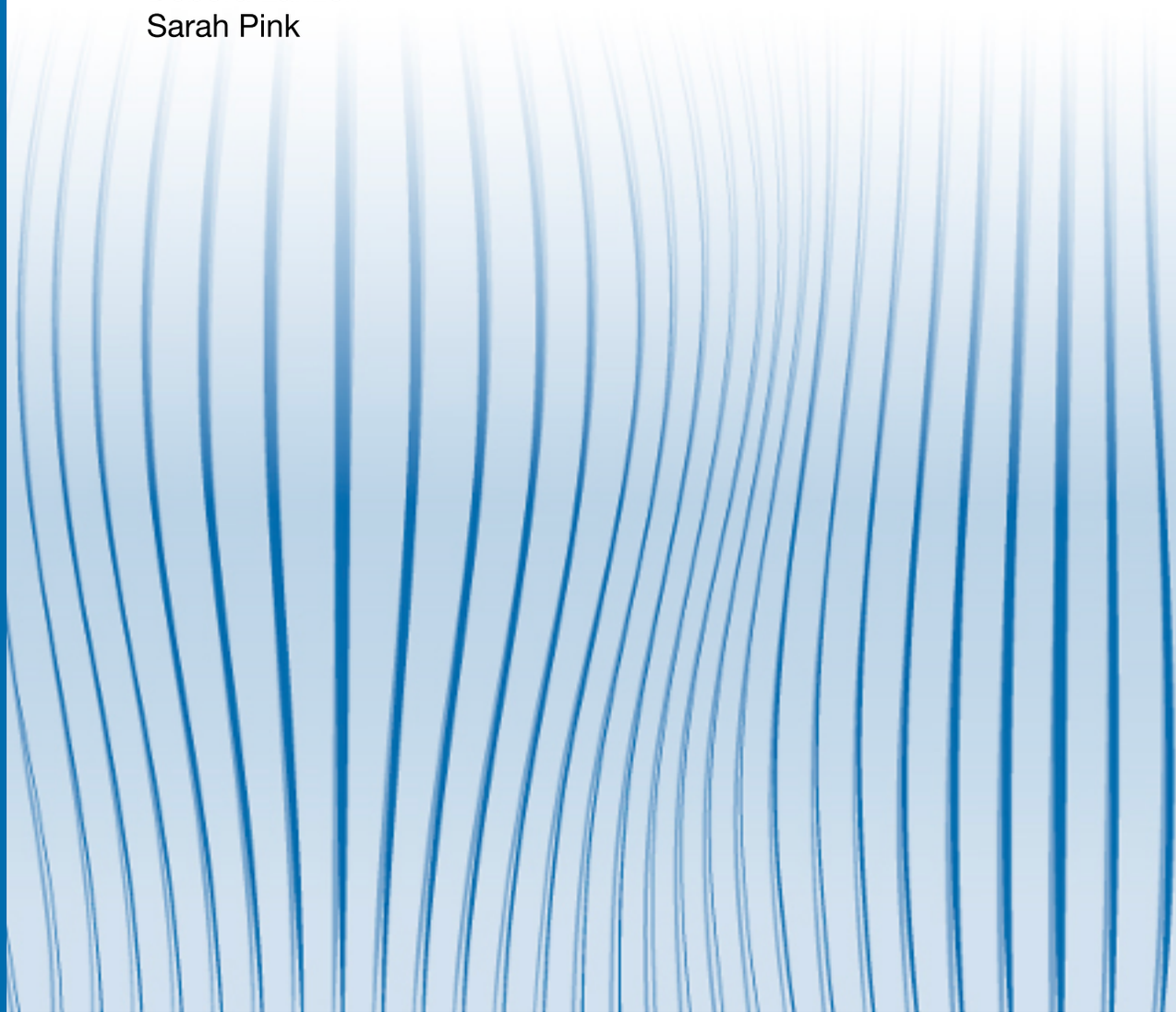
OCT
2026

Software Work Futures

From skills shortage to skills surplus: the remaking of the Australian software engineer

Debora Lanzeni
Sarah Pink



MONASH University
MONASH EMERGING TECHNOLOGIES RESEARCH LAB
MONASH FUTURES HUB
Australian Government
Australian Research Council

FUTURES Hub

Suggested Citation

Suggested citation Lanzeni, D., & Pink, S. (2026). From skills shortage to skills surplus: the remaking of the Australian software engineer. FUTURES Hub and Emerging Technologies Research Lab.

Acknowledgments and funding

We would like to thank Bianca Vallentine for her contributions with the report design and layout. Research discussed in this report was supported by the Australian Government through the Australian Research Council (ARC) Laureate Fellowship scheme: ‘The impact of human futures on Australia’s digital and net zero transition’ (FL230100131) awarded to Distinguished Professor Sarah Pink.

Acknowledgment of Country

We acknowledge the Bunurong and Wurundjeri Woi Wurrung people of the Kulin Nation as the traditional owners of the lands on which this report was created, and pay our respects to their Elders past, present and emerging.

Contents

Executive summary	4
Summary of findings	5-6
Introduction	7
Method and sample	8-9
1: The vanishing shortage	10-13
2. What the shortage story was doing	14-16
3. The tech professional replacing the software engineer	**16-17**
4. Software engineering and the twin transitions?	18-19
5. Who counts as a software engineer?	**19-21**
6. Where does software engineering work happen?	22-23
7. The Indo-Pacific and the sovereignty frame	24-25
8. Sites of innovation	26-27
9. Media: tech magazines, Instagram, LinkedIn and digital media repositories	27-30
10. Anticipated software engineering in Australia 2035	31-32
Conclusion	32- 36
References	37-40

Executive Summary



31 Reports analysed

10 years of grey literature

4 Classification systems

2 Government datasets

105 Social media posts

Context

For ten years, Australian grey literature reported that the country did not have enough software engineers. In October 2025, the narrative changed: the Occupation Shortage List published by the Government's Jobs and Skills Australia rates Software Engineer, Analyst Programmer, Developer Programmer and Web Developer was not in shortage, neither nationally nor in any state and territory. This report asks how a decade of skills shortage flagging ended so abruptly, and what the implications are for the current status of software engineering work and skills.

It analyses ten years of Australian grey literature and media on the technology workforce. Drawing on a review of 31 reports published between 2015 and 2026, two government datasets, and a sample of technology media and social media material, the report asks how the category of the software engineer was defined, measured, widened and eventually dissolved across this period, and what worker categories are now described as scarce in its place.

The report focuses on how industry bodies, consultancies, government agencies and publicly available media and social media material have represented the software engineering workforce. It is not a labour-market forecast, and it does not draw on primary research with software engineers about their own working conditions.

Summary of findings

The end of the software engineering skills shortage

- All existing software engineering plain occupations were rated “No Shortage” in 2025, both nationally and in all eight states and territories
- Skill Level 1 - the degree-qualified band holding every software engineering occupation - fell from 37 per cent in shortage in 2024 to 31 per cent in 2025, the steepest fall of any skill level.
- Professionals accounted for approximately half the net national decline in occupations in shortage, the major group into which every software engineering occupation sits

Online job vacancies across the economy fell 6.7 per cent over the year to June 2025 and the recruitment difficulty rate fell from 55 per cent to 44 per cent, the easing conditions against which every software engineering occupation was rated No Shortage

Enduring software engineering skills shortages

- Skills shortages endure in cyber security engineering, architecture, governance and operations, and in cloud engineering, DevOps, software testing and engineering technology
- Penetration testing, cyber security analysis and application development skills are not in national shortage
- Within a single OSCA classification group, Cloud Engineer and DevOps Engineer are in shortage while Software Engineer is not
- The software skills demand that remains is in verifying, securing and operating systems already built, rather than in writing new (code) applications

Changes in terminology and categories

- The terminology used to refer to software workers changed four times from 2015 to 2025: from ICT worker, to technology worker, to tech job and then skill rebundling (in August 2026 OSCA proposed to include for 2027 *Artificial Intelligence Engineers* in the group 2733)
- Industry reporting broadens the category of software engineer to include a more diverse range of roles. In contrast statistical classifications tend to diversify it into a number of separately defined and measurable roles
- Reports project acute shortages of software engineers while simultaneously arguing that the category is losing its boundaries

Unpacking software engineer workforce data

- Almost every major software workforce projection of the past decade was commissioned by an organisation with a direct interest in its result and modelled by a consultancy selling into the same market
- Projections of software worker skills shortage continue to be delivered after the shortages were declared over. However these tend to be noted in footnotes rather than in body of the reports
- Data on software engineer shortages changes meaning as it is reinterpreted for different purposes. For example where, the same estimate appears as both an annual and a cumulative contribution

Artificial intelligence

- The reports point to AI as a cause of future demand for software engineers
- The media and social media material shows how the software industry and workers understand AI tokens as a competitor for the same budget, and AI skills as a condition of employability

Introduction

For most of the past decade the dominant narratives across the grey literature analysed portrayed Australia as urgently needing more software engineers both to support industry in the present and for the nation's future. In 2025 the narrative shifted dramatically as generative AI agents were increasingly used to undertake coding (the basic building brick of software engineering work). Software work in Australia goes beyond the tech industry, of the roughly 359,000 workers in the ICT technical and professional occupational grouping in 2023, which includes software and applications programmers, around 64 per cent were employed outside Computer System Design and Related Services, and close to 59 per cent outside ICT industries altogether (our calculation from ACS 2024, Table A.4). The largest concentrations beyond the tech sector are in professional, scientific and technical services, financial and insurance services, and public administration, with smaller but significant numbers in retail, education, health and mining. Software engineers in particular are more numerous in other industries than in tech firms (Tech Council of Australia 2022). This workforce is also heavily composed of migrants, making up 41 per cent of those in technology occupations, and 59 per cent of Software and Applications Programmers hold a visa, the highest share of any technology occupation (FSO 2025, pp. 52–53, citing Oxford Economics Australia 2025).

