"In the traditional enterprise network, the power is shifting from its architects to its operators. Why build when you can buy?"

Before we delve into the network discussion, a word of caution regarding **AI** is warranted: be sceptical of the 'blame it on AI' rhetoric.

Throughout the New Year, numerous companies, including giants like Google, Amazon, Nike, Docusign, Blackrock and Cisco, have laid off thousands of employees. Some executives have attributed these cuts to AI LINK.

Although AI is set to influence employment in the long term, claiming that it is causing widespread job losses at this moment is an exaggeration. Most organisations are in the experimental phase, exploring AI's potential impact.

Take UPS as an example: the company announced plans to reduce its workforce by 12,000, citing the integration of AI in pricing decisions and certain administrative roles as a reason for these jobs not returning. However, a closer examination reveals a different story. Package delivery volumes dropped by 7.5% in the last quarter. UPS also failed to meet its revenue and profit goals, subsequently providing Wall Street with a much lower financial forecast for the upcoming year. It's clear that these business challenges are the real reasons for the layoffs, not AI. LINK

In our April 2023 newsletter LINK, we underscored the critical role of **hardware** in contrast to software. At that time, **Nvidia** led the AI hardware market. Since then, Nvidia's stock price has soared from US$270 to US$674, elevating the company to the fourth highest market valuation in the world at US$1.67 trillion as of February 22, 2024. Moreover, Nvidia's annual revenue surged by 126%, and its value now exceeds the total worth of all companies on the Hong Kong Stock Exchange.

In the twilight of my tenure at Cisco, it was apparent that significant transformations were underway. The traditional enterprise network, consisting of routers, switches, and access points, was on the brink of substantial change. We will investigate the causes of this transition and its consequences for all parties involved.

Previous Newsletters, including this one, are available on our site in pdf HERE

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Enterprise Networks Reimagined: The End of the Traditional Paradigm

"We have seen negative trends in NAS (Network Applications and Services) accelerate"
Vicky Brady, CEO Telstra, 15th February 2024

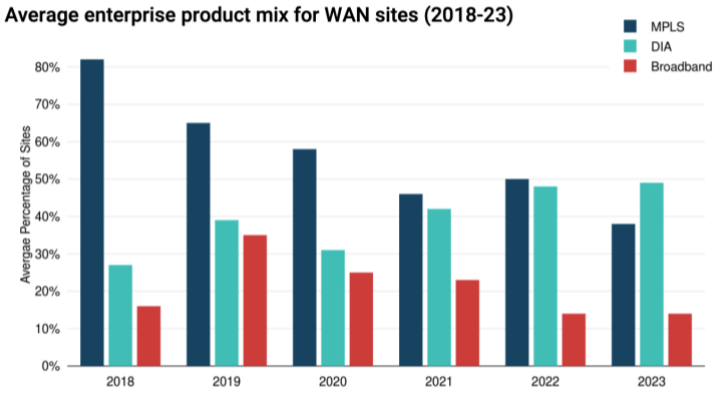
Telstra has reported a significant 67% reduction in earnings within its Fixed-Enterprise division, as detailed in the accompanying table.

	1H23	1H24	Change	Change $m
Mobile	$2,217m	$2,510m	13.2%	293
Fixed-C&SB	$50m	$105m	110.0%	55
Fixed-Enterprise	$213m	$71m	-66.7%	-142
Fixed-Active Wholesale	$71m	$52m	-26.8%	-19
International	$375m	$344m	-8.3%	-31
InfraCo Fixed	$807m	$834m	3.3%	27
Amplitel	$160m	$187m	16.9%	27
Other[1]	$2m	-$87m	n/m	-89
Underlying	**$3,895m**	**$4,016m**	**3.1%**	121
Guidance adjustments[2]	-$34m	-$9m	73.5%	25
Reported	**$3,861m**	**$4,007m**	**3.8%**	146

Source: Telstra Group Limited – Financial Results for the half-year ended 31 December 2023 – CEO/CFO Analyst Briefing

Telstra Enterprise provides telecommunication services for government and enterprise customers. It offers advanced technology solutions in Data and Connectivity (DAC) and Network Applications and Services (NAS) which together constitute approximately 16% of Telstra's overall revenues.

