problem solving</li> <li>Project team management</li> <li>Software product management</li> <li>System architecture</li> <li>Web development</li> </ul>	<ul style="list-style-type: none"> <li>Communication</li> <li>Demonstrating responsibility</li> <li>Interpersonal collaboration</li> <li>Testing</li> <li>Time management</li> </ul>	<ul style="list-style-type: none"> <li>Documentation maintenance</li> <li>Integration software</li> <li>Java</li> <li>Software development</li> </ul>



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# JOB ROLE

## BACK END DEVELOPER



### Job description

Back End Developers develop and maintain server-side logic and database structures. They collaborate with front-end developers to integrate user-facing elements with server-side logic and ensure high performance and responsiveness of back-end services and databases.

### Principal tasks

- **Development and maintenance:** Creating and maintaining the core application logic, databases, and server-side processes that power a website or application's functionality.
- **Integration services:** Developing APIs and integration services to ensure that different systems and applications can communicate effectively, supporting front-end applications and other system integrations.
- **Performance optimization:** Optimizing the website or application for speed and efficiency, ensuring high performance and scalability of the database and backend systems.

### Principal skills

- |                   |           |              |
|-------------------|-----------|--------------|
| • AWS             | • MongoDB | • PostgreSQL |
| • Docker Products | • MySQL   | • Python     |
| • Git             | • Node.js | • React.js   |

### Impact of AI

Gen AI may be able to help accomplish many of the tasks for which this role is responsible, leaving more time for people in this role to focus on higher value-added complementary skills. Specifically for Back End Developers,

this may mean using Gen AI to accelerate coding and troubleshooting, particularly with tools like Python.

# JOB ROLE

## BACK END DEVELOPER

### Key insights

In thinking about professional development and upskilling plans, people currently in this role might consider how to use Gen AI to dramatically reduce time spent working with Python, how to leverage Gen AI to increase

productivity working with object-oriented programming, and how to spend more time working on microservices.



### Skills impacted by AI

#### New

- AI ethics and responsible AI
- AI literacy
- Prompt engineering
- Python with Gen AI

#### Increasing relevance

- Object oriented programming

#### Stable

- Microservices

#### Decreasing relevance

- Python



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# JOB ROLE

## CLOUD ENGINEER



### Job description

Cloud Engineers are responsible for cloud infrastructure design and management, automation & optimization, and security & compliance. They design, implement, and manage cloud infrastructure solutions using platforms such as AWS, Azure, or Google Cloud, including setting up virtual networks, storage solutions, and computing resources. They develop and maintain automation scripts and tools to streamline cloud operations, improve system performance, and ensure efficient resource utilization, implementing Infrastructure as Code (IaC) practices using tools like terraform or cloud formation. They also ensure cloud environments adhere to security best practices and compliance standards by monitoring for vulnerabilities, implementing encryption protocols, and managing identity and access management (IAM) policies.

### Principal tasks

- **Automating cloud infrastructure:** Creating and managing automation scripts and tools, such as Terraform or Ansible, to automate the deployment, scaling, and management of cloud infrastructure, ensuring efficient and consistent operations
- **Deploying and configuring cloud resources:** Setting up and configuring virtual servers, storage systems, databases, and networking components on cloud platforms like Azure, AWS, or Google Cloud to support business applications and services
- **Monitoring and optimizing cloud performance:** Monitoring cloud infrastructure for performance issues, security threats, and cost inefficiencies, implementing optimization strategies and troubleshooting problems to maintain optimal system performance and security

### Principal skills

- |           |                 |                   |
|-----------|-----------------|-------------------|
| • Ansible | • Cloud compute | • Microsoft Azure |
| • AWS     | • Kubernetes    | • Powershell      |
| • Bash    | • Linux         | • Terraform       |

# JOB ROLE

## CLOUD ENGINEER

### Impact of AI

As Gen AI is adopted more broadly, these jobs will undergo reskilling, possibly leading to more innovation. Specifically for Cloud Engineers,

this may mean understanding how to use Gen AI to increase productivity when generating automation scripts.

### Key insights

In thinking about professional development and upskilling plans, people currently in this role might consider how to use Gen AI to dramatically reduce time spent working with tools like Terraform, how to leverage Gen AI to

increase productivity working with tools like Kubernetes, and how to spend more time working with cloud infrastructure design and development.



### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>Automated generation and troubleshooting of Terraform scripts</li> <li>Prompt engineering</li> </ul>	<ul style="list-style-type: none"> <li>Docker</li> <li>Kubernetes</li> </ul>	<ul style="list-style-type: none"> <li>Cloud infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>Jenkins</li> <li>Terraform</li> </ul>



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# JOB ROLE

## FRONT END DEVELOPER



### Job description

Front End Developers develop and implement user interfaces for websites and web applications using technologies such as HTML, CSS, and JavaScript to create engaging and functional user experiences. They collaborate with back-end developers and web designers to integrate designs, ensure responsive performance across devices, and optimize applications for speed and scalability and maintain up-to-date knowledge of industry trends and technologies, ensuring the continuous improvement of the user interface and staying current with best practices in web development.

### Principal tasks

- **Design and user experience:** Creating visually appealing and user-focused designs and ensuring that the website or application interfaces are intuitive and engaging for users
- **Development and feature implementation:** Building and integrating personalized and customized features into applications, translating design wireframes into functional web components using HTML, CSS, and JavaScript
- **Optimization and maintenance:** Maintaining an up-to-date knowledge of the latest web technologies and industry trends and optimizing applications for maximum speed and scalability, ensuring all code is up to the standards for quality and efficiency technical knowledge

### Principal skills

- CSS
- Git
- HTML5
- JavaScript
- jQuery
- Node.js
- React.js
- SASS
- TypeScript

# JOB ROLE

## FRONT END DEVELOPER

### Impact of AI

Gen AI may be able to help accomplish many of the tasks for which this role is responsible, leaving more time for people in this role to focus on higher value-added complementary

skills. Specifically for Front End Developers, this may involve automating simpler scripts and predicting user-friendly customizations and their underlying code.

### Key insights

In thinking about professional development and upskilling plans, people currently in this role might consider how to use Gen AI to dramatically reduce time spent working with CSS, how to leverage Gen AI to increase

productivity working with JavaScript, and how to spend more time working with user interface design.

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### Skills impacted by AI

#### New

- AI ethics and responsible AI
- AI literacy
- Codex
- Prompt engineering

#### Increasing relevance

- JavaScript
- React.js

#### Stable

- User experience
- User interface design

#### Decreasing relevance

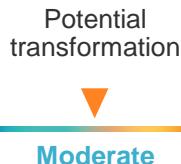
- CSS
- HTML



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# JOB ROLE

## FULL STACK DEVELOPER



### Job description

Full Stack Developers develop and maintain both front-end and back-end components of web applications, ensuring seamless integration and functionality. They collaborate with cross-functional teams to design, implement, and optimize scalable and efficient software solutions. They stay updated with the latest industry trends and technologies to continuously improve and innovate on existing systems and processes.



### Principal tasks

- Code quality and system performance:** Maintaining high standards in code quality and system architecture, ensuring that applications perform reliably and efficiently, managing both the upkeep of existing systems and the introduction of new technologies
- Project management:** Handling end-to-end project ownership and building scalable and distributed solutions that address both front-end and back-end needs, ensuring the software delivers a positive user experience and supports business growth
- Feature development and infrastructure enhancement:** Developing new features and enhancing infrastructure to meet rapidly changing business and project requirements, not only through coding but also planning and conceptualizing new projects before actual deployment

### Principal skills

- |              |              |
|--------------|--------------|
| • Angular    | • MongoDB    |
| • CSS        | • Node.js    |
| • Git        | • React.js   |
| • HTML5      | • TypeScript |
| • JavaScript |              |

# JOB ROLE

## FULL STACK DEVELOPER

### Impact of AI

Gen AI may be able to help accomplish many of the tasks for which this role is responsible, leaving more time for people in this role to focus on higher value-added complementary skills.

Specifically for Full Stack Developers, this may involve automating simpler scripts and enhancing skills related full project management and strategic feature design.

### Key insights

In thinking about professional development and upskilling plans, people currently in this role might consider how to use Gen AI to dramatically reduce time spent working with

CSS, how to leverage Gen AI to increase productivity working with JavaScript, and how to spend more time working on microservices.

### Skills impacted by AI

#### New

- AI ethics and responsible AI
- AI literacy
- Codex
- Prompt engineering

#### Increasing relevance

- JavaScript
- React.JS

#### Stable

- Microservices

#### Decreasing relevance

- CSS
- HTML



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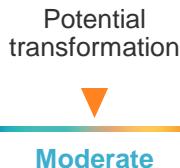


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# JOB ROLE

## JAVA DEVELOPER



### Job description

A Java developer is a software engineer specializing in developing applications using the Java programming language. They are responsible for designing, coding, and testing software solutions, as well as troubleshooting and maintaining existing Java-based applications.