The Occupation Shortage List published by Jobs and Skills Australia in October 2025 rates every canonical software engineering role - Software Engineer, Analyst Programmer, Developer Programmer, Web Developer - as No Shortage, nationally and in every state and territory. The shortage has narrowed to a specific locus: cyber security, cloud, DevOps, testing. This shifted a discourse that had run, without interruption, since 2015 (Digital Pulse 2015, 2019; 2023; 2024).

Taking this critical shift as a starting point, this report accounts for how visions of the future of software engineering are articulated both within the Australian technology sector and to the Australian public. It is based on analysis of carefully selected grey literature, policy and industry reports and, increasingly, visual media content produced over the last decade in Australia, cross-referenced with international material from the European Union, the United Kingdom and the United States. Instagram, tech magazines and software engineers' influencer content are analysed in order to account for the everyday visions of software engineering work that the grey literature omits.

Method and sample

The review presented here is based on a qualitative content analysis of two sets of materials:

First, a sample of thirty-one reports and two statistical data-sets on software engineering, the tech workforce and tech skills in Australia, examined for their treatment of current industry trends, government pathways and visions of the skill shortage. The sample was categorised by the entities that have produced them: technology consultancies, government departments, the tech industry and industry stakeholders. Ten reports focus specifically on Australia from 2015 to 2022, and twenty-one reports and the same two statistical data-sets cover the period 2023 to 2026. The Australian material is complemented by comparative reports from firms and organisations based in the United States (three), the United Kingdom (three) and the European Union (one), sourced in 2026.

This sample was created through purposive, criterion-based sampling appropriate to grey literature and categorised by producer: technology consultancies, government departments, industry bodies and sector stakeholders. Two Australian statistical datasets - the Jobs and Skills Australia 2025 Occupation Shortage List at six-digit occupational level, and ABS Occupation Profiles data (February 2026) - were analysed directly and underwrite the occupation-level claims made in Section 1. The sample is longitudinal by design, for example four editions of the ACS *Australia's Digital Pulse* series are included (2015, 2019, 2023, 2024) so that shifts in framing, terminology and projection can be traced across a decade of the reports from the same organisation

Second, a sample of the media materials through which the software engineering profession narrates itself to the public and to itself, and through which significant actors in the tech industry express their views. This sample was selected to represent existing industry, government and other sector stakeholders documents and media through which the software engineering profession and its relationship to the jobs market and technological innovation are represented.

Media accounts, channels and podcasts were selected across three domains.

Platforms: Instagram, YouTube, LinkedIn, and podcast and newsletters. Each platform has a distinct narrative register and reaches a distinct audience.

Perspectives: Australian and international tech magazines, professional-body and industry-association accounts, individual working engineers with public followings, career-transition influencers speaking to reskillers and students, and critical views whose content foregrounds labour conditions, *AI displacement or* ethical issues.

Registers: polished corporate content, everyday professional self-presentation, technical tutorial and explanatory content, and the more informal genre of engineers processing sector transitions in technical everyday jargon.

In total, the media sample comprises 17 Instagram accounts (two Tech Magazines Wired and Techcrunch; and fifteen tech Influencers spanning from AI to Tech Work to Python programming) 11 LinkedIn company profiles and Hacker News thread on Tech Jobs and newsletter series, followed from the 2023 to July 2026. With a total of 105 posts analysed. Media posts were selected because they engaged with: the present and future of the software engineer's professional life; AI impact in the market, coding, programming and technological design. To select them, we follow hashtag and mentions from already analysed accounts and posts such as #AIloop or #techindustrylayoffs along with searching articles in specialised digital magazines and/or repositories with keywords such as future of software engineering, vibecode or tech industry hires.

The reports are analysed as documents that produce categories rather than as neutral measurements. Across the decade, four distinct classification systems have been used to count software engineers: ANZSCO, OSCA, the Centre for Innovative Industries Economic Research groupings, and the Tech Council of Australia's own definition of tech jobs. Each represents a different segment of the population. This means that often it is not the workforce itself that changes, but the criteria that are used to define it.

1.The vanishing shortage

What the numbers said, and when they changed

For a decade the Australian technology sector was described as a sensitive industry for the economy, sovereignty and future of the nation running short of the people it crucially needed. The Australian Computer Society's *Digital Pulse report*, published annually since 2015 by Deloitte Access Economics, built and provided evidence for the government and industry alike until the present. The Tech Council of Australia's *Getting to 1.2 million* report (2022) provided the statistics of growing need of the tech sector and industrial spectrum workforce that informed the policy: Australia would need 653,000 additional tech workers by 2030, and 1.2 million tech jobs in total should be created.

The *Digital Pulse 2023* report was key for this report to establish the cost of the shortage for Australia in 2023 and the report priced the “inaction” at sixteen billion Australian dollars in 2030, in 2023 dollars. Moreover, *Digital Pulse* 2024 modelled a twenty-one billion dollar gain in economic activity over twenty years from raising the participation of women, workers over 55 and workers with a disability (p. 18).

However, in October 2025 the narrative shifted: Jobs and Skills Australia published the annual Occupation Shortage List, in which the proportion of occupations in shortage fell across all four skill levels. The sharpest fall was in Skill Level 1 - degree-qualified professionals, the band that contains every software engineering occupation - from thirty-seven per cent in shortage in 2024 to thirty-one per cent in 2025.

The *Internet Vacancy Index* – a monthly count of online job advertisements compiled by Jobs and Skills Australia with data available by occupational groups, skill level groups, state or territory and by regional areas – was down almost seven per cent. Recruitment difficulty fell from fifty-five per cent to forty-four, the Professionals major group - the ANZSCO/OSCA category that groups all degree-qualified occupations, from software engineers and doctors to lawyers, teachers and scientists - alone accounted for about half the national decline.

Software Engineer, Analyst Programmer, Developer Programmer, Web Developer, Penetration Tester, ICT Quality Assurance Engineer, ICT Systems Test Engineer, Software and Applications Programmers not elsewhere classified appear all No Shortage, nationally, and in every state and territory (Jobs and Skills Australia (2025), *2025 Occupation Shortage List* (line-level dataset, 6-digit ANZSCO 2022 and OSCA 2024). For the very first time the roles still marked in shortage are narrower and specific: Cyber Security Engineer, DevOps Engineer, Cloud Engineer, Software Tester (testing splits with Software Tester in shortage everywhere and the ICT quality-assurance and systems-test codes not in shortage anywhere), and the cyber-adjacent architectural and governance roles. Engineering Technologist is in national shortage under both frameworks. The shortage has not disappeared; it has been redrawn, and what remains - cybersecurity, cloud, DevOps, testing at the intersection of AI and infrastructure - show what the industry now conceives as its strategic frontier, the roles its most depends are precisely those it is struggling to hire.

Importantly, the roles which remain in shortage - Cloud Engineer, DevOps Engineer, Cyber Security Engineer, Software Tester, and the cyber-adjacent governance, architecture and operations roles - are precisely the roles that structure operational contemporary software engineering practice. They comprise the infrastructure engineers roles that supports production systems, the security and compliance roles that absorbs regulatory and reputational risk, and the automation and delivery roles that sustains continuous change (Jobs and Skills Australia 2025, OSL)

This new shortage reflects how the tech industry is projecting itself and its key operational areas for its future.

Roles whose main task is to produce code are excluded from the lists whilst the roles that secure and operate already existing code are in shortage. Organisations are struggling to recruit software engineers who can run, build, secure and govern architectures and infrastructures already programmed. This new shortage also reflects the tech industry's operational anxieties around system breaking; it has moved from building, writing and expanding code to testing and verifying code to secure what already exists. By 2026 experienced software engineers were most needed, while in contrast during the 2022 shortage entry level roles were most urgently needed to cover for the Australian’s industry projections. This points to a contradiction for the near future: if the organisations stop hiring level 1 software engineers they will not produce the future experienced professionals they now urgently need.

Why the story about the shortage ended (and why the industry keeps claiming a shortage)

Oxford Economics Australia's (OEA) modelling for the Future Skills Organisation (FSO), published in 2025, still projects a 131,000-worker occupational shortfall by 2030. Within this, Software and Application Programmers account for the largest single deficit at 19,600 workers or 12.5 per cent (p. 50), alongside a separately modelled industry shortfall of approximately 61,000 (p. 42).
Oxford Economics Australia built the model to a brief from the FSO, the industry-led Jobs and Skills Council for the sector. The plan describes the framework as offering an "unconstrained view of demand" (FSO p.41), a projection of the workforce that expected

industry growth would require by 2030, set compared to supply extrapolated from current trends. The resulting shortfall is therefore a modelled gap between two projections, not a count of positions employers cannot currently fill.