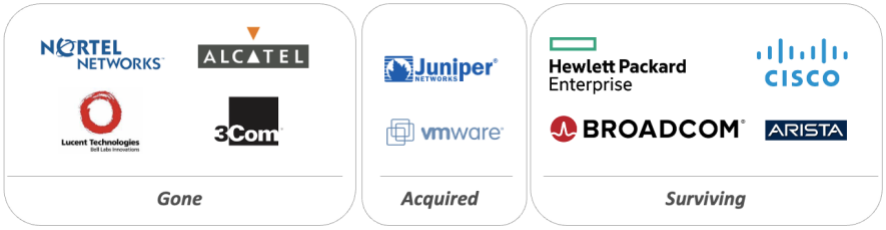
It's important to note that this downturn is not solely reflective of Telstra Enterprise's individual performance or the result of competitive pressures. Instead, it represents a widespread and enduring change within the industry. Supporting data from Telegeography illustrates the shift in enterprise product offerings, with a noticeable decline in MPLS usage and a corresponding rise in Direct Internet Access services, such as SD-WAN, underscoring a broader transformation across the telecommunications landscape.



Enterprise network products have shifted LINK
MPLS: Multi-Protocol Label Switching. DIA: Direct Internet Access

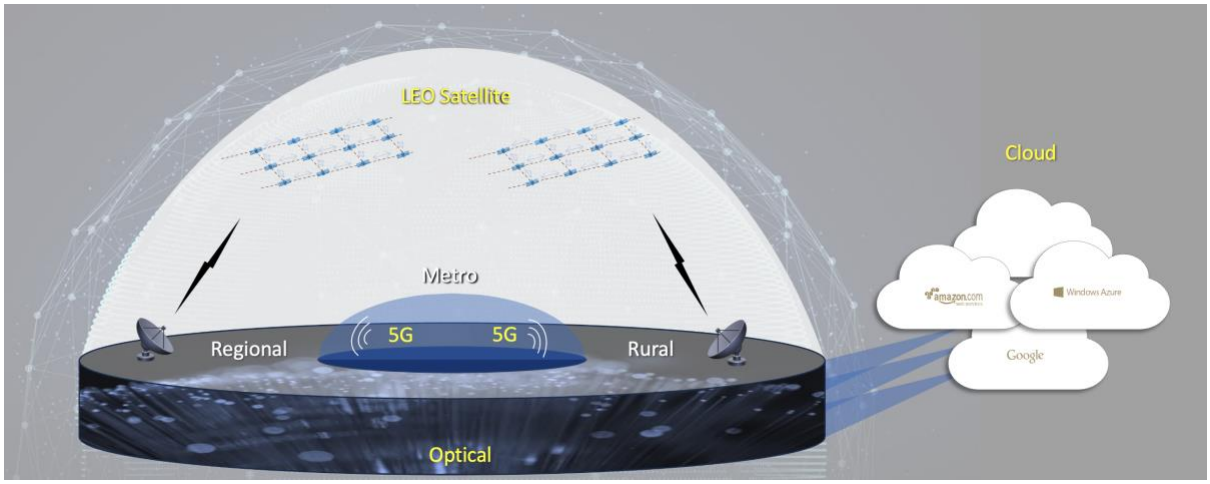
The industry has been witnessing cautionary indicators for a considerable period. Once-dominant pure-play networking corporations such as Nortel, Lucent, Alcatel, and 3Com have vanished from the marketplace, as illustrated in the diagram below. Among the enterprises that have persisted:

- **Cisco**: In the last quarter, the company reported a 12% year-over-year decline in networking revenue, which constitutes 77% of its total product offerings. LINK
- **HPE**: The company is facing challenges, placing its hopes on Juniper, which experienced a significant decrease in EBITDA of 32.8% year-over-year, to reverse the downturn. LINK.
- **VMware**: Following its acquisition by Broadcom, there is a notable migration of resellers. The industry is watching to see how Broadcom will manage VMware's integration and future direction. LINK



Evolution of pure-play networking vendors

Four Waves of Disruption



Four waves have disrupted the enterprise network: Cloud, 5G, Optical fibre, LEO satellites

Disruption #1: Cloud – Transforming demand, traffic flow, architecture and business models

In the last decade and a half, a pivotal shift has occurred as businesses and governmental entities have transitioned away from private data centres towards a strategic "cloud-first" approach. Software as a Service (SaaS) has gained widespread adoption, propelling the data centre services market to significant growth.