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### Principal tasks

- **Agile methodology:** Implement and follow agile practices such as scrum to manage projects and improve development efficiency
- **Continuous integration and continuous delivery (CI/CD):** Set up and manage CI/CD pipelines to automate testing and deployment processes
- **Documentation maintenance:** Create and maintain software documentation to ensure that all processes and code are clearly documented
- **Interpersonal collaboration:** Work collaboratively with other team members, including cross-functional collaboration to achieve project goals
- **Java programming:** Write and optimize Java code by utilizing advanced features such as Java Enums, the Java Stream API, and the Java Files API
- **Problem solving:** Address and resolve complex software issues and bugs, employing strong analytical and problem-solving skills
- **Software design patterns:** Apply design patterns and architectural principles to develop maintainable and scalable software
- **Software development:** Design, code, and debug applications in various software languages including Java
- **System integration:** Integrate software components into a fully functional software system
- **Testing:** Conduct software testing to ensure quality and identify defects, including development testing and unit testing

### Principal skills

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li>• Adaptability</li> <li>• Agile methodology</li> <li>• Communication</li> <li>• Creativity</li> <li>• Demonstrating responsibility</li> <li>• Development design</li> </ul> | <ul style="list-style-type: none"> <li>• Engineering software</li> <li>• Enterprise software</li> <li>• Interpersonal collaboration</li> <li>• Java</li> <li>• Leadership demonstration</li> <li>• Problem-solving</li> <li>• Software development</li> </ul> | <ul style="list-style-type: none"> <li>• Software integration</li> <li>• Software product management</li> <li>• System architecture</li> <li>• Testing</li> <li>• Web development</li> </ul> |
|--|---|--|

# JOB ROLE

## JAVA DEVELOPER

### Impact of AI

AI impact on the Java Developer role might be moderate to high. While skills like testing and engineering software are less affected, AI can significantly automate software development, integration, and assist with system architecture. Java Developers should focus on

upskilling in areas like software product management and development design, where AI can complement their work. Key technical skills like Java and web development are highly susceptible to AI automation.

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### Key insights

- Impact on number of hours:** Gen AI can significantly automate tasks related to Java programming, software integration, and development
- New skills:** Java developers will need to acquire skills in computer vision, natural language processing, TensorFlow, image signal processing, AI model development, cloud AI, prompt engineering, and AI optimization to stay competitive
- Skills in demand:** Soft skills such as demonstrating responsibility, problem solving, and communication will remain essential for Java Developers, as they often collaborate with cross-functional teams

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>AI model development</li> <li>AI optimization</li> <li>Cloud AI</li> <li>Computer vision</li> <li>Image signal processing</li> <li>Natural language processing</li> <li>Prompt engineering</li> <li>TensorFlow</li> </ul>	<ul style="list-style-type: none"> <li>Agile methodology</li> <li>Development design</li> <li>Engineering software</li> <li>Enterprise software</li> <li>Problem-solving</li> <li>Software product management</li> <li>System architecture</li> <li>Web development</li> </ul>	<ul style="list-style-type: none"> <li>Adaptability</li> <li>Communication</li> <li>Creativity</li> <li>Demonstrating responsibility</li> <li>Interpersonal collaboration</li> <li>Leadership demonstration</li> <li>Testing</li> </ul>	<ul style="list-style-type: none"> <li>Java</li> <li>Software development</li> <li>Software integration</li> </ul>



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# JOB ROLE

## PRINCIPAL SOFTWARE ENGINEER



### Job description

A Principal Software Engineer leads the design, development, and deployment of complex software systems, ensuring high performance and scalability. Responsibilities include setting technical direction, mentoring engineers, and collaborating with stakeholders on strategic projects. Expertise in system architecture, coding, and leadership skills are essential.



### Principal tasks

- Lead software development efforts and mentor team members in best practices and techniques
- Apply agile methodologies to software development processes for iterative and adaptive delivery
- Utilize XML for data representation and configuration in software applications
- Design and develop distributed systems to handle large-scale data processing and analysis
- Develop Perl scripts for automation and system administration tasks in Unix/Linux environments
- Design and implement object-oriented software solutions for complex business requirements
- Develop software for embedded systems and IoT devices, optimizing for performance and reliability
- Design and develop web applications using modern frameworks like Spring
- Implement multithreading and concurrency mechanisms to improve application performance
- Develop and execute test automation scripts to ensure software quality and reliability

### Principal skills

- |                       |                             |                       |
|-----------------------|-----------------------------|-----------------------|
| • Agile methodologies | • Object oriented design    | • System architecture |
| • C++                 | • Perl                      | • Test automation     |
| • Debugging           | • Shell scripting           | • Tomcat              |
| • Device drivers      | • SOA                       | • Web applications    |
| • Distributed systems | • Software design platforms | • Web services        |
| • Embedded systems    | • Software development      | • XML                 |
| • Multithreading      | • Spring framework          |                       |

### Impact of AI

AI impact on the role might be moderate. Engineers will focus on upskilling in areas like advanced system architecture, strategic project leadership, and AI integration strategies. While

AI can automate routine coding and optimize workflows, the human elements of creativity, mentorship, and complex decision-making remain essential.

# JOB ROLE

## PRINCIPAL SOFTWARE ENGINEER

### Key insights

- Principal Software Engineer role involves advanced technical leadership, system architecture, and strategic decision-making tasks requiring human judgment, creativity, and interaction
- **System architecture:** AI can provide insights and optimizations but cannot fully grasp and design complex systems
- **Strategic project leadership:** AI can assist in tracking and optimizing project workflows but cannot handle all aspects of project leadership and strategic decision-making (moderate impact)
- **Mentoring:** AI can offer learning resources but cannot provide personalized guidance and support to team members (low impact)
- **Technical innovation:** AI can suggest improvements based on data but lacks the creativity required for groundbreaking innovation (low impact)
- **Advanced coding:** AI can assist with code generation and optimization but cannot replace the deep understanding and problem-solving abilities of a human engineer (moderate impact)
- **Performance optimization:** AI can help identify performance bottlenecks and suggest optimizations but requires human expertise for complex tuning (moderate impact)
- **Security:** AI can aid in detecting vulnerabilities and ensuring system security but requires human oversight for comprehensive protection (moderate impact)
- **Cross-functional collaboration:** AI can facilitate communication but cannot replace human collaboration and relationship-building (low impact)
- **Troubleshooting:** AI can identify and resolve common issues but may not fully understand complex problems or provide innovative solutions (moderate impact)
- Overall, AI can augment many aspects of the principal software engineer role but cannot fully replace the essential human elements of creativity, mentorship, strategic thinking, and complex decision-making

### Skills impacted by AI

#### New

- **AI-driven system design:** Leveraging AI tools to enhance system architecture and design
- **AI ethics and responsible AI:** Understanding and ensuring the ethical use of AI in software development
- **AI literacy**
- **AI-powered security measures:** Developing and implementing ai-based security solutions



# JOB ROLE

## PRINCIPAL SOFTWARE ENGINEER

### Skills impacted by AI

#### Increasing relevance

- **Agile methodologies:** AI can help adapt workflows and improve team productivity, but human leadership remains essential
- **C++:** AI can provide code suggestions and optimizations but lacks the creativity and problem-solving abilities of a human engineer
- **Debugging:** AI can identify issues and suggest fixes, but human expertise is required for complex problem-solving
- **Distributed systems:** AI can optimize data distribution and processing but requires human insight for complex system design
- **Embedded systems:** AI can assist in optimization and testing, but complex designs require human expertise
- **Multithreading:** AI can help optimize multithreading processes but requires human expertise for complex implementations
- **Object oriented design:** AI can generate code templates and suggest patterns, but human insight is crucial for effective design
- **Service-Oriented Architecture (SOA):** AI can help with integration and optimization but needs human oversight for complex implementations
- **Software design patterns:** AI can suggest patterns but can't replace human creativity in applying them effectively
- **Software development:** AI can assist with code suggestions and optimizations but cannot replace advanced problem-solving and creativity
- **Spring framework:** AI can help with configuration and code generation but needs human insight for complex integrations
- **System architecture:** AI tools can provide insights for architectural decisions, but complex designs need human expertise
- **Test automation:** AI can significantly enhance testing efficiency and coverage, automating many repetitive tasks
- **Web applications:** AI can help with development and optimization but needs human creativity for user experience design
- **Web services:** AI can automate testing and integration, enhancing efficiency but still needs human oversight for design

#### Stable

- **Device drivers:** AI can assist but development and troubleshooting of low-level hardware-software interactions are complex requiring deep human expertise
- **Embedded systems:** while AI can optimize certain tasks, the development of embedded systems often requires human expertise for hardware-software integration skills

# JOB ROLE

## PRINCIPAL SOFTWARE ENGINEER

### Skills impacted by AI

#### Decreasing relevance

- **Perl:** AI can automate scripting tasks, decreasing the reliance on manual Perl scripting
- **Shell scripting:** AI can generate and optimize scripts, reducing the need for manual scripting
- **TOMCAT:** AI can assist in deployment and performance tuning, reducing the need for manual configurations
- **XML:** AI can automate data parsing and generation, reducing the need for manual XML handling



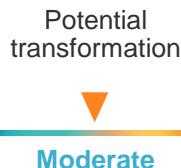
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# JOB ROLE

## PYTHON DEVELOPER



### Job description

Python Developers analyze requirements and design system installations or modifications using Python, ensuring feasibility within time and cost constraints. They collaborate with stakeholders to gather information and coordinate project activities. Additionally, they develop, modify, and test software systems and stay updated on advancements in Python and related technologies.