However, FSO itself includes a disclaimer footnote which notes that shifts in migration policy or economic circumstances may render the modelling useless. Therefore, FSO's projections of growth are contingent on continued development of the technology sector and adjacent sectors. Rather than forecasting the labour market, they inform planning for expanding training pathways and migration policy, repeating the same logic observed in the Tech Council and ACS projections .

In continuing to describe a shortage that the Jobs and Skill Australia's more empirical instruments no longer register, the FSO report supports a policy environment that has to be cautious and not reactive to alterations that could be temporary. The report offers similar stability to migration and education settings that must be in place for a national future that exceeds the current market needs. More importantly, they take into account the relevance of the tech sector's role in the future economy.

1 The role-level shortage ratings referred to throughout this section are drawn from the author's filtering of the Jobs and Skills Australia 2025 Occupation Shortage List dataset (6-digit ANZSCO 2022 and OSCA 2024), retaining only occupations that fall within a working definition of software-engineer-relevant work - direct software, cloud, cyber, testing and data-engineering roles; adjacent ICT and data roles commonly filled by software engineers; and broader ICT management and support pathways. The narrative interpretations of the JSA figures - the "matter-of-fact tone," the "redrawn perimeter" - are the author's, not JSA's; the JSA report itself observes only that "the results for these roles are consistent with various sectors in the labour market that are integrating artificial intelligence technology" (2025 OSL Key Findings Report, p. 5)

The plausible explanations

The explanation of the *no shortage* in the Jobs and Skill Australia 2025 report is mainly an outcome of the following factors.

A. The post-pandemic hiring rampage of 2021–2022 was followed by a normalisation of job postings across the tech sector, and the parallel wave of redundancies at major technology employers released mid-career engineers back into the local market. This dynamic is best documented in US data but visible in Australian sector coverage (CompTIA, State of the Tech Workforce 2026; corroborated in State of the Tech Workforce 2024).

B. Jobs and Skills Australia notes that the results for these roles are consistent with sectors integrating AI, and observes that the finance and technology sectors have been ‘more progressed in digital skills development’ (p. 5).

C. The Copilot successors and agentic development environments that arrived through 2024 and 2025 have reduced the number of engineers required per project, particularly for the routine work that used to justify graduate hiring. This shift had already been anticipated by ACS Digital Pulse 2023 when it observed that “Generative AI may streamline the need for in-depth knowledge of coding" illustrating an expectation of difficulty rather than a projection about software work futures (ACS 2023, p. 22).
D. The migration queue has continued to clear through the pathway to permanent visas, twenty-two per cent of Software and Applications Programmers initially entered Australia on a temporary visa before transferring to a permanent one (FSO Workforce Plan 2025, p. 53, citing Department of Home Affairs, Migration trends 2022–23). And the reskilling infrastructure - the bootcamps, corporate training programmes, and mid-career transition schemes documented in the Digital and Tech Skills Working Group's 2023 mapping - is now visible in the workforce, even if VET and university completion rates remain a persistent concern (Digital and Tech Skills Working Group, Final Report, 2023; FSO WFP 2025, p. 33.).

D. The migration queue has continued to clear through the pathway to permanent visas, twenty-two per cent of Software and Applications Programmers initially entered Australia on a temporary visa before transferring to a permanent one (FSO Workforce Plan 2025, p. 53, citing Department of Home Affairs, Migration trends 2022–23). And the reskilling infrastructure - the bootcamps, corporate training programmes, and mid-career transition schemes documented in the Digital and Tech Skills Working Group's 2023 mapping - is now visible in the workforce, even if VET and university completion rates remain a persistent concern (Digital and Tech Skills Working Group, Final Report, 2023; FSO WFP 2025, p. 33.).

2. What the shortage story was doing

Tech is a ‘good job’

The Tech Council's 2022 report strongly represents tech jobs as *good jobs*. On a weekly basis tech sector jobs overall paid sixty-four per cent more than the national average which the report points to a higher rate of full time work. Tech workers who had worked in tech were less likely to have left the workforce altogether after eight years, lower than in other high-paying industries.

Forty per cent of tech workers did not have a tertiary degree, which the report used to reframe tech as the great social-mobility ladder of the Australian economy. There were, the report noted with satisfaction, more software engineers and developers in Australia than solicitors, plumbers and hairdressers (Tech Council 2022).

The Tech Council report thus positioned software engineering as an inspiration for an aspirational job in the digital economy: well-paid, secure, and accessible to people whose parents did not go to university. It made tech work visible to the Australian imagination as an opportunity for the middle class, opposite to an elite work for the upper class. This understanding of techwork also shaped the design of reskilling programmes, the marketing of bootcamps, (for example: Envato's mid-career apprentices in Melbourne; Phocas Software's regional developers in Orange), and the case for expanding the migration pipeline (Tech Council of Australia and Accenture (2022) *Australia's Tech Jobs Opportunity*, pp. 4 and 9). When the software engineer shortage was seen to end the Tech Council's positioning of software engineering did not necessarily become redundant. However, it is now harder to sustain the narrative of techwork as a social ladder in the current context where high salaries are no longer directly associated with high demand for software work.

From technology jobs to technology skills

In its 2023 reports *Australia's Digital Pulse 2023*, subtitled *A new approach to building Australia's technology skills,* ACS argued that the correct unit of analysis was no longer technology jobs but technology skills. Technology, the report's foreword said, is not a standalone function. Every business function is now recruiting technical capability. What matters is not the count of software engineers in the economy but the distribution of technical skills across the workforce. *Digital Pulse* 2024 elaborated: 1.1 million Australians in adjacent roles could, with support, transition into tech such as mathematicians, electronic engineers, marketing professionals. According to *Digital Pulse 2024* the problem moved from there being no workers to there being no pathways to upskill existing workers.

This was a significant reframing moving the object of policy from a demarcated professional category to a distributed capability. It allows the tech-workforce discourse to survive the ending of the shortage story, because if the unit is skills rather than jobs, then the demand is never really satisfied and the workforce is always in some sense under-skilled. It was also a move which correctly anticipated that if **AI tools enable any knowledge worker to produce working code, then the software engineer is no longer defined by the ability to write code.** Instead software engineers have become distinguished by their capabilities in judgement, architecture, security, integration, and the capacity to know when the code the AI produced is wrong and how to fix it (see Osmani, 2025). The 2023 reframing was, in retrospect, unusually well timed partially in an anticipation movement to respond to an expected disruption AI would cause.

Critical technologies, geopoliticised engineering

The other major reframing of the shortage was represented in the *Commonwealth Critical Technologies Statement* (2023) which identified seven critical technologies fields as consequential for national interest to 2030 and beyond. *ACS Digital Pulse 2024* built on this to argue that digital skill is not a generic ICT function but a national-strategic capability. This is a claim made for ‘technology workers” in general, including software engineers but not exclusively. This was made concrete across a series of investments: the Australian Signals Directorate's REDSPICE programme, expected to create 1,900 new positions and representing a three-fold increase in offensive cyber capability, defined as the largest single investment in signals intelligence in ASD's seventy-five year history; the combined Commonwealth and Queensland commitment of almost one billion dollars in grants, loans and share purchases to PsiQuantum, investment justified by CSIRO projections of a $5.9 billion quantum industry by 2045, but whose workforce composition remains largely unspecified in the public record; and, following the 2021 AUKUS Partnership and the 2023 Defence Strategic Review, thirty-six billion dollars earmarked for cyber, space and electronic warfare over the following decade (ACS 2024, pp. 9–10).

Queensland commitment significance for software engineers lies in establishing the state as a major purchaser of technical work, concentrated in precisely the specialisms that the 2025 Occupation Shortage List still records as unmet. And they attach conditions of participation that are difficult to match for the commercial market, such as clearance and citizenship. The one shortage rating in the 2015 *Digital Pulse* that applied to software engineers was for those requiring high-level security clearance. A decade later, this is one of the few areas in which

the software worker shortage continues. Software engineering, in fields that require security clearance, is not just a *good job*, it is a crucial national capability. It is entangled with Australia's national sovereignty and place in the Indo-Pacific region. This is a very different image of the profession from that of social mobility represented in the Tech Council reports. It moreover targets a different worker to the reskilled professional from marketing, in the form of the security-cleared specialist or/and data scientist.

3. The tech professional replacing the software engineer

Values Three spheres of value were identified across the reports: *responsible innovation*; *regulation*; and *emerging occupational categories*. Together these can be seen to shape new expectations for the emerging role of the emerging tech professional. *Responsible innovation:* Cisco's 2025 *Purpose Report* is the fullest expression of the values that are embodied by the current notion of the role of the software engineer: security, privacy, ethics, accessibility-by-design, human rights due diligence in the supply chain, and public-policy advocacy for guardrails on AI. Ninety-nine point nine per cent of Cisco employees complete annual Code of Business Conduct training. Advancing responsible AI is described as a workforce-skills issue. The tech professional, in this frame, is a person of judgement who inhabits an ethical infrastructure that their employer provides.

Regulation as THE horizon: Dr Ian Oppermann, the NSW Chief Data Scientist, has formulated that "creating the right environment and settings for critical technologies like AI… is not a matter of compliance; it's a cornerstone of a prosperous and ethical digital future" (*Digital Pulse* 2023 p.17) . He proposed a move from regulation as a constraint to an enabler. The tech professional is recast as *guardian* of public interest, working with regulators rather than seeking to evade them.