"The global cloud computing market, valued at approximately $US546.1 billion in 2022, is poised to quadruple, reaching an estimated $2.32 trillion by 2032"
Market US, AFR 21-2-24

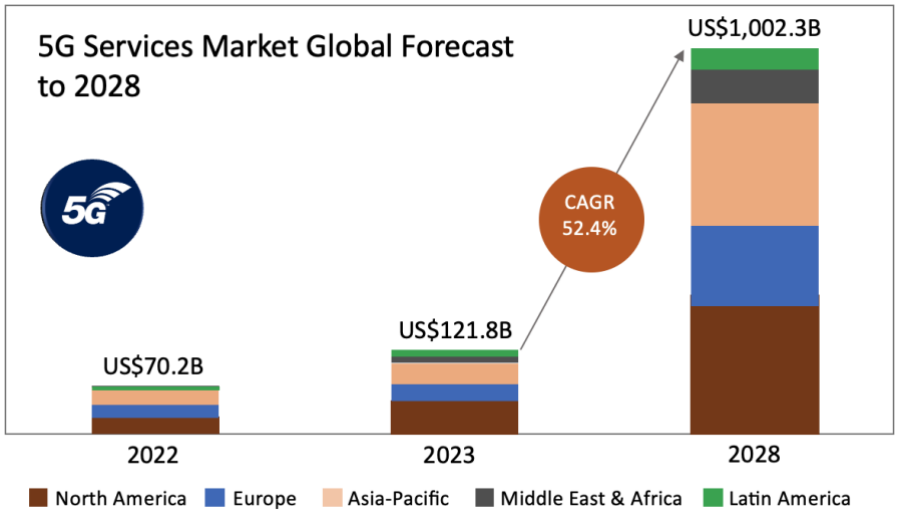
This seismic shift has led to fundamental changes in traffic patterns and network architecture, with financial models evolving from transactional to consumption-based (as-a-Service). Consequently, the control plane — or network intelligence — has migrated to the cloud, resulting in a marked decrease in both the costs and complexity associated with traditional networking hardware such as routers, switches, and related Customer Premises Equipment (CPE).

Public cloud vendors, anticipating these changes, opted to innovate independently of established networking vendors and paradigms. They developed their own infrastructure and shared their innovations through open-source platforms like ONF and FBOSS, dramatically reducing costs. This was not an inconsequential move as their investment in infrastructure now surpasses the collective investment of global telecommunications companies.

At Cisco, a forward-thinking cadre of engineers recognised these trends early on. When they couldn't persuade company leadership — a scenario reminiscent of the "Innovators Dilemma" — they departed to establish Arista Networks. Today, Arista has distinguished itself in the market, largely thanks to cloud vendors, and boasts a market capitalisation exceeding US$80 billion.

Disruption #2: 5G – Ubiquitous, it satisfies almost all connectivity use-cases

5G technology has solidified its position as the leading form of connectivity. After gaining traction over the years, by 2021-22, the establishment of over 300 5G networks and more than 1.48 billion 5G subscriptions globally has cemented its future. Projections indicate that by 2029, 5G will represent a 58% market share with subscriptions soaring to 5.3 billion. The dominance of 5G is expected to persist in the years to come.



The 5G Services market is expected to be worth US$1,002.3 billion, growing at a CAGR of 52.4% to 2028. LINK

In Australia, Telstra reports that 5G network coverage has reached approximately 87% of the population, with nearly half of all mobile traffic now being carried over 5G.. LINK 15th Feb 2024.

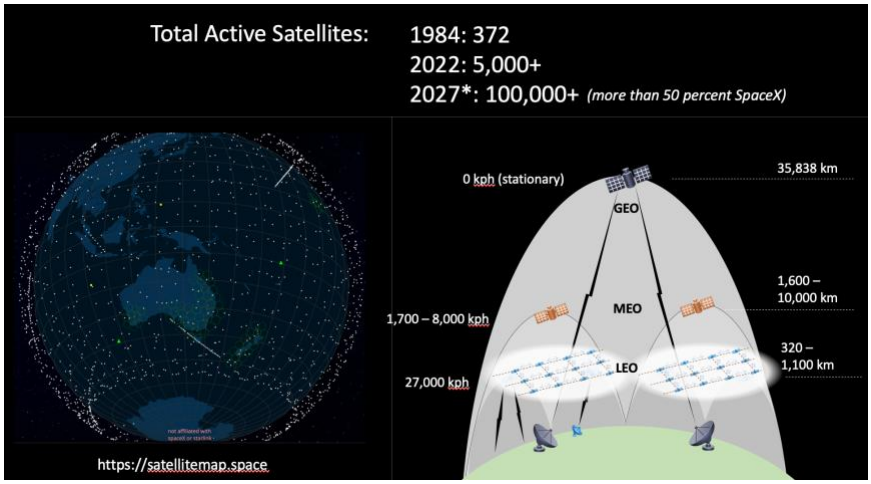
Several key factors contribute to the widespread adoption and success of 5G:

- Global standardisation efforts have streamlined technology deployment.
- Substantial investments from mobile network operators have bolstered infrastructure.
- Handset manufacturers have universally embraced 5G, ensuring device compatibility.
- The technology's versatility allows it to support a vast array of use-cases for both individuals and machines, a domain where its predecessor, 4G, already excelled.