### Principal tasks

- Analyze requirements to recommend and plan the installation or modification of systems, leveraging Python for efficient and effective solutions
- Analyze user needs and software requirements to determine feasibility of design within time and cost constraints
- Confer with data processing or project managers to obtain information on limitations or capabilities for data processing projects
- Confer with systems analysts, engineers, programmers and others to design systems and to obtain information on project limitations and capabilities, performance requirements and interfaces
- Consult with customers and departments on project status, proposals, and technical issues, focusing on Python-based software system design and maintenance
- Coordinate the installation of Python-based software systems
- Design, develop and modify software systems using Python, leveraging scientific analysis and mathematical models to predict and measure outcomes and consequences of design
- Determine system performance standards
- Develop or direct Python-based software testing or validation procedures, programming, or documentation
- Modify existing software to correct errors, adapt it to new hardware, or upgrade interfaces and improve performance
- Obtain and evaluate information on factors such as reporting formats required, costs, or security needs to determine hardware configuration
- Prepare reports or correspondence related to Python project specifications, activities, or status
- Store, retrieve, and manipulate data for analysis of system capabilities and requirements.
- Supervise and assign work to programmers, designers, technologists, technicians, or other engineering or scientific personnel
- Stay updated on the latest developments in Python and related technologies, incorporating new features and improvements into projects



# JOB ROLE

## PYTHON DEVELOPER

### Principal skills

- Big data
- Business requirements
- Collaboration
- Communication
- Configuration management
- Data engineering
- Debugging
- Machine learning
- Management
- Planning
- Problem solving
- Python
- Research information
- Software engineering
- SQL
- Test automation
- Unit testing
- Writing

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### Impact of AI

Gen AI is set to significantly transform the skillsets required for Python Developers. In the near term, 61% of their skills will be impacted, with 22% of these skills being augmented to boost efficiency and 39% of skills that heavily relate to coding could be at risk of displacement. As such, developers will transition from a primary focus on writing code

to understanding and addressing business problems, use cases, and success measures. They will play a critical role in integrating Gen AI solutions into business processes, requiring them to have a comprehensive understanding of both technical and business aspects.

### Key insights

- More than half of the skills will likely be impacted by Gen AI in the near term, with about one-fifth of them being augmented to boost efficiency
- In the long run, about one-sixth of skills could be automated, while nearly a quarter will still require direct human involvement, even with advanced Gen AI
- Python Developers will need effective prompt engineering skills as well as a deep, technical understanding of LLM architecture

as these workers will be responsible for designing, developing, and maintaining Gen AI applications, building core software, automating tasks that will leverage Gen AI, and creating intelligent AI agents

- Rather than simply focusing on writing code, Python Developers will now need to understand the core business problems, use cases and success measures as they develop software to address these items

# JOB ROLE

## PYTHON DEVELOPER

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>• AI ethics and responsible AI</li> <li>• AI literacy</li> <li>• Prompt engineering</li> <li>• LLM architecture and frameworks</li> </ul>	<ul style="list-style-type: none"> <li>• Debugging</li> <li>• Machine learning,</li> <li>• Test automation</li> <li>• Unit testing</li> </ul>	<ul style="list-style-type: none"> <li>• Business requirements</li> <li>• Collaboration</li> <li>• Communication</li> <li>• Configuration management</li> <li>• Management</li> <li>• Planning</li> <li>• Problem solving</li> </ul>	<ul style="list-style-type: none"> <li>• Big data</li> <li>• Data engineering</li> <li>• Python, Research information</li> <li>• Software engineering</li> <li>• SQL</li> <li>• Writing</li> </ul>



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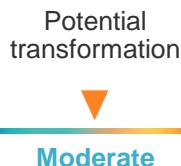
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JOB FAMILY GROUP: SOFTWARE DEVELOPMENT

# JOB ROLE

## SENIOR SOFTWARE DEVELOPMENT ENGINEER



### Job description

A Senior Software Development Engineer designs, develops, and maintains high-performance software systems, ensuring scalability and reliability. Responsibilities include advanced coding, system architecture, mentoring team members, and leading technical projects. Expertise in software engineering principles, problem-solving, and leadership skills are essential.



### Principal tasks

- Utilize SQL for database querying and manipulation in software development projects
- Apply agile methodologies to software development processes to enhance collaboration and flexibility
- Use XML for data representation and configuration in software applications
- Develop web services to enable communication between disparate systems and applications
- Participate in scrum meetings and ceremonies to ensure project alignment and progress tracking
- Implement Perl scripts for automation and system administration tasks
- Gather and analyze requirements from stakeholders to inform software design and development
- Manage software project lifecycles to ensure timely delivery and quality of deliverables
- Write shell scripts to automate system tasks and operations in Unix/Linux environments
- Utilize Hadoop for distributed storage and processing of large datasets in big data applications

### Principal skills

- |                       |                                   |                               |
|-----------------------|-----------------------------------|-------------------------------|
| • Agile methodologies | • Object oriented design          | • Software project management |
| • C++                 | • Perl                            | • SQL                         |
| • Git                 | • Python                          | • Test automation             |
| • Hadoop              | • Requirements analysis           | • WCF                         |
| • Java                | • Scrum                           | • Web services                |
| • Linux               | • Shell scripting                 | • XML                         |
| • Multithreading      | • Software development life cycle |                               |

# JOB ROLE

## SENIOR SOFTWARE DEVELOPMENT ENGINEER

### Impact of AI

AI impact on the Senior Software Development Engineer role might be moderate. Senior Software Development Engineers might focus on upskilling skills like advanced system architecture and

leadership. While skills in coding and troubleshooting remain relevant, their demand for manual tasks will decline due to AI-assisted automation and optimization.



### Key insights

- The Senior Software Development Engineer role involves advanced technical, analytical, and mentoring tasks requiring human judgment, creativity, and interaction
- Advanced coding:** AI can assist with code suggestions and optimizations but lacks the creativity and problem-solving abilities of a human engineer (moderate impact)
- System architecture:** AI can provide data-driven insights for architecture but cannot fully grasp complex system designs (moderate impact)
- Mentoring:** AI can provide learning resources but cannot offer personalized guidance and support (low impact)
- Technical project leadership:** AI can assist in tracking and optimizing workflows but cannot handle all aspects of project leadership (moderate impact)
- Scalability and reliability:** AI can provide insights and automation but requires human expertise for complex optimizations (moderate impact)
- Troubleshooting:** AI can identify issues but may not fully understand complex problems or provide innovative solutions (moderate impact)
- Security:** AI can assist with vulnerability detection but cannot fully ensure security without human oversight (moderate impact)
- Research and innovation:** AI can suggest solutions based on data but lacks the creativity for groundbreaking innovation (low impact)
- Overall, AI can augment many aspects of the senior software development engineer role but cannot fully replace the essential human elements of creativity, mentorship, and complex problem-solving

### Skills impacted by AI

#### New

- AI-driven system design:** Leveraging AI tools to enhance system architecture and design
- AI ethics and responsible AI:** Understanding and ensuring the ethical use of AI in software development
- AI literacy**
- AI-powered security measures:** Developing and implementing ai-based security solutions

# JOB ROLE

## SENIOR SOFTWARE DEVELOPMENT ENGINEER

### Skills impacted by AI

#### Increasing relevance

- **Agile methodologies:** AI can help adapt workflows and improve team productivity, but human leadership is essential
- **C++:** AI can provide code suggestions and optimizations but lacks the creativity and problem-solving abilities of a human engineer
- **Git:** AI can optimize version control management but requires human input for decision-making
- **Hadoop:** AI can optimize data processing tasks but still requires human expertise for architecture and complex queries
- **Java:** AI can assist in optimizing and generating code snippets but can't replace advanced programming skills
- **Linux:** AI can automate many system administration tasks, but human expertise is still needed for complex configurations and troubleshooting
- **Multithreading:** AI can help optimize multithreading processes but requires human expertise for complex implementations
- **Object oriented design:** AI can generate code templates and suggest patterns, but human insight is crucial for effective design
- **Python:** AI can help with code generation and optimization, enhancing programming efficiency
- **Requirements analysis:** AI can aid in gathering and analyzing requirements, but human judgment is needed for nuanced understanding
- **Scrum:** AI tools can assist in tracking and optimizing workflows, enhancing scrum practices
- **Shell scripting:** AI can automate script generation and optimization but can't fully replace human problem-solving
- **Software development life cycle:** AI can streamline various stages of the development lifecycle but needs human oversight for complex decisions
- **Software project management:** AI can assist in tracking progress and resource allocation, but human leadership and decision-making remain essential
- **SQL:** AI can assist with query optimization and data management but still requires human insight for complex queries and data architecture
- **Test automation:** AI can significantly enhance testing efficiency and coverage, but human oversight is needed for comprehensive test scenarios
- **Web services:** AI can automate integration and testing, enhancing efficiency but still needs human oversight for design



# JOB ROLE

## SENIOR SOFTWARE DEVELOPMENT ENGINEER

### Skills impacted by AI

#### Stable

- No skills identified

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#### Decreasing relevance

- **Perl:** AI can automate scripting tasks, decreasing the reliance on manual Perl scripting
- **SQL:** AI can assist with query optimization and data management but still requires human insight for complex queries and data architecture
- **WCF:** AI can handle routine integration tasks, reducing the need for manual configuration and management
- **XML:** AI can automate data parsing and generation, reducing the need for manual XML handling



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# JOB ROLE

## SENIOR SOFTWARE ENGINEER



### Job description

A Senior Software Engineer designs, develops, and maintains complex software systems, ensuring scalability and performance. Responsibilities include code review, mentoring junior engineers, collaborating with cross-functional teams, and leading technical projects. Strong coding skills, problem-solving, and the ability to manage software development lifecycle are essential.