Emerging occupational categories: Digital Pulse 2023 projects the arrival of AI ethicists, AI personality designers, algorithm bias auditors, information validators and AI regulatory specialists as recognisable roles by 2030. This values-focused work is being formalised as an occupational category, instead of being assumed to be an implicit dimension of engineering practice. While the ethical and regulatory dimensions of AI have conventionally been dispersed responsibilities located across the engineering community, they are now becoming jobs, with training pathways and salary bands.

What the reports do not cover

The Australian sample of reports analysed contained little discussion of engineer-led activism, refusal, unionisation or worker-organised ethics movements. For example there was no mention of key events including the Google walkouts of the late 2010s (Google Walkout For Real Change, Medium, 3 November 2018;Hepler, Bekiempis & Weaver, *The Guardian*, 1 November 2018;Wakabayashi, Tsang & Conger., *New York Times*, 1 November 2018), the Amazon and Microsoft internal petitions on defence contracts (Solon, *NBC News*, 22 February 2019; O'Donovan, *BuzzFeed News*, 22 February 2019), the current wave of writer- and technologist-led campaigns against generative AI training practices (Frenkel & Thompson, *New York Times*, 18 July 2023; Barbaro, 2023; Bansal, Tech Policy, 17 June 2026).
This is consistent with accounts of tech worker activism that centre software engineers and other privileged tech workers, when much of that activism is in fact led by last-mile workers (Tan & Nedzhvetskaya, Collective Action Archive, 2026).

Thus the values associated with software work are predominantly corporate-led and state-adjacent, rather than being worker-led. In this respect the grey literature analysed did not represent narratives that were found in the analysis of media and influencer materials, where Australian software engineers narrate their own accounts of what the work is becoming.

The lone coder is retired

In AI-related job advertisements, people skills - communication, teamwork, problem-solving, writing - rose from twenty-three per cent to thirty-two per cent of total skills requested over five years (Digital Pulse 2024, p.37). This departs from the figure of the *lone coder* which has characterised the values, practices and ethos of the software engineers in media and academic literature for almost two decades. The lone coder was linked to the Silicon Valley Ideology (See Svensson, 2020) but not exclusively (Bialski, 2024), and has been also understood as aligned with the logics of big tech companies (Srnicek, 2025), yet is no longer represented in software worker job advertisements or skillset descriptions. What a software engineer *is* has become increasingly defined in relation to people skills.

4. Software engineering and the twin transitions?

The dominant frame for the future of tech work in Australia is the digital transition (Tech Council, 2022).

Oxford Economics Australia for the Future Skills Organisation projects the technology industry growing at four per cent annually, potentially exceeding six hundred thousand jobs by 2030. Computer System Design and Related Services alone is projected to grow at 4.6 per cent. Migration is projected to supply fifty-eight thousand six hundred workers to the tech industry between 2024 and 2030. The Tech Council estimates that AI will contribute $115 billion to Australia's economy and create 200,000 jobs by 2030 (Workforce Plan 2025, p. 61). *Digital Pulse 2024* reports the same number as an annual contribution and attributes it directly to generative AI (p. 6).

Australia’s net zero transition, represented in the Australian Government's, is less directly associated with software work futures.

Digital Pulse 2024 notes that climate tech has reduced or removed two million tonnes of CO2 to date (p.6), and that technology leaders are thirteen per cent more likely to target net zero by 2030 (*Digital Pulse 2023*) than other C-suite executives. There are references to critical minerals, solar, batteries and hydrogen as part of the Future Made in Australia agenda. But nowhere in the Australian workforce literature is there a serious estimate of how many climate-tech software engineers the country needs, or where they will work, or what the training pathway looks like. In contrast, the European double frame of digital and green transition makes this more evident. The European Commission's Digital Decade report, published in September 2023, describes digital and green as twin transitions. They are joined in policy and monitored together. In contrast, Australia's reports tend to take these transitions separately.

Cisco's FY25 Purpose Report is one of the few places where the relationship between AI growth and net zero comes into view. The report projects an increase in Cisco's own operational energy demands alongside the growth of AI and digitisation, and towards this, three priorities: improving product energy efficiency, modernising the electric grid, and adopting clean energy. Yet CISCO’s report separates the discussion of workforce from that of the twin transitions. Its Networking Academy, Learn with Cisco, and commitment to train twenty-five million further learners by FY2030 refer only to digital and cybersecurity skills, with AI added as course content (pp. 17-19). Across fifty-three pages, the

report contains no reference to green skills, sustainability skills, or energy skills.

Even water appears in relation to Cisco's own operational withdrawals, never in connection with data centres or cooling (p. 48). The tech worker is asked to have the skills to operate in the digital transition but not to bring this together with the clean energy transition.

This frame could become more consequential in Australia if debates about data-centre placement, grid capacity, and water use for cooling intersect with the geopolitics of AI infrastructure.

5. Who counts as a software engineer?

The category of *software engineer* is not stable across the reports and grey literature reviewed. For the ANZSCO dataset, Software Engineer is grouped in a cluster called Software and Applications Programmers, whose common denominator is writing code, alongside Analyst Programmer, Developer Programmer, and Software Tester. The group survives. ANZSCO unit group 2613 *Software and Applications Programmers* becomes OSCA unit group 2733 Software and Applications Engineers. Certain terms move to other categories or are reclassified as categories themselves; "Programmer" is relocated as a noun for a family of occupations but no longer refers to a job that someone can do; “Software Engineer” is regrouped with the Cloud Engineer and the DevOps Engineer; cybersecurity is removed into a self-contained block of seven codes, and testing has moved to ICT support. This suggests that activity, as the principle of classification, has been replaced by infrastructure and professional domains such as cloud, data, network, security. In practice, a tech worker may write code in any of these professional domains, but the occupations or roles are no longer named by the activity they perform. The state's classification of technology work is applied to categories of specialist skills deployed across different domains, while simultaneously the tech industry has a single, broad category of tech skills. However the role of the software engineer is dispersed differently in each of these systems, and doesn't fully fit either category.

The 2025 Occupation Shortage List was published in both ANZCO and OSCA frameworks because the transition is still in progress, it might reflect a change in measurement methods.

ANZSCO 261313 Software Engineer: designs, develops, modifies, documents, tests, implements, installs and supports software applications and systems.

OSCA 273333 Software Engineer: designs, develops, modifies, documents, tests and maintains software applications and systems using programming languages and development tools.

The official definition of who is a software engineer is being rethought at exactly the point when the shortage narrative that depended on the older definition has ended.

Four taxonomies now coexist in Australian discourse.

- OSCA 2024, the current ABS classification, breaks the profession and spreads it out. The successor codes to ANZSCO 2613 are now spread across at least three OSCA unit groups, with cyber security removed to its own block and testing moved to ICT Test Analyst.
- ANZSCO 2022 uses a four-digit unit group - Software and Applications Programmers (2613) - that most projections still rely on.
- ACS uses a classification that groups occupations into ICT management, ICT technical and professional, ICT sales, ICT trades, and electronic trades.
- The Tech Council's current definition combines tech occupations in tech industries with tech occupations elsewhere, plus online-commerce roles in retail and wholesale.

Each taxonomy tells a story about how many software engineers Australia has, where they work, and what they do for different audiences, suggesting the profession is a constellation, not an occupation.

* Direct software engineering roles - twenty-three OSCA and ANZSCO codes that explicitly name software, development, DevOps, cloud, cyber engineering, testing or data engineering.

* Adjacent roles - twenty-four ICT, data, cyber and systems codes commonly filled by people trained as software engineers.

Broader ICT pathways, nineteen management, design, administration and support codes where a software engineer with experience might land (OSL 2025). There are moreover tensions between these classifications: Skill Level 1 in ANZSCO and OSCA maps to bachelor-degree qualification, but the Tech Council's own data records that forty per cent of tech workers (people in the tech sector) do not have a tertiary degree. The official classification system over-represents formal credentialism relative to what the industry actually hires. When ACS argues that the unit of analysis should shift from jobs to skills, it is partly acknowledging this. It is also, quietly, admitting that the taxonomy the reports rely on no longer describes the workforce those same reports describe.

Professionals Australia in its grey literature, including the *Employment and Remuneration Trends for Tech, Software and IT Professionals* 2024 report, between approximately 2021 and 2024, renamed its workforce report from *ICT professionals* to *Tech, Software, and IT professionals.* This suggests that the terminology change could be more organic to the tech environment than industry-driven.

6. Where does software engineering work happen?

This section highlights the key Australian software companies' and strategic government initiatives evident in the reports reviewed. We note that this does not cover all activity in the Australian software sector but indicates a series of standout initiatives.

Software industry employers

The global software company Atlassian is the largest Australian-founded (in Sydney in 2002) software company, and appears on the list of organisations consulted by the Digital and Tech Skills Working Group. However Atlassian was rarely analysed in the reports reviewed or in academic literature (it is mentioned illustratively in Tech Council's *2022 Tech Jobs Opportunity Report*) which is noticeable since it is the largest Australian software company and probably one of the biggest private contractors of software engineers. Envato, based in Melbourne is a company which provides software tools for creative content producers. In the reports reviewed it was treated as a preferred case study for mid-career reskilling, particularly through its Apprentice Developer Programme. Phocas Software in Orange, New South Wales, is the go-to example of regional tech employment. Westpac and Commonwealth Bank are cited for women-in-tech reskilling programmes across cyber security, data and cloud. HCLTech's TechBee programme is worth attention as a high-school-to-tech-career pipeline run by an Indian multinational, useful for the India-Australia migration pathway.

