



# The digital telco of the future:

Challenges and opportunities

**Challenges for telecommunication providers have never been greater.** The basic connectivity services that have for so long underpinned their revenue and profitability have been commoditised. Higher level and higher value services offer the potential for growth, but telcos are large organisations and can struggle to be as nimble as newer 'born digital' organisations. These communications service providers (CSPs) are also often constrained by the challenges of legacy infrastructure and internal systems that are costly and complex to upgrade.

Additionally, the size and power of the global hyperscale cloud providers—AWS, Microsoft, Google Cloud—is growing to the point where they could threaten the very existence of CSPs as independent entities.

Against that, CSPs can employ the advantages of scale to accelerate investments in the development of competencies and partnerships that will allow them to take full advantage of new technologies and applications. Areas such as 5G, edge computing, and IoT hold the promise of significant upside.

At the same time, customer expectations are rising: for a wider and more flexible range of product and service offerings that meet their needs; for speedy and efficient customer service and product activation; and for channels of interaction that suit their preferences.

This backdrop presents huge opportunities for CSPs. They can leverage new technologies, operating models, and processes. Cultural changes and partnering opportunities are a chance to migrate away from legacy technologies and ways of doing business that are inflexible or too slow to offer optimal outcomes.

The Internet of Things (IoT), augmented reality (AR) and virtual reality (VR), and artificial intelligence (AI) and machine learning (ML) demand reliable, ubiquitous and, in some cases, high-speed connectivity — and will create massive data volumes. Additionally, this data can



be leveraged to deliver insights and improved customer services through predictive modelling and intelligent automation.

But capitalizing on these opportunities requires bold, strategic moves implemented with agility and speed. Change will not be easy due to legacy infrastructure and long-established systems.

This white paper will identify and explore some of the major challenges and barriers constraining CSP's growth and profitability, as well as trends in customer expectations and customer service, and emerging technology developments.

By increasing network capacity and efficiency, adopting pervasive automation in a closed-loop creating networks that can adapt, and developing infrastructure that facilitates innovation while ensuring security, CSPs can meet their customers' needs now and into the future.

## 5G AND EDGE COMPUTING

5G and edge computing are quite separate elements, but a key feature of both — delivering a better end-user experience (with a magnitude lower latency for example) — means they are frequently conjoined.

**According to STL Partners**, 5G and edge computing are inextricably linked, “both poised to significantly improve the performance of applications and enable huge amounts of data to be processed in real-time.”

In 2019, ABI Research **forecast** the penetration of edge servers in telecommunications infrastructure would create a US\$54 billion opportunity by 2024, saying telco edge deployments would become the de facto platforms to deliver services to end-users and enterprise facilities, but with the caution that “5G and edge are partner technologies, and in the long term, neither can become truly profitable without the other.”

It is said CSPs must identify both the enterprise vertical to prioritise and the ideal position of their edge servers, and warned that “Amazon, Google, and Facebook will target the very same enterprise verticals that Managed Service Providers (MSPs) are trying to address. This will seriously devalue 5G and the future of mobile service providers in general.”

CSPs do have an advantage over the major cloud providers: expertise in what will be a challenging technology. **According to the 5GPP Technology Board**, “The challenge of achieving deterministic high bandwidth and low latency to support today’s demanding edge computing use cases is not trivial.”

However, they do face challenges to exploit the many new opportunities that will be created by the combination of edge computing and 5G.

The Boston Consulting Group (BCG) **says edge computing** is “a defining moment for

telecommunications operators,” and they must decide which edge-enabled services to offer based on their existing business, resources, and capacity for risk.

“Telcos can stick with providing connectivity, but risk seeing significant value move away from operations, similar to their experience with consumer video and social media services. Or they can launch edge-based horizontal platforms and end-to-end vertical solutions, both of which are expected to create more lucrative returns.”

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BCG suggests telcos will need to find partners to exploit the potential for edge computing fully and it identifies the very same hyperscale cloud providers flagged as targeting the edge computing markets. Juggling these relationships will be a delicate dance.

To make the most of 5G, operators will require a highly virtualised and distributed core network, managed end-to-end by leveraging orchestration and analytics – a network that can self-configure, self-optimize, and even self-heal in a far more autonomous manner than 4G.

In other words, 5G is much more than a wireless network upgrade. For CSPs that already have established backhaul networks using standards-based technology, it represents a significant opportunity to upgrade and leverage those networks.

## OPTICAL NETWORKS

Telcos' networks are their greatest asset and their greatest liability; they are extensive and pervasive. CSPs have many years of expertise in operating and managing networks to very high levels of reliability but need to invest substantially to update them to ensure flexibility and economical and efficient operation.

An increasing number of carriers and service providers are transitioning away from TDM technologies toward modern packet-based approaches. Packet-based networks can deliver the best possible system performance, support both legacy and new business services, and reduce operational costs related to management, support, and maintenance of multiple networks and ageing infrastructures.

This results in savings, not only for the communications services providers, but also for end-users, who will benefit over time from much higher-speed services at generally lower recurring costs.