### Principal tasks

- Develop and maintain Java-based applications and systems to meet project requirements
- Apply agile methodologies to software development processes for improved efficiency
- Utilize XML for data interchange and configuration in software applications
- Implement web services to enable interoperability and communication between systems
- Design and implement distributed systems to handle large-scale data processing and storage
- Utilize Perl scripting for automation and system administration tasks
- Apply object-oriented design principles to develop scalable and maintainable software solutions
- Develop embedded systems software for specialized hardware platforms and devices
- Design and implement web applications using modern frameworks like AngularJS
- Debug and troubleshoot software issues to ensure product reliability and performance

### Principal skills

- |                       |                          |                        |
|-----------------------|--------------------------|------------------------|
| • Agile methodologies | • Java                   | • Shell scripting      |
| • Ajax                | • Json                   | • Software development |
| • AngularJS           | • MongoDB                | • Spring framework     |
| • Design patterns     | • Node.js                | • Tomcat               |
| • Eclipse             | • Object oriented design | • Web services         |
| • Git                 | • Perl                   | • XML                  |
| • Hibernate           | • Scrum                  |                        |

# JOB ROLE

## SENIOR SOFTWARE ENGINEER

### Impact of AI

AI impact on the Senior Software Engineer role might be moderate. Senior Software Engineers might focus on upskilling skills like advanced programming and project management. While skills in code review and troubleshooting

remain relevant, their demand for Senior Software Engineers will decline due to AI-assisted automation and optimization.



### Key insights

- The Senior Software Engineer role involves advanced technical, analytical, and mentoring tasks requiring human judgment, creativity, and interaction
- **Advanced programming:** AI can assist with code suggestions but lacks the creativity and problem-solving abilities of a human engineer (moderate impact)
- **Code review:** AI can automate code quality checks but cannot fully replace human oversight and mentorship (moderate impact)
- **Mentoring:** AI can provide learning resources but cannot offer personalized guidance and support. (Low impact)
- **Project management:** AI can assist in tracking and optimizing workflows but cannot handle all aspects of project leadership (moderate impact)
- **Cross-functional collaboration:** AI can facilitate communication but cannot replace human collaboration and relationship-building (low impact)
- **Scalability optimization and performance tuning:** AI can provide insights and automation but requires human expertise for complex optimizations (moderate impact)
- **Troubleshooting:** AI can identify issues but may not fully understand complex problems or provide innovative solutions (moderate impact)
- **Software security:** AI can assist with vulnerability detection but cannot fully ensure security without human oversight (moderate impact)
- Overall, AI can augment many aspects of the senior software engineer role but cannot fully replace the essential human elements of creativity, mentorship, and complex problem-solving

### Skills impacted by AI

#### New

- AI-driven software development
- AI-powered security measures

- **AI ethics and responsible AI:** Understanding and ensuring the ethical use of AI in product development
- AI literacy

# JOB ROLE

## SENIOR SOFTWARE ENGINEER

### Skills impacted by AI

#### Increasing relevance

- **Agile methodologies:** AI can help adapt workflows and improve team productivity
- **AJAX:** AI can suggest optimizations but can't replace understanding of asynchronous programming
- **AngularJS:** AI can assist with code suggestions but can't replace the need for human creativity in front-end development
- **Design patterns:** AI can suggest patterns but can't replace human creativity in applying them effectively
- **Git:** AI can optimize version control management but requires human input for decision-making
- **Hibernate:** AI can automate configuration and optimization but requires human understanding for complex mappings
- **Java:** AI can assist in optimizing and generating code snippets but can't replace advanced programming skills
- **JSON:** AI can automate data parsing and generation but requires human oversight for complex data structures
- **MongoDB:** AI can assist with query optimization and data management but needs human input for schema design
- **Node.js:** AI can provide optimizations and code suggestions but can't replace human creativity and problem-solving
- **Object-oriented design:** AI can generate code templates but needs human insight for design patterns and architecture
- **Scrum:** AI tools can assist in tracking and optimizing workflows, enhancing scrum practices
- **Shell scripting:** AI can automate script generation and optimization but can't fully replace human problem-solving
- **Software development:** AI tools can automate parts of the development process, enhancing efficiency
- **Spring framework:** AI can help with configuration and code generation but needs human insight for complex integrations
- **TOMCAT:** AI can assist in deployment and performance tuning but requires human oversight for complex setups
- **Web services:** AI can automate testing and integration but needs human oversight for design

#### Stable

- No skills identified



# JOB ROLE

## SENIOR SOFTWARE ENGINEER

### Skills impacted by AI

#### Decreasing relevance

- **Eclipse:** AI can automate some aspects of IDE usage, reducing the need for manual configuration
- **Perl:** AI can automate scripting tasks, decreasing the reliance on manual Perl scripting
- **XML:** AI can automate data parsing and generation, reducing the need for manual XML handling



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# JOB ROLE

## SOFTWARE ARCHITECT



### Job description

Software Architects engineer end-to-end system software for a specific technology, product/platform, or market segment, including software structure and bounding box, firmware, drivers, frameworks, cross component, interfaces, interactions, interoperability, protocols, algorithms, and applications.

1 / 2



### Principal tasks

- Pathfinding and providing technical direction for software development and validation
- Engages with customers on technical requirements/discussions and interacts with technologists internally and within the industry to evaluate the feasibility of requirements and determine priorities for development
- Creates specifications for software to be developed at various levels of the software stack, including software structure, interfaces, frameworks, protocols, algorithms and/or validation direction

### Principal skills

- |   |                                  |                                  |
|---|----------------------------------|----------------------------------|
| • Architecture definition               | • Full stack software frameworks | • Requirement definition/design  |
| • Architecture modeling                 | • High level software design     | • Software debug                 |
| • Communication of architectural intent | • Programming ability/languages  | • Software modeling, prototyping |
| • Customer problem solving              | • Prototyping                    |                                  |

### Impact of AI

Gen AI is a tool which will enhance the capabilities for software architecture, enabling

engineers to work more efficiently in architecting software systems

# JOB ROLE

## SOFTWARE ARCHITECT

### Key insights

#### New Gen AI techniques enable:

- Design assistance: suggesting design patterns or architectural components based on requirements
- Technology selection of most appropriate techniques/frameworks
- Performance optimization techniques
- Risk analysis and security analysis
- Scenario planning
- Spec development and review
- Documentation generation
- Architecture diagram/visualization creation

2 / 2



### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>• AI ethics and responsible AI</li> <li>• AI literacy</li> <li>• LLM architecture and frameworks</li> <li>• Prompt engineering</li> </ul>	<ul style="list-style-type: none"> <li>• Architecture definition</li> <li>• Architecture modeling</li> <li>• Communication of architectural intent</li> <li>• Prototyping</li> <li>• Software debug</li> <li>• Software modeling</li> </ul>	<ul style="list-style-type: none"> <li>• No skills identified</li> </ul>	<ul style="list-style-type: none"> <li>• No skills identified</li> </ul>



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# JOB ROLE

## SOFTWARE DEVELOPER



### Job description

Designs, develops, integrates, tests, validates, and/or debugs software across multiple layers of the software stack spanning firmware, drivers, operating systems, middleware, frameworks, algorithms, and applications/UI for a specific technology, product/platform, and/or market segment, including the development of software to enable specific features, capabilities, solutions and reference platforms.