Strategic initiatives in Australia

An example of the strategic views in Australia is PsiQuantum's Brisbane facility, backed by close to one billion dollars in combined Commonwealth and Queensland investment, is the flagship of the sovereign-technology narrative. This initiative plans to generate 400 new jobs in Queensland expecting to be in its majority from STEM and within it, mostly software engineers specialising in quantum computing and adjacent technologies.

Another initiative for extending AI capability into small and medium enterprises are the fourAI Adopt Centres funded through a $17 million Australian Government programme. This initiative is linked to the support needed by the government to achieve the 1.2 million tech jobs target (Tech Council 2022) although it is not job creation or workforce expansion planned attached to the centres.

The tech-adjacent industry as employer of software engineers

The most important structural fact about Australian software engineering is that most of it does not happen in software companies. Most software engineering roles are in banks, mining companies, government agencies, insurers, professional-services firms, health systems and retailers. *Getting to 1.2 Million* (2022) highlights that even when the software industry is one of the most hiring industries in Australia most of the jobs in Tech Sector are outside of software companies. Therefore, the 861,000 tech-sector workers counted by the Tech Council in 2021 are dispersed across the economy. In the United States comparator provided by CompTIA's 2026 report, the top ten industry sectors employ around ninety-four per cent of tech workers, with the proper tech sector representing only the largest of them. The rank order runs: tech, professional services, finance and insurance, public sector, holdings, administrative services, retail and wholesale, manufacturing, healthcare, education. Australia's distribution is likely similar.

AI-related job advertisements in mining, healthcare and manufacturing more than doubled over five years. Nevertheless, ACS highlights that AI skills are progressively requested to apply digital tools rather than developing them, with people or soft skills rising from 23 to 32 per cent of requested skills. Ergo, the narrative that AI is expanding job demands is correct, but the benefit is not mainly for software engineers.

Among the fastest-growing AI-skill-requesting roles are cyber security analysts (up 243 per cent), product managers (up 215 per cent) and researchers (up 193 per cent). *Top AI-requesting occupations*: data scientists, software developers, data analysts, database architects and computer systems engineers account for 45 per cent of AI job advertisements but grew only 6 percent in the last five years (Digital Pulse 2024, p.37). Software engineers are being pulled into industries that historically did not think of themselves as tech employers (which is an anticipated move for quantum futures as well). The non-tech industry is where the profession currently lives, and increasingly the threat of Agentic AI “killing” the SaaS (software as a service) industry (Saker, 2026) will potentially push more software engineers to the non-tech industries.

7. The Indo-Pacific and the sovereignty frame

Australia's position in its region matters more to the tech-workforce discourse than the reports make explicit because of its prominence in the region. The 2023 report of the House Standing Committee on Industry, Science and Resources placed sovereign capability as an organising principle for advanced manufacturing (*Sovereign, smart, sustainable)* as a post-pandemic consensus. *Digital Pulse 2024* extended the framing to digital skills: In the Indo-Pacific, digital skills are also gaining prominence, as countries seek to “counter grey zone activities such as cyber warfare” and sovereign *digital workforce*. The cyber security workforce, in particular, is now understood as a regional security asset, not just a national labour market.

Migrants constitute forty-one per cent of the technology workforce; when the measure widens to "born overseas" ACS Digital Pulse puts the share closer to forty-nine (FSO Workforce Plan 2025, p. 52, citing Oxford Economics Australia FTB Migration analysis; cf. ACS *Digital Pulse 2024,* Snapshot on cultural diversity, pp. 18 and 21). Fifty-nine per cent of Software and Applications Programmers are visa holders (Workforce Plan 2025, p. 53, citing Oxford Economics Australia FTB Migration analysis). The temporary skilled visa pathway plus transition account**s for** 17% of the tech workforce**, double the rate in other occupations and** 22% of Software and Applications Programmers **entered on a t**emporary visa before transferring to permanent (Workforce Plan 2025, p. 53, citing Department of Home Affairs, Migration trends 2022–23).

The comparison with the European Union highlights what Australian sources lack. The EU's 2023 State of the Digital Decade report describes an international outreach built on digital partnerships with like-minded states (Japan, the Republic of Korea and Singapore) and structured through Trade and Technology Councils with the United States and India. The transatlantic council has stopped, whilst the EU–India council has continued. It met for the third time in July 2026, and its agenda now covers everything from cooperation between the EU's Digital Skills Academies and India's NIELIT platform to the mobility of skilled ICT professionals. In 2023, Australia signed a Migration and Mobility Partnership Arrangement with India under which the MATES scheme assigns 3,000 places a year to Indian graduates, eligible fields including AI, fintech, agritech, engineering, mining, renewable energy and ICT. However, Australia lacks a council instrument. The importance of this will be tested in the digital sovereignty of the coming decade, which is built through these bilateral and regional councils; Australia's participation in labour mobility without participation in standards-setting directly shapes what its software workforce will and will not have access to, and to institutional pathways.

The investment gap with peers is the other recurring frame that appears in Future Made, Tech Council and ACS reports. Digital Pulse 2023 records that Japan's investment in technology is up to 8.2 per cent of GDP, the United States 7.8 per cent, and Australia 6.7 per cent. This is a small gap in percentage terms and a large one financially, deployed in the reports as an argument for domestic investment and, we suggest, workforce expansion. It also, quietly, positions Australia as *always-behind*, which is a rhetorical stance the reports continue over the years, and Digital Pulse 2023 makes explicit when it predicts strong investment growth to 2030. It also specifies that even if superb growth happens it will not match Japan and the US.

8. Sites of innovation

Five sites are highlighted across the grey literature in the sample analysed as the places where the next demand for software engineering is being produced and in correlation to localised shortages claimed in the analysed reports.

CSIRO estimates an Australian **quantum computing industry** worth $5.9 billion by 2045, contributing $6.1 billion to GDP in that year, of which $2.4 billion would come from spillovers into health, transport, space, mining and defence (ACS Digital Pulse 2024, p. 9, citing CSIRO 2022; “potentially adding” in FSO Workforce Plan 2025, p. 62) making quantum the most prominent locus for innovation. CSIRO modelling also suggests that the effect will generate 19,400 new jobs by 2045 (Digital Pulse 2023, p. 16). The Centre for Quantum Growth and the PsiQuantum investment are the current pillars, the latter carrying almost $1 billion in Commonwealth and Queensland grants and loans. The workforce implication is a small, highly specialised professional community concentrated in a few institutions, most of them university-adjacent: as at 2021 the reports counted 22 quantum-related research institutes, two Centres of Excellence and 16 quantum-related private organisations.

Digital Pulse 2024 reports that **defence, the largest funded area**, already employed over 5,200 technology workers in 2023, or eight per cent of its total workforce, and that this number is set to grow with a planned $36 billion investment in cyber, space and electronic warfare in the next decade.

Digital Pulse 2024 credits the **climate tech sector** with innovation across agrifood, carbon markets, renewables and the circular economy, and with two million tonnes of CO2 reduced or removed from the atmosphere to date. The number appears in the report's economic impact section, alongside value-added and export data. No workforce projection attaches to it anywhere in the sample of materials analysed. Climate technology enters this grey literature as an impact narrative with no workforce plan.

The **dissolution of the boundary between consumer and military technology** is the most distinctive niche. *Digital Pulse 2024* cites the Ukrainian army's adoption of first-person-view drones - civilian technology repurposed for surveillance and strike - as an instance of how technological readiness and adaptability now decide outcomes. The report makes this argument about platforms, but it could extend to software engineers: if civilian and military stacks are converging, then the difference between what a civilian and a military software engineer builds is dissolving, or is being made to dissolve. This has implications for how software engineers imagine the ethical scope of their work. This is a values discussion that the grey literature does not include.

The fifth site is **cybersecurity,** the only one where the shortage is documented in real time. A specific group of software-engineer-relevant occupations in national shortage on the 2025 Occupation Shortage List, under both the ANZSCO 2022 and OSCA 2024 frameworks: cyber security engineer, cyber security architect, cyber governance risk and compliance specialist, cyber security operations coordinator, DevOps engineer, cloud engineer, software tester (ICT test analyst under OSCA) and engineering technologist (Jobs and Skills Australia, 2025 Occupation Shortage List). The group being narrower than "cyber security" suggests. Penetration testers, cyber security analysts and cyber security advice and assessment specialists show no national shortage. **What is in shortage, in other words, is the engineering, architecture, governance and operations of secure systems.**

The demand for software engineers is being posed around security and infrastructure-as-code. It could be led by quantum threats to the cryptographic assumptions of existing systems, AI-scale computing is adding infrastructure faster than it is adding the people to secure it, and both the volume of attacks and the concentration of data in vulnerable infrastructure continue to grow.

9. Media: tech magazines, Instagram, LinkedIn and digital media repositories

Software engineers engage with a spectrum of media to identify their own narratives, share code and produce meaning of the processes they are involved in (Lanzeni, 2016; Otto et al, 2023). For this reason, to understand how software engineers themselves engage with and contribute to shaping the changing national workforce panorama described in the previous sections, it is important to account for this media world. The narratives identified in our analysis of reports and grey literatures are often amplified, or countered in media content created by software engineers themselves for YouTube, Instagram and other social media platforms, and/or media delivered by other key actors, including for example, *Wired* (a globally recognised tech magazine) and *Hacker News* (a social news aggregator for the tech, startup, and developer communities, by Y Combinator).