5G technology is not static; it is undergoing continuous enhancements in both functionality and performance, known as 5G-Advanced. In metropolitan areas, 5G often surpasses WiFi speeds, offering 50-100 Mbps, if not more. Its evolution will further extend its applicability to a wider range of applications, including the Internet of Things (IoT), autonomous vehicles, and AI-driven solutions.

5G already satisfies most connectivity requirements and uses cases for both humans and end-point devices. Why would a business build if it can buy?

Disruption #3: LEO Satellite – Connecting the rest of the planet



Live satellite map (June 2022). Low Earth Orbiting (LEO) satellites operate at about 600 km.
Non-geostationary Low Earth Orbit (LEO) satellites featured in BlochBytes newsletter June 2022, LINK

Historically, vast expanses of the Earth, such as agricultural regions, maritime routes, mining operations, and isolated communities, suffered from inadequate or non-existent internet access. Traditional satellite solutions, namely GEOs and MEOs, failed to offer a viable solution due to prohibitive costs.

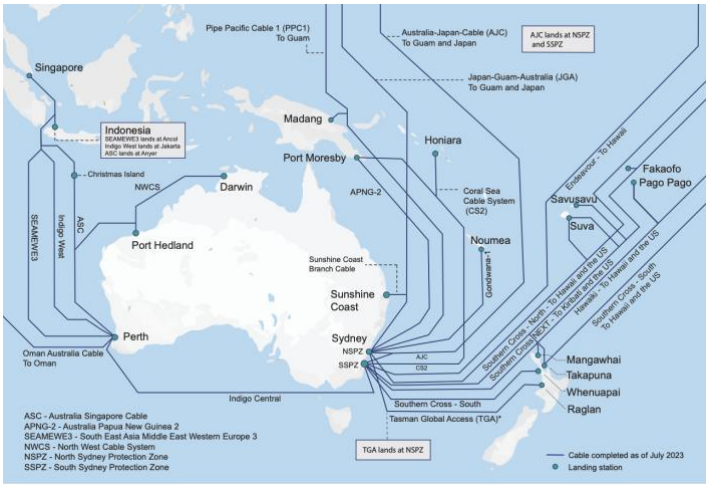
However, LEO satellites have dramatically altered the economic landscape for global connectivity, thanks to two pivotal advancements. The first is the ground-breaking development in rocket reusability, which has considerably reduced the costs associated with launches. The second is the capability to sustain satellites in a lower orbit, below 1,000 kilometres, allowing for a reduction in satellite mass, enhanced speed, reduced costs, and the provision of broadband connections with low latency.

Front-runners such as SpaceX, OneWeb, and Amazon's Kuiper initiative have been instrumental in pioneering this new era of communication. The result is a transformative leap from a few hundred satellites in the early 2000s to tens of thousands currently in orbit, delivering competitive and high-performance broadband services across the globe.

Disruption #4: Optical fibre – Catalysing exponential growth in connections & data

The burgeoning expansion of optical fibre is laying the groundwork for a future where every individual, every device, and every square meter of the planet is interconnected. Optical fibres are the unsung heroes, already facilitating billions of digital connections and managing the flow of zettabytes worth of data. The global expansion of optical fibre networks is steadfast, aiming to meet the ever-increasing demands of the telecommunications infrastructure.

Innovation in optical fibre technology is ongoing, with developments like coherent technology, which boosts spectral efficiency, and Elastic Optical Networking (EON), enhancing the overall functionality and integration of optical and packet networking. These advancements are streamlining the optical fibre ecosystem, driving down the cost per bit and energy consumption, and significantly elevating performance metrics.



Australia already boasts significant optical fibre network capacity domestically and internationally.
Source: ACMA LINK

Implications of industry shifts from architect to operator

The transition from traditional enterprise networking towards more operationally focused models has far-reaching implications that challenge initial expectations. Rather than solely benefiting network operators (as one may falsely assume), this evolution presents a complex landscape shaped by several factors:

- **Over-The-Top (OTT) Services**: Streaming giants and content providers such as Netflix, Disney+, and Google have capitalised on the existing network infrastructure without bearing proportional costs, consequently eroding a significant share of potential profits from network operators.
- **Technological Efficiencies**: Breakthroughs in technology have significantly improved cost-efficiency ratios, setting new customer expectations for enhanced services without corresponding price increases.
- **Public Cloud Expansion**: Cloud service providers have not only matched but often exceeded the network capabilities of traditional telecommunications companies. By constructing extensive global networks and offering essential services, these providers are emerging as formidable competitors in the telco space.