1 / 3



### Principal tasks

- Develops software at one level or across the stack, including firmware, drivers, OS, middleware, frameworks, algorithms, and applications
- May specialize in specific technology domains including cloud, AI, HPC, graphics
- Develops software to improve/enhance internal product development including manufacturing and product design
- Develops software for improving or enabling customer designs to obtain the greatest value
- Software debug/validation
- Software integration
- Collaborating with teams

### Principal skills

- Analytical thinking
- Code review
- Compliant development
- Critical problem solving
- DevSecOps
- Effective communication
- High-level software design
- Programming ability/languages
- Secure code development
- Software debug
- Software modeling
- Software test engineering and test execution
- Source control management
- Systems thinking
- **Technical architecture design & governance:**
  - Data management
  - Identity & access management
  - Integration & interoperability
  - Performance optimization and total cost of ownership

### Impact of AI

The democratization of software development will increase the need for strict standards and guardrails within companies, industries to ensure software performance, reliability, and security. Developers will move up the value

chain by gaining deeper industry / domain knowledge, they will create more tailored and effective solutions, overseeing the architecture of complex systems and ensuring seamless integration between platforms.

# JOB ROLE

## SOFTWARE DEVELOPER

### Key Insights

- Developers will embrace AI to automate code generation, leveraging Gen AI to work through complex problems, and automate testing.
- AI will democratize the ability to write and check code which allows for more ideas but also has a risk in terms of its quality. Employers must support their workers with tools, processes and people (enablement) to ensure that the code that makes it into production is secure, of high quality, and aids in the user experience - not AI just for AI's sake
- As the 'barrier of entry' to create code is lowered, other skills will become more important to ensure that code works, be able to check its quality, and think about down the line consequences of the code onto other elements of your product. This requires a deeper level of knowledge in architecture, systems thinking, etc

### External Sources:

- Gartner has forecasted that, by 2028, as many as 3/4 enterprise Software Engineers will harness the power of AI code assistants, up from just one in 10 in 2023 (STAMFORD, Conn, 2024)<sup>[36]</sup>
- Gartner's research found that the demand for no-code/low-code development platforms is expected to grow at least 5x faster than traditional application development through 2023.
- "In 3-5 years, developers will evolve to think more about connected systems and architecture vs just coding. Junior developers especially will be able to focus on this" Inbal Shani GitHub Chief Product Officer

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### Skills impacted by AI

#### New

- AI assisted code generation
- AI ethics and responsible AI
- AI literacy
- Business acumen/strategy and vertical knowledge
- Domain-specific knowledge
- Prompt engineering

#### Increasing relevance

- Compliant development
- Code review
- Critical problem solving
- DevSecOps
- Secure code development
- Software debug
- Software test engineering and test execution
- Technical architecture design & governance

# JOB ROLE

## SOFTWARE DEVELOPER

### Skills impacted by AI

#### Stable

- Analytical thinking
- Effective communication
- High-level software design
- Software modeling
- Source control management
- Systems thinking

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#### Decreasing relevance

- Documentation
- Programming ability/ languages



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# JOB ROLE

## SOFTWARE ENGINEER



### Job description

The entry level Software Engineer designs, develops, tests, and debugs responsive web applications using HTML/CSS and JavaScript. They gather user requirements, collaborate with UX/UI designers to create appealing and functional interfaces, maintain front-end and back-end applications, ensure security, optimize performance and SEO, stay current with emerging technologies, create reusable components, and participate in scrum rituals.



### Principal tasks

- Participate in regular scrum ritual
- Communicate with users to gather requirements and collaborate with and manage requests from UX/UI designers to reflect design intent
- Contribute code to libraries and create reusable components
- Create code in HTML/CSS and JavaScript
- Design, develop, test, debug responsive web applications
- Help maintain back-end and front-end applications and ensure web applications security
- Optimize website for speed, performance and SEO
- Stay up to date with emerging technologies and replace legacy technology with new ones
- Use testing tools and frameworks to test and debug code and systems

### Principal skills

- Back-end development for websites
- Building a webserver in Node.js
- Consuming APIs
- Delivery content via CMS and delivery platforms
- Deploying in the cloud
- Designing and creating basic functions and algorithms
- DevOps
- Front-end development for website including HTML5, CSS, JavaScript Git GitHub and version control
- Implementing responsive images and typography
- Organizing, creating, consuming, and rendering data
- Python
- Querying media
- Responsive design for mobile web development
- Testing and debugging best practices and tools
- Troubleshooting
- Verbal and written communications

# JOB ROLE

## SOFTWARE ENGINEER

### Impact of AI

Software Engineering roles and the field at large have been an early target of disruptive artificial intelligence tools and products. That trend is accelerating. Today, workers and students of software engineering can leverage large language models (LLMs) to assist in drafting blocks of code with varying degrees of success and reliability. As these tools improve, software engineers will not only benefit from error reduction, greater efficiency, and faster testing, but also the integration of diverse AI

solutions into their software. These integrations will facilitate individualized experiences for users. Additionally, Gen AI solutions which can create full web pages and applications with simple prose prompts are being developed. With the democratization and automation of code creation, software engineers will evolve towards strategic planning, increasingly complex problem solving, and AI-supported creative innovation.

### Key insights

- **Software development tools:** Further advancements in AI-powered assistive technologies will help guide code development tasks and eventually take on large swaths of development with prompts and other design inputs
- **Quality assurance:** Code review, testing, and analysis tools will help software engineers identify and resolve errors, security vulnerabilities, and inefficiencies more quickly and effectively
- **Interface development:** Voice and chat-enabled software introduced new engineering considerations in software development, and additional AI-powered interactive advancements, like image/live video recognition and gesture controls will be impacted, especially as individualized user experiences become more popular

### Skills impacted by AI

#### New

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• AI ethics and responsible AI</li> <li>• AI literacy</li> <li>• AI service integration in cloud computing and deployment</li> <li>• Artificial intelligence frameworks (e.g., PyTorch, TensorFlow, keras, etc.)</li> </ul> | <ul style="list-style-type: none"> <li>• Bias mitigation</li> <li>• Data science analytics</li> <li>• LLM architecture and frameworks</li> <li>• Natural language processing</li> <li>• Transformer models</li> </ul> |
|--|---|

# JOB ROLE

## SOFTWARE ENGINEER

### Skills impacted by AI

#### **Increasing relevance**

- Back-end development for websites
- Building a webserver in Node.js
- Designing and creating basic functions and algorithms
- DevOps
- GitHub and version control
- JavaScript
- Organizing, creating, consuming, and rendering data
- Python
- Querying media
- Testing and debugging best practices and tools
- Deploying in the cloud
- Troubleshooting

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#### **Stable**

- Consuming APIs
- Verbal and written communications

#### **Decreased relevance**

- Delivery content via CMS and delivery platforms
- Front-end development for website including HTML5, CSS
- Implementing responsive images and typography



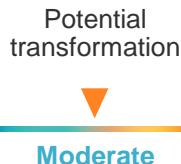
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# JOB ROLE

## WEB DEVELOPER



### Job description

Web Developer is responsible for the design and implementation of web applications. Web developers create well-designed, testable, and efficient code using best practices for web development, ensuring responsive and mobile-friendly designs. They maintain and enhance websites by maintaining, expanding, and scaling websites, addressing both front-end and back-end aspects, and ensuring website performance and reliability. They collaborate with teams and stakeholders and work closely with designers, content creators, and other stakeholders to ensure that the website meets both technical and user requirements, providing a positive user experience.



### Principal tasks

- Website and application development:** Designing and iterating websites, ensuring functionality, usability, and attractiveness, using standard technologies like HTML, CSS, and JavaScript
- Testing and optimization:** Testing websites to ensure they are bug-free and optimizing their performance to improve speed and efficiency, ensuring the best possible user experience
- Maintenance and updates:** Maintaining existing sites, making updates and adjustments as needed to ensure they stay current with technological advancements and continue to meet the needs of all user groups

### Principal skills

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• CSS</li> <li>• HTML</li> <li>• JavaScript</li> <li>• jQuery</li> <li>• Node.js</li> </ul> | <ul style="list-style-type: none"> <li>• PHP</li> <li>• React.js</li> <li>• SQL</li> <li>• WordPress</li> </ul> |
|--|---|

# JOB ROLE

## WEB DEVELOPER

### Impact of AI

Gen AI may be able to help accomplish many of the tasks for which this role is responsible, leaving more time for people in this role to focus on higher value-added complementary skills..

### Key insights

In thinking about worker development and upskilling plans, people currently in this role might consider how to use Gen AI to dramatically reduce time spent working with

For Web Developers, this may mean leveraging tools like GitHub Copilot to make coding more efficient, or Applitools to conduct visual testing and monitoring.



CSS, how to leverage Gen AI to increase productivity working with JavaScript, and how to spend more time developing and maintaining web applications.

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>Applitools</li> <li>Codex</li> <li>GitHub CoPilot</li> <li>Prompt engineering</li> </ul>	<ul style="list-style-type: none"> <li>JavaScript</li> <li>React.js</li> </ul>	<ul style="list-style-type: none"> <li>Software development</li> <li>Web development</li> </ul>	<ul style="list-style-type: none"> <li>CSS</li> <li>HTML</li> </ul>



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# TESTING AND QUALITY ASSURANCE

# JOB ROLE

## QUALITY ASSURANCE ANALYST



### Job description

A Quality Assurance Analyst is responsible for ensuring that software products and applications meet specified quality standards. They perform testing, identify defects, and collaborate with development teams to resolve issues and improve overall product quality.