While the grey literature and reports deliver static updates (albeit regularly) they cannot stay up to date with the continuous shifts in the processes and practices of both software developers and the sector associated with agentic AI. Yet these changes are consistently and prominently represented in tech magazines and on social media. Influencer content moves faster than the grey literature, and in Influencer social media posts

shifting professional identities is reflected as it happens in everyday posting.

The vibe-coding vernacular. New practices and uses of AI are posted weekly in the online software engineering community, ranging from vibe coding and agentic loops, to the ambient promise that AI can build whatever you ask for These are also consumer-facing topics from the AI industry, but they are being moved into how professional engineers narrate their own practice particularly when seeking to share their know-how. For example, their self-description is changing from *I write software* to *I orchestrate systems*.

The "coping register" (Wired Instagram post, October 2025) is a recurring content genre found in LinkedIn posts, short-form video, and podcast episodes in which experienced software engineers process the layoffs of 2023 and 2024. Preliminary analysis of "coping register" narratives suggests that software engineers interpret the problem as not that there are no jobs, but that the job has changed and previous expectations about pathways to seniority have become uncertain. Thus while the reports and grey literature reviewed describe an easing labour market; social media influencers describe a labour market that has changed in ways that are not represented in labour market statistics.

The circulating claim that "programming as a profession will not exist in three years." This claim is taken more seriously by critics of the software industry than by the working software engineers as reflected on analysed posts and accounts. The implication is that the anticipatory practices of the profession are more grounded, and more collectively developed, than the grey literature or the media assume.

Artificial Intelligence in the software engineers everyday life

AI arrived in mass media as a wholesale disruption of working life with the public release of ChatGPT in late 2022, and over the following two years the narrative settled into an inevitability mode: which jobs would go, which would be remade, how quickly. For software developers none of this was news. AI had been present for years in the systems they built and in their professional imaginaries of where coding was heading, from statistical autocomplete and static analysis to GitHub Copilot's general availability in 2022. What changed was not the arrival of the technology in their working lives but the terms on which it entered their own practices of making, from writing code to designing architectures. That shift came in early 2025, when agentic tools such as Cursor, Claude Code and Copilot's agent mode moved from proposing the next line to writing, running and revising whole units of work, and Andrej Karpathy's coinage of "vibe coding" in February 2025 gave the change a name that travelled considerably faster than any evidence about its consequences.

To account for everything now unfolding between AI and software engineers would require a different report. An increasing tension emerged across the social media material and reverberated directly on the shortage: the first is budgetary, between what a firm spends on engineers and what it spends on the AI capacity those engineers use. This concerns how software engineers regard and actively negotiate their own immediate occupational futures.

Tokens against engineers

The allocation of a company's budget either to salaries or to AI tokens, according to Insider Tech, a social media account well recognised among software engineers and commented on assiduously at Hacker News, calls this "token-fever whiplash", setting a model-building company's claim that a $100,000-a-year employee can probably be made twice as productive with $10,000 worth of tokens against the start-up MindFort's discomfort at having to weigh its token-to-people ratio at all. The ratio is stated as though the two quantities were substitutes, which is the whole of the tension in a phrase.

On the All-In Podcast, recorded on the final day of GTC 2026, the Nvidia chief executive Jensen Huang said he would be "deeply alarmed" if a $500,000 engineer's annual token consumption came in under half their salary; asked whether Nvidia was spending $2 billion a year on tokens for its engineering team, he answered that it was trying to.

Whether the substitution pays is another question that is also generating tension between the organisation management, particularly for CTO and COOs. Gartner's May 2026 survey of 350 executives at companies with at least $1 billion in revenue, all already piloting or deploying autonomous capabilities, found that around 80 per cent had reduced headcount and that the reductions showed no correlation with return on investment. Workforce reductions, in the analyst's summary, create budget room rather than revenues.

These sources are American. The tension appears, still incipiently, in the accounts of Australian developers and tech influencers such as Victor Fang (vfnggz), Troy Hunt, Blair Hudson or Michelle Sandford. But it is present in comments of Australian software engineers social media accounts in relation to organisations asking employees to reduce their token use to keep their salaries. This leads to another tension worth exploring, which is also emerging in social media, the pressure to justify software engineers' value against AI tokens.

AI native

A clear tendency emerges from the media analysis, a mandate to become "AI native". It circulates across platforms but is articulated most insistently by tech and recruitment companies hiring software engineers, and by institutional accounts - professional bodies among them - whose content carries a normative charge, presenting it as the baseline condition for participating in the tech workforce at all. The mandate extends well beyond the tech industry, across most of the white-collar workforce, but for software engineers it is a binomio: they are expected both to work with AI, as any knowledge worker now must, and to build the systems that impose that same expectation on everyone else.

The phrase carries a genealogy worth tracing, because the genealogy explains what the mandate demands. "Native" entered technology discourse as a description of persons, in Prensky's "digital natives" (2001; part 1), a generational claim about fluency acquired by immersion in opposition to instruction. It then migrated to infrastructure, where "cloud native" refers to an architecture, systems designed around the cloud from the start. "AI native" inherited this second, architectural sense before it was applied to anyone at all, describing through 2023 and 2024 the products, companies and workflows built with AI at their core. Applied back to a person, the architectural sense does not disappear. To be an AI-native engineer by 2025 is to have been built around AI in detriment of the software engineers that have adopted AI. Here "native" quietly naturalises an acquired competence into a capability of origin. Those who trained earlier are not undertrained, they are legacy.

Addy Osmani, an engineering leader at Google Chrome for over a decade, now heading its Developer Experience organisation and writes for a substantial developer audience through his Substack newsletter Elevate, his books and a heavy conference presence provided the meaning. In "The AI-Native Software Engineer", published on 1 July 2025 and subtitled a practical playbook, he defined the notion as one who integrates AI deeply into daily workflow and treats it as a partner rather than a tool, and framed the change as mainly one of mindset: not "will AI replace me?" but "could AI help me do this faster, better, or differently?" The substance is a shift from writing code to orchestrating agents (both terms are GenAI crafted) - Cursor, GitHub Copilot, Chrome DevTools MCP - with the engineer keeping for themselves rigour, verification and ownership of quality; it has since become a conference talk of the same title. What Osmani did was convert "AI native" from a business-strategy adjective into a describable kind of worker, with a disposition, a workflow and a set of tools attached.

10. Anticipated software engineering in Australia 2035

This section examines how the reports depict, in narrative and in numbers, the future of software engineers and of the Australian tech industry. Six visions of the future appear across the sample of reports analysed, largely oriented towards 2030, with some projections extending to 2035 and, in the case of quantum computing, to 2045. This report groups the promises, expectations and concerns according to what each vision constructs as its focus of attention.

Visions of the future for software engineers and the tech industry

The reports do not fully agree with one another, and the disagreements are as interesting as the shared assumptions. The first question to ask is what happens to the terms that refer to the figure of the software engineer over a decade of reporting.

Across the decade, the software engineer reference (a term I choose because it combines a profession, a role, and a signal of the tech industry) changes its name four times.

- In 2015 it is the ICT worker.
- By 2019 it is the technology worker.
- By 2022 it is the tech job, a category expansive enough to include legal, HR and product management.
- By 2023 it is added a “skill” to technology worker, distributed across a workforce of 11.2 million , 95% of the whole workforce, of whom every one will see (p.19), in the ACS's formulation, “at least 20% “of their work time replaced, augmented or otherwise impacted" in other words “will be tech workers in some way”(p. 34).
- OSCA 2024 disaggregates where the industry consolidates under *software engineer* category, splitting the software engineer into cloud, DevOps and software engineering roles that can be separately counted and separately found to be in shortage or not.

The counting of the terms is: *ICT worker* 123 and *technology worker* 0 in 2015; 4 and 111 in 2019; 1 and 43 in 2023; 0 and 86 in 2024.

The software engineer does not disappear from this sequence; on the contrary, it sits at the core of every new definition.

This progressive expansion/broadening of the meaning of the software engineer affects how we can understand the skills shortage. When Jobs

and Skills Australia recorded in 2025 that the canonical software engineering roles had moved to *No Shortage*, the industry literature was not contradicted, because it had long since stopped referring at the level of software engineering.

At the same time, as the last bullet point suggests, the state moved in the opposite direction. The notion of the software engineer in 2026 sits between two classificatory pressures: an industry discourse that dissolves it upward into the general condition of digital work, and statistical measurement that resolves it downward into special roles. Each classification defines what the software engineer is understood to be, and how the software engineer role is understood to fit within the economy and industrial spectrum.

The perpetual skills shortage that never quite arrives

The reports consistently project the software engineering skills shortage forward to 2030. However each time they use different vocabulary and against different assumptions about future economic and social conditions.

An example of these, the FSO *Workforce Plan 2025* defines the skills shortage through two distinct analytical tools: from an occupation-based perspective, technology occupations are expected to face a labour shortage of 131,000 workers by 2030 (p.50), with the largest single deficit in Software and Application Programmers, a shortfall of 12.5 per cent of that workforce; while from an industry-based perspective, the technology industry is expected to face a shortfall of approximately 61,000 workers by 2030, 80 per cent (p.42) of which is attributed to expected growth in the Computer System Design and Related Services sector. These are two ways of drawing the boundary around the same problem.