Evolution of telecommunications vendors

The financial health of the telecommunications industry, as measured by metrics like Return on Invested Capital (ROIC), has shown signs of stress over recent years. Venture Insights recently found that, despite a 32.6% increase in the Consumer Price Index (CPI) in Australia since mid-2012, telecom prices have concurrently decreased by 24.6%. The private sector's share of industry profits has been on a decline. [CommsDay 19June2023].

The downward trend in financial viability is detrimental to all stakeholders. It inhibits the level of investment necessary for the development and maintenance of a robust telecommunications infrastructure, essential for meeting a country's burgeoning connectivity needs.

This has significant implications to the various stakeholders as illustrated below:

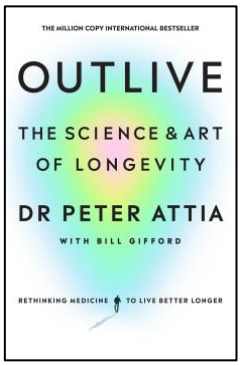
Nation/Government	Enterprise Customers	Network Operators	Network Vendors	Cloud Vendors
Connectivity and internet access is considered a basic human right, vital to national prosperity. Lack of confidence in telco economics results in a lower propensity to invest. This is not in the national interest.	Enterprise customers are the primary beneficiaries of the current market dynamics. As they shift their applications to the cloud and provide everyone and every thing with high speed, secure, reliable broadband access from anywhere, anytime, the need (and desire) to 'build their own' diminishes.	The traditional enterprise network, will fade as demand for telco services such as 5G, LEO and optical expands. Like the telco network vendors, operators will focus on ARPU and lower churn. They need to carefully consider where and how closely they work with their new cloud partners.	Enterprise network vendors are in search of new revenue sources. Telco network vendors will shift functionality to the cloud either independently or with public cloud providers. They need to pick cloud partners carefully or go alone.	Although telecoms is moving towards cloud, it is a complex industry. Cloud providers will need to pick their timing and placement carefully. Regulation, spectrum licences, civil works and USO, to name a few, are not for the feint-hearted.
The OTT situation (and 'net neutrality') is unsustainable and needs to be addressed / regulated.	**Key question: "Why NOT buy?"**	**Focus on ARPU, profitable use cases, cloud. Partner carefully.**	**Seek more profitable growth opportunities (security, observability, GenAI) quickly.**	**Apply cloud skills and capabilities to the telco sector. Leverage their own networks.**

Implications of the network market dynamics to various stakeholders

Featured Book: Outlive, The Science & Art of Longevity

Dr Peter Attia, with Bill Gifford, April 2023 LINK

"The goal of this new medicine — which I call Medicine 3.0 — is not to patch people up and get them out the door, removing their tumours and hoping for the best, but rather to prevent the tumours from appearing and spreading in the first place".



Dr. Peter Attia redefines the landscape of medicine in "Outlive," where he introduces Medicine 3.0, a proactive approach that focuses on the prevention of diseases rather than the traditional model of treatment. He challenges the reactive nature of Medicine 2.0 with an innovative strategy aimed at not just extending our lifespan but also enhancing our 'healthspan' — the quality of our health during those extended years.

"Outlive" is both a source of inspiration and a blueprint for life-changing practices. It shifts the paradigm from the customary medical visits for immediate issues to a forward-thinking mentality that prioritises future wellbeing.

"Medicine 2.0 is akin to finding shelter from the rain. Medicine 3.0, however, is about understanding the weather patterns and deciding whether we need a sturdier roof or perhaps a boat."

This concept of healthspan, which was barely recognised in medical schools until recently, is now at the forefront of Dr. Attia's longevity philosophy. He advocates for a tailored and proactive longevity strategy that transcends generic 'biohacking.' Backed by rigorous science, the book offers actionable guidance to enhance nutritional habits, optimize physical activity, refine sleep quality, and improve emotional and mental well-being.

"Outlive" serves as a practical guide, offering readers a roadmap to not only live longer but to ensure that each subsequent decade surpasses the previous in health and vitality. It invites you to anticipate the future and take deliberate steps today for a healthier tomorrow.

Stay connected.

Kevin