### Principal tasks

- **Collaborate with development teams:** Work closely with software developers and other project team members to ensure quality considerations are integrated throughout the development process
- **Conduct quality assurance testing:** Perform thorough testing of products or systems to ensure compliance with standards and to identify any issues
- **Continuous process improvement:** Analyze testing processes and results to identify areas for improvement and implement changes to enhance quality and efficiency
- **Develop test plans and strategies:** Create comprehensive test plans that outline testing strategies and methodologies to ensure product quality
- **Document testing processes and results:** Maintain detailed documentation of test cases, procedures, and outcomes to ensure traceability and compliance with standards
- **Ensure regulatory compliance:** Ensure that all testing and quality assurance activities comply with relevant regulations and standards
- **Manage quality assurance projects:** Oversee and coordinate quality assurance projects, ensuring that all aspects are executed according to plan
- **Perform audits and inspections:** Conduct regular audits and inspections of systems and processes to ensure adherence to quality standards and identify areas for improvement
- **Train and support team members:** Provide training and support to other team members on quality assurance practices and tools
- **Utilize quality assurance software tools:** Employ various software tools and technologies to facilitate and enhance the quality assurance process

### Principal skills

- |                                  |                               |                         |
|----------------------------------|-------------------------------|-------------------------|
| • Auditing                       | • Detail-oriented             | • Problem solving       |
| • Automation testing             | • Documentation maintenance   | • Regulatory compliance |
| • Communication                  | • Integration software        | • Reporting             |
| • Continuous process improvement | • Interpersonal collaboration | • Test planning         |
| • Demonstrating responsibility   | • Microsoft excel             | • Testing               |

# JOB ROLE

## QUALITY ASSURANCE ANALYST

### Impact of AI

AI impact on the Quality Assurance Analyst role might be moderate. While skills like testing and auditing are less affected, AI can significantly automate documentation and assist with regulatory compliance. Quality Assurance Analysts should focus on upskilling

in areas like continuous process improvement, where AI can complement their work. Technical skills like automation testing and integration software are highly susceptible to AI automation.

### Key insights

- Impact on hours:** Gen AI can automate some tasks like documentation and testing, but core responsibilities like auditing and process improvement may be less affected
- New skills:** Quality Assurance Analysts should acquire emerging skills such as automated testing, speech recognition algorithms, conversational AI, and AI model

development to stay relevant and in demand

- Soft skills:** Demonstrating responsibility, communication, and problem solving will remain essential for quality assurance analysts to effectively ensure product quality and collaborate with teams

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI literacy</li> <li>AI model development</li> <li>Automated testing</li> <li>Conversational AI</li> <li>Speech recognition algorithms</li> </ul>	<ul style="list-style-type: none"> <li>Auditing</li> <li>Continuous process improvement</li> <li>Microsoft excel</li> <li>Problem solving</li> <li>Regulatory compliance</li> <li>Testing</li> </ul>	<ul style="list-style-type: none"> <li>Communication</li> <li>Demonstrating responsibility</li> <li>Detail-oriented</li> <li>Interpersonal collaboration</li> <li>Reporting</li> <li>Test planning</li> </ul>	<ul style="list-style-type: none"> <li>Automation testing</li> <li>Documentation maintenance</li> <li>Integration software</li> </ul>



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# JOB ROLE

## SOFTWARE TEST AND DEBUG



### Job description

Integrates and debugs software across the stack including firmware, drivers, and operating systems for a specific product, platform, feature, or technology throughout the product lifecycle. Debugs software products using systematic tests to develop, apply, and maintain quality standards for company products.

### Principal tasks

- Develops a software debug plan and associated methodologies. Analyzes issues, manages sightings from various validation streams, determines root cause, and drives or develops improvements
- Drives project stress and stability and supports power, performance, and key KPI task forces
- Develops, modifies, and executes software test plans, analyzes, and writes test standards and procedures
- Analyzes test results to ensure correct functionality, determines root causes of failures, and recommends corrective action

### Principal skills

- |                                  |                             |                              |
|----------------------------------|-----------------------------|------------------------------|
| • Automation                     | • OS architecture internals | • Software test environments |
| • Code review                    | • Scripting                 | • Source control management  |
| • Full stack software frameworks | • Secure code development   |                              |
| • HW-SW full stack debug         | • Software debug            |                              |
|                                  | • Software test automation  |                              |

### Impact of AI

Gen AI is a tool which will enhance the capabilities for Software Test And Debug,

enabling engineers to work more efficiently in detecting software bugs proactively.

### Key Insights

New Gen AI techniques enable:

- Automated error/bug detection in software code, reducing time engineers spend identifying and classifying bugs
- Code suggestions for fixes in identified bugs by generating code suggestions for engineers to review and apply

- Skill shift for test/debug engineers to focus more on software design, system architecture, and understanding complex interactions within code that are harder for Gen AI to detect today
- Test plan generation

# JOB ROLE

## SOFTWARE TEST AND DEBUG

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>• AI assisted code generation</li> <li>• AI ethics and responsible AI</li> <li>• AI literacy</li> <li>• Prompt engineering</li> <li>• LLM architecture and frameworks</li> <li>• Software code development</li> </ul>	<ul style="list-style-type: none"> <li>• Automation</li> <li>• Code review</li> <li>• Software debug</li> <li>• Software test automation</li> <li>• Software test environments</li> </ul>	<ul style="list-style-type: none"> <li>• No skills identified</li> </ul>	<ul style="list-style-type: none"> <li>• No skills identified</li> </ul>



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# JOB ROLE

## TECHNICAL WRITER



### Job description

A Technical Writer is responsible for creating and editing technical documentation, such as user manuals, instruction guides, and online help systems. They translate complex technical information into clear and concise language that is easily understandable for the intended audience.

### Principal tasks

- Communication skills:** Effectively communicate complex technical information to both technical and non-technical audiences
- Documentation creation and maintain:** Develop and maintain clear, concise, and accurate documentation including manuals, guides, and online help content
- Interpersonal collaboration:** Work closely with technical staff, project managers, and other stakeholders to gather information and clarify technical details
- Project management:** Manage documentation projects, including planning, scheduling, and tracking progress to ensure timely delivery of materials
- Quality assurance:** Review and revise technical documents for quality assurance and ensure they meet industry standards and regulatory compliance
- Research and analysis:** Conduct thorough research to understand complex technical information and translate it into user-friendly text
- Software and tools proficiency:** Utilize various documentation tools and software like Microsoft office, SharePoint, and content management systems to create and manage documents
- Technical knowledge application:** Apply technical knowledge to understand and document complex systems, software, and processes
- Technical writing and editing:** Write and edit technical materials, ensuring they are clear, comprehensive, and technically accurate
- Training material development:** Develop training materials and user manuals to assist end-users and internal staff in understanding products and systems

### Principal skills

- Communication
- Demonstrating responsibility
- Detail-oriented
- Documentation maintenance
- Interpersonal collaboration
- Prioritization
- Project team management
- Regulatory compliance
- Scientific research
- Task coordination



# JOB ROLE

## TECHNICAL WRITER

### Impact of AI

AI impact on the Technical Writer role might be high. Documentation, which is a core skill for Technical Writers, can be significantly automated by AI. Other skills like scientific research, task coordination, and regulatory compliance are moderately affected. Technical

Writers should focus on upskilling in areas like project team management, where AI can complement their work. Technical skills like user requirements documentation and conducting research are highly susceptible to AI automation.

### Key insights

- Impact on number of hours:** Gen AI can significantly automate tasks related to documentation, user requirements documentation, and research
- New skills:** Technical Writers will need to acquire skills in automated testing, AI model development, AI integration, cloud AI, and prompt engineering to stay competitive

- Skills in demand:** Soft skills such as demonstrating responsibility, communication, and interpersonal collaboration will remain essential for Technical Writers, as they often work closely with subject matter experts and development teams

### Skills impacted by AI

New	Increasing relevance	Stable	Decreasing relevance
<ul style="list-style-type: none"> <li>AI ethics and responsible AI</li> <li>AI integration</li> <li>AI literacy</li> <li>Automated testing</li> <li>Cloud AI</li> <li>Prompt engineering</li> </ul>	<ul style="list-style-type: none"> <li>Microsoft office</li> <li>Onepoint project</li> <li>Prioritization</li> <li>Project team management</li> <li>Regulatory compliance</li> <li>Scientific research</li> <li>Task coordination</li> </ul>	<ul style="list-style-type: none"> <li>Communication</li> <li>Demonstrating responsibility</li> <li>Detail-oriented</li> <li>Interpersonal collaboration</li> </ul>	<ul style="list-style-type: none"> <li>Documentation maintenance</li> <li>Research information</li> <li>User requirements documentation</li> </ul>