The demand for twenty-five of the twenty-six technology occupation groups is forecast to grow faster than the average for all finance, technology and business occupations, and Software and Application Programmers alone are projected to add 56,600 workers between 2024 and 2030, the largest projected increase of any technology occupation, ahead of ICT Managers (33,500) and Database and Security Specialists (21,600).

The *continued growth* plus the lack of skilled workers bring with it a call to action that ACS *Digital Pulse 2023* put as warning that inaction will conservatively cost Australia sixteen billion dollars in forgone economic activity in 2030, in 2023 dollars, and that a lack of the right digital skills already costs Australian businesses $3.1 billion each year (p.56).

Conclusion

The shortage projections continue to describe an acute shortage even as the JSA 2025 Occupation Shortage List records the shortage as ending. Notably the projection-based vision persists after the statistical evidence has changed.

Every worker is a tech worker: the dissolving software engineering profession

As noted in the introduction to this section, the terms used to refer to the software engineering profession and its roles are uneven across the last decade and across the reports analysed. Nonetheless, a common thread runs through them: all refer to people working, or holding a job, related to producing and designing technology across the Australian industrial spectrum.

The ACS *Digital Pulse 2023* reported that job advertisements requiring key emerging technology skills grew from 13% in 2012 to 32% in 2023, suggesting it will reach 61%by 2030. It projected that “as critical technologies mature, additional, unforeseen and exciting roles will be created throughout every organisation. *Every worker will be a tech worker* in some way" (p.34), to suggest that 95% of the Australian workforce -11.2 million employees - will have at least a fifth of their work time replaced, augmented or otherwise affected by critical technologies (p.19), and will require some reskilling (p.34, 56).

More recently CompTIA, the American industry association behind the A+, Network+ and Security+ certifications, has made the same move redefining the workforce. Its State of the Tech Workforce reports open by distinguishing a core tech workforce from a "tech-adjacent" digital workforce, observing that "the lines between the core tech workforce and the tech-adjacent digital workforce continue to blur as technology underpins just about every business function across industry sectors" (State of the Tech Workforce 2026, p. 3). The sentence appears verbatim in the 2026 United States edition and the 2025 United Kingdom edition, in the paragraph explaining how the taxonomy is created.

For both organisations, almost every knowledge job is becoming a tech-inflected job. The implication, for the market and for the profession itself, is that the software engineer as a distinct occupational category is dissolving.

The hybrid professional: technical plus people skills

In the tech media, we found that the figure of the lone coder is retired, or at least technical skills are no longer weighted above social skills. The future software engineer is defined as much by communication, empathy and collaboration as by technical capability: by 2024, according to the ACS *Digital Pulse*, people skills had risen from 23 to 32 per cent of the total skills requested in AI-related job advertisements over a five-year period.

For example, in the ACS *Digital Pulse 2023*, three of the five most-demanded skills for 2030 are people skills: communication, teamwork and collaboration, and problem solving. The pattern repeats across every emerging-technology chapter of the report: cybersecurity, cloud, AI/ML/NLP, virtual worlds, high-performance computing and additive manufacturing. Thus the report describes a context where: "People skills complement and amplify the effectiveness of technical abilities. Communication skills enable technology professionals to convey complex concepts and ideas clearly, facilitating collaboration and understanding" and where "Technology workers with people skills can effectively lead and work in diverse teams, adapt to rapidly changing circumstances, and empathise with end-users to develop user-centric solutions." Similarly The *Digital and Tech Skills Working Group Final Report* (2023) codifies "digital fluency" alongside non-digital workplace skills -reliability, resilience, emotional self-regulation, communication, following instructions, time management - as the core skill set for entry-level tech roles.

New role categories and the professionalisation of values work

While the vision of the hybrid professional accounted for in the previous section has the software engineering profession dissolving into the general condition of digital work, simultaneously new and highly specific occupational categories are emerging, often concerned with the ethical and regulatory dimensions of technology.

The ACS *Digital Pulse 2023* anticipates artificial intelligence, machine learning and natural language processing "will also give rise to new job roles, including positions such as AI Ethicist, AI personality designers, algorithm bias auditors, information validators, and AI regulatory roles" (p.28), alongside new tech roles including Quantum Data Analysts, Human-Computer Integration specialists, Holographic Engineers and Virtual Worlds Safety Officers. The report anticipates and describes how work and jobs currently delivered in compliance departments and design studios will be reclassified as technology work, in the form of: "tech jobs either not available right now, or which may have roots in functions such as design, production, compliance and finance"(p.8) in a context where

critical thinking, people skills, governance processes and practical use-case applications are as important as technical expertise in programming languages such as Python, JavaScript or PHP. The FSO *Workforce Plan 2025* documents the same movement with more institutional weight behind it. Jobs and Skills Australia has identified ten emerging roles driven by rapid technological advancement, among them AI Engineer - which saw a three hundred per cent increase in online job advertisements between 2018 and 2022 - alongside Quantum Computing Scientist, Automation Engineer, Cloud Developer and Blockchain Engineer. More significantly for the argument here, the FSO organises the AI-era workforce into four functional groupings: building AI systems, through engineering, data science, cybersecurity and product development; scaling AI across organisations, through sales, marketing, finance and human resources; governing AI deployment, through legal, policy, risk and compliance roles; and managing AI integration, through senior management and executive leadership. Governance is not an afterthought in this schema. It is one of four constitutive functions, and the report is explicit that these roles "ensure responsible AI deployment in accordance with regulatory frameworks" and that expanding the pool of expertise in this area will require both training and targeted migration.

In anticipating that what were once diffuse professional software engineering responsibilities -ethics, safety, governance, compliance - will become credentialed and salaried roles the reports also imply consequences for how software engineers understand the scope of their own responsibility: if ethical judgement becomes someone else's job title, it may cease to be everyone's obligation.

The augmented engineer and the AI-native workforce

In the reports reviewed, the future software engineer is imagined as an AI-enhanced professional whose value is derived from their ability to orchestrate, evaluate and integrate outcomes from using AI, rather than from their own ability to write code.

For instance CompTIA's *State of the Tech Workforce 2026*, suggests employers seek "a software developer with skill and experience in leveraging AI-enabled coding tools to save time in generating and debugging code", and frames AI as "another tool in workplace tool belts" for just about every digital or knowledge worker.

For the ACS in 2023, the "democratisation of AI" (p.54) produces a state where "consumers and line-of-business workers along with people across the tech spectrum from infrastructure and security specialists, software engineers and data scientists [are] increasingly working together to learn together."

The uncertain future: adaptable skills and do-it-yourself lifelong learning

The reports reviewed acknowledge that the future they project is unknowable at the level of specific skills or roles. Their response is to shift the object of prediction from specific outcomes to adaptive capacity. For example, the ACS *Digital Pulse 2023* comments that "There is no predictive model of all the skills Australia will need in advance. Some skills are obvious, software engineering, UX Design, networking and infrastructure, for instance. But the art of the possible in us all may create completely unanticipated skills needs"(p.56). The FSO *Workforce Plan 2025* acknowledges that "changes in government policies such as skilled migration, economic conditions, regulations, and other external factors may impact these projections in the future" and "while the projections provide a valuable snapshot of anticipated trends, they may no longer be applicable if significant changes occur."

References

Documents generated

software_engineer_relevant_occupations_from_2025_OSL, May 2026 - filtering the Jobs and Skills Australia 6-digit dataset for software-engineer-relevant occupations (direct, adjacent and broader ICT pathways), is the analytical instrument that underwrites the role-level shortage claims made throughout Section 1 of the report.

Australian grey literature

Jobs and Skills Australia

Jobs and Skills Australia (2025). *2025 Occupation Shortage List: Key Findings Report*. Canberra: Australian Government, October 2025.

Jobs and Skills Australia (2025). *2025 Occupation Shortage List: Additional Insights Report*. Canberra: Australian Government, October 2025.

Jobs and Skills Australia (2025). *2025 Occupation Shortage List: 6-digit ANZSCO and OSCA dataset*. Canberra: Australian Government, October 2025.

Australian Computer Society. Digital Pulse series (decade of publications, 2015–2024)

Deloitte Access Economics for the Australian Computer Society (2015). *Australia's Digital Pulse: Key challenges for our nation - digital skills, jobs and education*.

Deloitte Access Economics for the Australian Computer Society (2019). *Australia's Digital Pulse 2019: Booming today, but how can we sustain digital workforce growth?*

Deloitte Access Economics for the Australian Computer Society (2023). *Australia's Digital Pulse 2023: A new approach to building Australia's technology skills*.

Deloitte Access Economics for the Australian Computer Society (2024). *Australia's Digital Pulse 2024: A decade of digital leadership*.

Tech Council of Australia

Tech Council of Australia. (2021). *Roadmap to deliver one million tech jobs*. (Research by Accenture). https://techcouncil.com.au/newsroom/2021sept-jobs-roadmap/

Tech Council of Australia and Accenture (2022). *Australia's Tech Jobs Opportunity*. February 2022.

Tech Council of Australia (2022). *Getting to 1.2 Million: Our roadmap to create 1.2 million tech jobs by 2030*.