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## GLOSSARY

Abbreviation	Description
AI	Artificial Intelligence
AWS	Amazon Web Services
CAD	Computer Aided Design
CI/CD	Continuous Integration/Continuous Deployment
CMS	Content Management System
DR	Disaster Recovery
ETL	Extract, Transform, Load
Gen AI	Generative AI
HPC	High Performance Computing
ICT	Information and Communication Technology
IoT	Internet of Things
KPI	Key Performance Indicator
LLM	Large Language Models
ML	Machine Learning
NLP	Natural Language Processing
OS	Operating System
OWASP	Open Web Application Security Project
QoS	Quality of Service
RAG	Retrieval Augmented Generation
SASE	Secure Access Service Edge
SDLC	Software Development Life Cycle
SD - WAN	Software Defined Wide Area Network
SEO	Search Engine Optimization
SIEM	Security Information and Event Management
SOA	Service Oriented Architecture
SRE	Site Reliability Engineering
UX	User Experience
VPN	Virtual Private Network

## Appendix A: Key Definitions

Term	Definition
<b>Artificial Intelligence (AI)*</b>	An AI system is a machine-based system that, for explicit or implicit objectives, processes input to generate outputs such as predictions, content, recommendations, or decisions. These outputs can influence physical or virtual environments. AI systems vary in their levels of autonomy and adaptiveness after deployment (OECD, 2024) <sup>[37]</sup>
<b>AI Impact on Skills Transformation</b>	<ul style="list-style-type: none"> <li><b>New skills:</b> Skills essential for effectively integrating and utilizing AI</li> <li><b>Skills with increasing relevance:</b> Skills enhanced by AI</li> <li><b>Stable skills:</b> Skills that remain unaffected by AI advancements</li> <li><b>Skills with decreasing relevance:</b> Skills decreasing in relevance due to AI</li> </ul>
<b>Foundational Skills</b>	New AI skills that are common and essential for a majority of the 47 job roles
<b>Foundational Training</b>	Training programs that provide individuals with versatile skills (e.g., critical thinking) essential for adapting to the evolving impact of AI across 47 Information and Communication Technology (ICT) job roles assessed in the report
<b>Job Categorization Framework</b>	Job roles categorized into 'job family' clusters based on shared technical competencies and functional requirements, offering a structured framework to understand roles in the ICT industry
<b>Job Family</b>	<p>A job family is a group of related job roles that share similar skills, responsibilities, and career paths</p> <ul style="list-style-type: none"> <li><b>Business and Management:</b> Overseeing the development, business analysis, and marketing of technology products and services</li> <li><b>Cybersecurity:</b> Safeguarding systems, networks, and data from security breaches and cyberattacks</li> <li><b>Data Science:</b> Analyzing and interpreting large datasets to derive valuable insights</li> <li><b>Design and User Experience:</b> Creating intuitive user experiences and interfaces</li> <li><b>Infrastructure and Operations:</b> Managing computer networks, including installation, configuration, and troubleshooting</li> <li><b>Software Development:</b> Creating and maintaining software applications</li> <li><b>Testing and Quality Assurance:</b> Ensuring technical support and user assistance</li> </ul>
<b>Job Specific Training</b>	Tailored training programs recommended for specific job roles

\* This work examines the transformative potential of AI systems in enhancing tasks performed by workers in ICT job roles and the subsequent impact on required skills. While the primary focus is on Gen AI systems, the analysis considers a broader definition of AI. For simplicity, the report will refer to AI systems as AI.

## Appendix A: Key Definitions

Term	Definition
<b>Job Transformation Canvas</b>	A survey conducted by the Consortium aimed to study the ICT job landscape and gain insights into the identified job roles
<b>Level of AI Transformation</b>	<p>The Consortium incorporated a qualitative impact labeling system within our assessments.</p> <p>This AI transformation labeling combines the <b>opinion of subject matter experts</b> and a simple formula that estimates the AI Transformation percentage (%) = (principal skills that experience a significant increase and/or decrease in relevance skills) / (principal skills).</p> <ul style="list-style-type: none"> <li>• <b>High transformation:</b> More than 70% of the principal skills affected by AI</li> <li>• <b>Moderate transformation:</b> Between 50% and 70% of the principal skills affected by AI</li> <li>• <b>Low transformation:</b> Less than 50% of the principal skills affected by AI</li> </ul>
<b>Principal Skills</b>	Essential skills list for the job role, encompassing technical abilities and critical soft/professional skills necessary for successful job performance and key tasks
<b>Principal Tasks</b>	List of the essential tasks' integral to the job role

## Appendix B: Job Transformation Canvas

### Job Transformation Canvas

#### Section 0 of the CANVAS – Consortium Member Information

##### 1. Consortium member

A. Select the consortium member name from the drop-down list

##### 2. Name

A. Name of the contributor

##### 3. Email

A. Email ID of the contributor for follow-up question (if any)

##### 4. Analysis for which job Role ?

A. Select the job role from the drop-down list

---

#### Section 1 of the CANVAS - Job Role

Basic information about the job role

1) Description: A job role description that provides a clear and concise outline of the responsibilities, duties, and expectations associated with the specific position. (paragraph up to 50 words)

2) Principal Tasks: List of the most important tasks for this job role. (between 3 to 15 tasks)

3) Principal Skills: List of the essential skills required for the job role, including both technical abilities and soft/professional skills crucial for successfully performing the job and the principal tasks. (between 3 to 15 skills)

##### 5. Job Role description (paragraph up to 50 words)

A. Provide A job role description that provides a clear and concise outline of the responsibilities, duties, and expectations associated with the specific position.

##### 6. Principal tasks (between 3 to 15 tasks)

A. Provide a list of the most important tasks for this job role

##### 7. Principal skills (between 3 to 15 skills)

A. Provide a list of the essential skills required for the job role, including both technical abilities and soft/professional skills crucial for successfully performing the job and the principal tasks.

## Appendix B: Job Transformation Canvas

### Section 2 of the CANVAS - AI Impact

Impact Label: This section provides an understanding of the level of impact of AI on the ICT job (High, Moderate, Low)

Impact Summary: This section provides an executive summary of generative AI's impact on the specific job role, with a qualitative impact labeled as high, moderate, or low. (paragraph up to 150 words)

Key Insights: This section dives deeper into specific findings, supported by data and narratives. It serves to substantiate the claims made in the Impact Summary with evidence and detailed analysis, giving the reader concrete takeaways.

(List of short paragraphs up to total 200 words.)

Skills Impact: This section presents the effect of AI on the job skills categorizing them into:

- New skills
- Skills with increasing relevance
- Stable skills
- Skills with decreasing relevance

#### 8. Level of transformation (AI transformation on the specific job: H/M/L)

A. Provide the level of impact of AI on the ICT job

#### 9. Impact summary (a single paragraph up to 150 words)

A. Provide an executive summary of generative AI's impact on the job role, with a qualitative impact labeled as high, moderate, or low

#### 10. Key insights (numbered list of concise paragraphs. Up to 200 words in total)

A. Provide insights and scientific findings supported by data and narratives to substantiate the claims made in the Impact Summary, giving the reader concrete takeaways.

#### 11. Skills with increasing relevance

A. Provide a list of skills expected to be augmented by AI

#### 12. Skills with decreasing relevance

A. Provide a list of skills at risk of obsolescence

#### 13. Stable skills

A. Provide a list of skills with Mild or No Impact at all

#### 14. New skills

A. Provide a list of the New Skills that are going to be required for the role

## Appendix B: Job Transformation Canvas

### Section 3 of the CANVAS - Training Recommendations

*This section organizes and lists current and upcoming educational opportunities, tagging each offering with the skills it develops and indicating whether it is free or paid. The resources may be grouped in two subsections.*

*Job specific learning offerings: This section details training programs relevant only for the specific job role. (List of titles, tagged with augmented or new skills, free/paid and URLs. Between 2 and 15).*

*Common foundation learning offering: Core training programs that equip individuals with versatile skills applicable to various job roles in adapting to the widespread influence of AI. Please add one new line per each offering indicating the title, the skills, if is paid or free and the URL.*

**15. Job specific - Learning recommendations** (*Create a list of course titles, each tagged with relevant skills, cost status (free or paid), and the corresponding URL.*)

A. Recommendation of job specific trainings and resources

**16. Common foundation - Learning recommendations** (*Create a list of course titles, each tagged with relevant skills, cost status (free or paid), and the corresponding URL.*)

A. Recommendation of common foundational trainings and resources

## Appendix C: Expected Levels of Transformation by Job Family

<b>Job Family</b>	<b>Low</b>	<b>Moderate</b>	<b>High</b>
<b>Business and Management</b>	<b>0%</b>	<b>37.5%</b>	<b>62.5%</b>
Entry	0%	25%	75%
Mid	0%	33.3%	66.7%
Senior	0%	100%	0%
<b>Cybersecurity</b>	<b>0%</b>	<b>75%</b>	<b>25%</b>
Entry	0%	66.7%	33.3%
Mid	0%	100%	0%
<b>Data Science</b>	<b>0%</b>	<b>75%</b>	<b>25%</b>
Entry	0%	100%	0%
Mid	0%	50%	50%
<b>Design and User experience</b>	<b>0%</b>	<b>33.3%</b>	<b>66.7%</b>
Entry	0%	50%	50%
Mid	0%	0%	100%
<b>Infrastructure and Operations</b>	<b>40%</b>	<b>40%</b>	<b>20%</b>
Entry	50%	25%	25%
Mid	40%	40%	20%
Senior	0%	100%	0%
<b>Software Development</b>	<b>0%</b>	<b>80%</b>	<b>20%</b>
Entry	0%	77.8%	22.2%
Mid	0%	66.7%	33.3%
Senior	0%	100%	0%
<b>Testing and Quality Assurance</b>	<b>0%</b>	<b>33.3%</b>	<b>66.7%</b>
Entry	0%	33.3%	66.7%
<b>Grand Total</b>	<b>8.5%</b>	<b>57.5%</b>	<b>34%</b>

Table 2: Level of transformation expected within each job family, by career level

## Appendix D: Top 10 technical skills expected to shift in relevance

### Skills with increasing relevance

The skills expected to gain prominence can be defined as new or transformed AI skills that complement and enhance proficiency across all career stages. These skills are becoming essential as AI continues to reshape job

functions and requirements, ensuring that workers are equipped to thrive in a rapidly changing technological landscape. Below is an overview of how individuals can leverage these skills complemented by AI.

Skills	How will it help?
AI ethics and responsible AI	Our study shows 100% of ICT job roles analyzed will increasingly integrate ethical AI considerations, highlighting the need for robust frameworks to deploy AI responsibly and meet regulatory standards.
AI literacy	AI literacy and proficiency in modeling as essential skills in 100% of the ICT job roles analyzed, especially with the increasing demand for AI integration.
Prompt engineering	66% of ICT job roles analyzed are expected to require prompt engineering as a significant skill. This will enhance AI-driven communication and decision-making across digital platforms by crafting contextually relevant user interactions and responses.
Large Language Models (LLM) architecture	AI enhances capabilities of LLM architecture by improving language understanding, generating coherent text, and advancing natural language processing tasks across various domains.
Agile methodologies	Leveraging AI for automating tasks, providing data insights, and enhancing team collaboration in project management and software development.
Data analytics	AI enhances data analytics capabilities by automating data processing, uncovering insights from large datasets, and optimizing predictive modeling.
Machine learning	AI drives advancements in automating tasks, analyzing data patterns, and enhancing decision-making processes.
Retrieval augmented generation	The integration of AI techniques can enhance content creation and decision-making by combining information retrieval with generative capabilities.
TensorFlow	Mastering TensorFlow enables efficient development of advanced machine learning models, empowering individuals to excel in diverse AI roles and contribute effectively.
Natural language processing	NLP equips individuals to innovate in language understanding and generation tasks, essential for advancing AI applications.

Table 3: Top 10 technical skills expected to increase in relevance

## Appendix D: Top 10 technical skills expected to shift in relevance

### Skills with decreasing relevance

Similarly, we have also identified skills that are expected to undergo high-level transformation in response to AI advancements, making them less relevant. These skills, while currently integral, are anticipated to see decreased

demand as AI technology continues to automate and streamline processes. Below is an overview of how these skills are expected to be transformed and how AI can perform them.

Skills	How will it help?
Basic programming and languages	As AI evolves, 31% of job roles anticipate reducing relevance for basic programming and languages. This shift reflects automation and the increasing sophistication of AI tools, reducing the demand for manual coding tasks and emphasizing the need for higher-level AI development skills such as machine learning and natural language processing.
Content creation	Similarly, 18% of job roles expect decreased relevance in traditional content creation with AI advancements, shifting focus to roles managing and optimizing AI-generated content.
Data management	AI advancements are expected to decrease the relevance of traditional data management practices, highlighting a shift towards automated data handling and advanced analytics.
Research information	AI's capacity for processing vast amounts of data and generating insights at unprecedented speeds challenges the conventional methods of conducting research. This shift underscores the need for workers to adapt by leveraging AI tools for more efficient analysis and decision-making, thereby transforming the landscape of research practices.
Documentation maintenance	The relevance of traditional documentation skillset is expected to reduce, influenced by automated information processing, and evolving digital communication methods
SQL	With advancements in automated data handling and analytics, shifting focus towards AI-driven solutions for efficient data management and querying, SQL as a skill may see reduced relevance.
Manual XML handling	The automation of data structuring and manipulation processes by AI highlights the imperative for workers to transition to AI-driven tools for managing and processing XML data efficiently.
Manual Perl scripting	AI-driven tools offer more efficient and scalable scripting solutions, reducing the relevance of manual Perl scripting in light of technological advancements.
Integration software	AI innovations automate integration processes, optimize system performance, and streamline data flow between systems. Proficiency in integration software will evolve to leverage these AI-driven advancements, enhancing the ability to integrate complex IT environments and improve organizational efficiency.
Manual malware analysis	AI transforms manual malware analysis by automating detection and enhancing accuracy, enabling rapid responses to evolving threats and proactive defense strategies.

Table 4: Top 10 technical skills expected to decrease in relevance

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# Acknowledgment



"As we look to unlock the full promise that AI brings, it is essential that we equip people with the skills they will need, and which they are eager to learn. The far-reaching impact of this technology demands that we design learning pathways that will position everyone to have deeper AI skills as the work in our industry requires. The initial report from the Consortium is an important step to turn aspiration to action – with specific reskilling recommendations that can accelerate progress for individuals, organizations, and society." – Ellyn Shook, Chief Leadership & Human Resources Officer at Accenture



"AI represents a never-before-seen opportunity for technology to benefit humankind in every way, and we have to act intentionally to make sure populations don't get left behind. Across the Consortium member companies, we have made it our collective responsibility to train and upskill 95 million people over the next 10 years. By investing in a long-term roadmap for an inclusive workforce, we can help everyone participate and thrive in the era of AI." – Francine Katsoudas, Executive Vice President and Chief People, Policy, and Purpose Officer at Cisco



"This report clearly demonstrates the immediate impact of AI on almost any career, regardless of industry or size. Creating a talent-centered organization, in which the entire workforce can learn and grow responsibly, is the next step for every successful business." – Ashutosh Garg, Co-CEO and Co-founder at Eightfold AI

# Acknowledgment



"The benefits of AI must be accessible to every worker. We're proud to support the Consortium's new research, which will advance our shared vision to equip all workers with the AI skills they need to succeed in the jobs of today and tomorrow." – Lisa Gevelber, Founder of Grow with Google



"At IBM, we have been investing in the future of work through access to education and training opportunities for decades. The findings of this report further highlight the significant need for upskilling and reskilling, particularly with the rise of AI. Now, those in the ICT sector — from students to workers to employers — have the data about which jobs will change, how they will change, and what individuals and employers can do to prepare for this shift and remain competitive in the evolving global labor market." – Lydia Logan, Vice President, Global Education and Workforce Development at IBM



"We are excited by the impactful work this group is doing to understand the likely impact of AI on ICT workers and provide employers with the resources to support their workforce through this transformation. Indeed's mission is to help people get jobs. As AI skills rise in prominence, we're prioritizing skills-first hiring, to help job seekers demonstrate their AI capabilities and to connect employers to the broadest possible pool of talented job seekers across a broad range of industries." – Hannah Calhoon, Head of AI Innovation at Indeed

# Acknowledgment



"We believe AI represents a paradigm shift with great potential to deliver new opportunities and tools, and our goal is to advance AI responsibly to help solve the world's most significant challenges. Training, upskilling and reskilling workers on how to collaborate with AI and be critical thinkers is vital to our workforce and our next generation of innovation." – Christy Pambianchi, Executive Vice President, and Chief People Officer at Intel Corporation



"AI can be a tool that empowers workers around the world, but they must have the skills to use it. That's why Microsoft has committed to helping people and communities around the world gain new and necessary AI skills, and this new report contains important recommendations to take the global workforce into the future" – Naria Santa Lucia, Microsoft General Manager, Skills for Social Impact.



"What stands out from this research beyond the undeniable needs for responsible AI development and broad AI literacy across-all ICT jobs, is the necessity for all roles to enhance their higher-order skills, such as critical thinking, creativity, and complex problem-solving. Beyond the initial adoption of AI, we believe evaluating the second-order effects of these skills shifts will highlight which skills will be commoditized and which will be differentiating in the future" – Nicole Helmer, Vice President & Global Head of Development Learning at SAP

# AI-Enabled ICT Workforce Consortium

Our vision is to enable the success of the ICT workforce  
in the AI era

Website: [www.cisco.com/c/m/ai-enabled-ict-workforce-consortium](http://www.cisco.com/c/m/ai-enabled-ict-workforce-consortium)

Training recommendations: [www.cisco.com/c/m/ai-enabled-ict-workforce-consortium/training](http://www.cisco.com/c/m/ai-enabled-ict-workforce-consortium/training)