Future Skills Organisation

Future Skills Organisation (2025). *Workforce Plan 2025: Technology Workforce*. Modelling by Oxford Economics Australia.

Consultancy modelling behind the FSO plan

Oxford Economics Australia. (2025). *FTB workforce and skills report: Final report*. Future Skills Organisation.

Oxford Economics Australia. (2025). *FTB migration analysis: Final report*. Future Skills Organisation.

Australian Government working groups and policy reports

Digital and Tech Skills Working Group (2023). *Final Report: An Earn While You Learn model for the digital and tech sector*. Report to the Australian Government.
Digital Skills Organisation (2023). *Growing Australia's Digital Workforce Report*.

Occupational and classification data

Australian Bureau of Statistics (2026). *Occupation Profiles Data, February 2026*.

Industry and corporate reports

Cisco and Oxford Economics (2019). *Technology and the Future of Australian Jobs*. Cisco public report.

Cisco (2025). *FY25 Purpose Report: Powering an Inclusive Future for All*.

Professionals Australia

Professionals Australia (2024) *Employment and Remuneration Trends for Tech, Software and IT Professionals*. Melbourne: Professionals Australia.

International comparators

United States

CompTIA (2024). *State of the Tech Workforce 2024*. Downers Grove, IL.

CompTIA (2026). *State of the Tech Workforce 2026*. Downers Grove, IL, January 2026 release.

United Kingdom

CompTIA (2025). *State of the Tech Workforce UK 2025: Nations, Metro Areas, Tech Hiring Trends, Wages, Workforce Characteristics*.

European Union

European Commission (2023) *2023 State of the Digital Decade Report*. Brussels, 27 September.

Additional CompTIA industry outlook

CompTIA (2026). *IT Industry Outlook 2026*. Research report, January 2026 release.

Other Australian sources

Australian Bureau of Statistics. (2022). *ANZSCO: Australian and New Zealand standard classification of occupations* (2022 update). https://www.abs.gov.au/ANZSCO

Australian Bureau of Statistics. (2024). *OSCA: Occupation standard classification for Australia, 2024, version 1.0*.
https://www.abs.gov.au/statistics/classifications/osca-occupation-standard-classification-australia/2024-version-1-0

Australian Bureau of Statistics. (2026). *Consultation draft: Occupation standard classification for Australia (OSCA)* [Draft for feedback, August 2026].

Department of Home Affairs (2023) *Australia–India Migration and Mobility Partnership Arrangement*. Signed 23 May.

Australian government and parliamentary sources

House of Representatives Standing Committee on Industry, Science and Resources. (2023). *Sovereign, smart, sustainable: Driving advanced manufacturing in Australia*. Parliament of Australia.
https://www.aph.gov.au/Parliamentary_Business/Committees/House/Industry_Science_and_Resources/AdvancedManufacturing/Report

Jobs and Skills Australia. (2025). *Internet vacancy index* (Data set). Australian Government.

Department of Home Affairs. (2023). *Mobility arrangement for talented early-professionals scheme (MATES)*. Australian Government.

The AI-native software engineer talk

https://www.youtube.com/watch?v=FoXHScf1mjA

Academic and Media

Australian Government (2023) *Critical Technologies Statement*. Department of Industry, Science and Resources

https://www.industry.gov.au/publications/critical-technologies-statement

Australian Government (2023) *List of Critical Technologies in the National Interest*. Department of Industry, Science and Resources.

https://industry.gov.au/publications/list-critical-technologies-national-interest

Authors Guild. (2023, July 18). *More than 15,000 authors sign Authors Guild letter calling on AI industry leaders to protect writers* [Press release].
https://authorsguild.org/news/thousands-sign-authors-guild-letter-calling-on-ai-industry-leaders-to-protect-writers/

Bansal, V. (2026, June 17). *Tech workers are fighting against Silicon Valley's AI push*. Tech Policy Press.
https://www.techpolicy.press/tech-workers-are-fighting-against-silicon-valleys-ai-push/
Barbaro, M. (Host). (2023, July 18). The writers' revolt against A.I. companies [Audio podcast episode]. In *The Daily*. The New York Times. https://www.nytimes.com/2023/07/18/podcasts/the-daily/ai-scraping.html

Bernhardt, A., Kresge, L., & Suleiman, R. (2023). The data-driven workplace and the case for worker technology rights. *ILR Review*, *76*(1), 3-29.

Bialski, P., 2024. Middle tech: Software work and the culture of good enough. Princeton University Press

CSIRO (2022) *Growing Australia's Quantum Technology Industry: Updated Economic Modelling*

https://www.csiro.au/en/work-with-us/services/consultancy-strategic-advice-services/csiro-futures/future-industries/quantum

Dave, P., (2026, June 16). ‘Pretty Crazy’ Token Usage Is Testing Bosses’ Bet on AI *Wired*. https://www.wired.com/story/claude-tokens-compute-cost-code-8x8/

Frenkel, S., & Thompson, S. A. (2023, July 15). 'Not for machines to harvest': Data revolts break out against A.I. *The New York Times*. https://www.nytimes.com/2023/07/15/technology/artificial-intelligence-models-chat-data.html

Gartner (2026) *Gartner Says Autonomous Business and AI Layoffs May Create Budget Room, But Do Not Deliver Returns*. Press release, 5 May.

https://www.gartner.com/en/newsroom/press-releases/2026-05-05-gartner-says-autonomous-business-and-artificial-intelligence-layoffs-may-create-budget-room-but-do-not-deliver-returns

Google Walkout for Real Change. (2018, November 2). Google employees and contractors participate in global "walkout for real change". *Medium*. https://googlewalkout.medium.com/google-employees-and-contractors-participate-in-global-walkout-for-real-change-389c65517843

Hepler, L., Bekiempis, V., & Weaver, M. (2018, November 1). Google walkout: Global protests after sexual misconduct allegations. *The Guardian*. https://www.theguardian.com/technology/2018/nov/01/google-walkout-global-protests-employees-sexual-harassment-scandals

Hussey, S. (2026, March 12). Atlassian cuts another 1,600 jobs amid AI shakeup. *Forbes Australia*. https://www.forbes.com.au/news/investing/atlassian-cuts-another-1600-jobs-amid-ai-shakeup/

Kaur, D. (2026, July 10). *How to shrink the token budget without shrinking the team*. AI News. https://www.artificialintelligence-news.com/news/shrink-token-budget-not-team/

Lanzeni, D. (2016). Smart global futures: Designing affordable materialities for a better life. In *Digital materialities* (pp. 45-60). Routledge.

O'Donovan, C. (2019, February 22). *Microsoft employees are demanding the company cancel its HoloLens contract with the US Army*. BuzzFeed News. https://www.buzzfeednews.com/article/carolineodonovan/microsoft-hololens-army

Otto, E. I., Salka, J. H., & Blok, A. (2023). How app companies use GitHub: on modes of valuation in the digital attention economy. *Journal of Cultural Economy*, *16*(2), 242-259.

Office of the Prime Minister of Australia (2024) *Delivering a Future Made in Australia with 400 New Technology Jobs in Brisbane*

https://www.pm.gov.au/media/delivering-future-made-australia-400-new-technology-jobs-brisbane

Osmani, A. (2025) 'The AI-native software engineer: a practical playbook for integrating AI into your daily engineering workflow', *Elevate*, 1 July. https://addyo.substack.com/p/the-ai-native-software-engineer

Prensky, M. (2001). Digital natives, digital immigrants part 1 & 2: Do they really think differently?. *On the horizon*, *9*(6), 1-6.

Saker, R. (2026, February 19). Why AI's destruction of SaaS is the greatest opportunity for consultancies in a generation. *Medium*. https://medium.com/@rsaker/why-ais-destruction-of-saas-is-the-greatest-opportunity-for-consultancies-in-a-generation-d10a3eb73b04

Solon, O. (2019) ''We did not sign up to develop weapons': Microsoft workers protest $480m HoloLens military deal', *NBC News*, 22 February. Available at: https://www.nbcnews.com/tech/tech-news/we-did-not-sign-develop-weapons-microsoft-workers-protest-480m-n974761 (Accessed: 18 August 2026).

Srnicek, N., 2025. *Silicon empires: The fight for the future of AI*. Polity, Cambridge.

Svensson, J. (2020). *Wizards of the Web: An outsider's journey into tech culture programming and mathemagics*. Nordicom.

Tan, J. S., & Nedzhvetskaya, N. (2026). *Collective Action in Tech* [Data set]. Collective Action in Tech. Retrieved September 18, 2026, from https://data.collectiveaction.tech/

Username: Verizon. (2026, March 11). *Atlassian CEO "deeply sorry," cuts 10%* [Online forum post]. Blind. https://www.teamblind.com/post/atlassian-ceo-deeply-sorry-cuts-10-prnjwrfk

Vyborov, E. (2026, March 9). *SaaS apocalypse: Why AI agents replace static software*. Ability.ai. https://www.ability.ai/blog/saas-apocalypse-ai-agents

Wakabayashi, D., Tsang, A., & Conger, K. (2018, November 1). Google walkout: Employees stage protest over handling of sexual harassment. *The New York Times*. https://www.nytimes.com/2018/11/01/technology/google-walkout-sexual-harassment.html

FUTURES Hub
Monash University

Workplace Futures Report
From skills shortage to skills surplus: the remaking of the Australian software engineer