Networks must be able to easily adapt to meet a diverse range of customer needs. To achieve this, they need to deploy and leverage network functions virtualisation and software-defined networking (SDN), and do so effectively.

CSP's need to maximise ROI from their investment in optical networks and improve system performance, network efficiency, and service availability. The photonic technology on which they rely is becoming increasingly intelligent and programmable, although they need advanced software tools and increased automation to fully operationalise and realise the benefits associated with a modern optical network.

Advancements in software applications make it possible to leverage analytics to simplify next-generation photonic network operations. These innovations

abstract operational complexity and give providers unprecedented visibility into their optical networks.

These advanced software applications that combine SDN with real-time analytics are being leveraged to make optical networks smarter by extracting the most value from existing network resources across the various stages of the photonic network lifecycle.

The risks of migrating a TDM network to packet are much easier to overcome with help. Working with the right partner ensures a successful outcome that achieves set goals — on time, within budget, and without service disruption — and leads the way to better and higher performing infrastructure that benefits end users and operators alike.

## MODERN IP VS. LEGACY IP

Adaptability is critical to success, and that requires IP networks to be open, programmable, automated and, virtualised. That also means they must be able to be reconfigured quickly — without human intervention — to address new and emerging services, and of course to support existing ones.

Three key factors are driving the need for modern, flexible, and adaptable IP networks:

■ **Applications** IoT, cloud gaming, AR, VR, and enterprise collaboration tools require more than just high-capacity services. These cloud-based applications need low-latency, high-availability, and the ability to enforce strict service-level agreements (SLAs) in near-real-time. This requirement is driving the adoption of high-performance network architecture that moves applications and key network functions from a centralized location and distributes them at the network's edge. As 5G and edge computing emerge, they will need to be highly scalable to cope with the

exponential and unabated growth in IP endpoints toward the network edge.

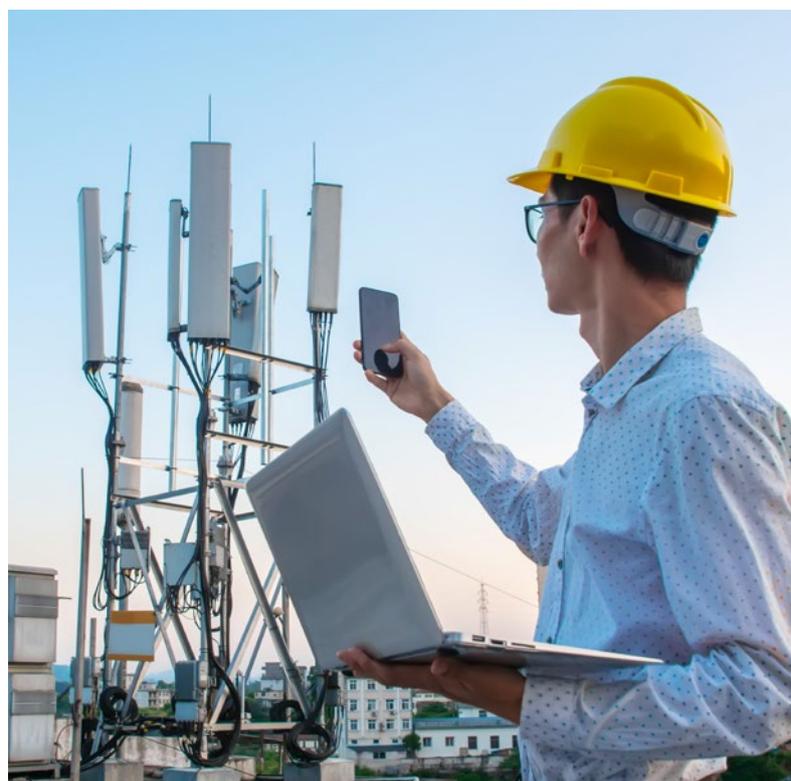
■ **Customer experience** Customers want more than just basic network connectivity. They need a more holistic overall quality of experience. And this is not just a human need. Machines also require applications to support business operations, facilitate communication, and operate at maximum efficiency.

■ **Cost** The high cost of the constant capacity and platform upgrades that keep legacy networks functional is also driving the uptake of modern IP networks. But simply adding more IP protocols is a stopgap measure that creates unnecessary complexity and a heavy dependence upon manual processes. It also hurts agility, by making it harder to react to ever-changing market dynamics. Scaling to new and emerging demands in a cost-efficient manner becomes near impossible.

In such circumstances, the traditional, box-centric way of building and scaling IP networks with complex protocol stacks poses a risk to businesses and their future viability and cannot be sustained.

What's needed is an intelligent and programmable service delivery platform that can support existing services and applications and also new and emerging use cases. That includes 5G, business services, edge-to-cloud, and IoT applications. Not forgetting use cases with programmable infrastructure, software control and automation, and analytics and intelligence. It's a big ask.

High-performance IP applications capture real-time telemetry from network devices, domain controllers, and service orchestrators to provide powerful forensic, visualisation, analytics, path computation, and traffic engineering capabilities to accelerate the transition to networks that can adapt.



## CLOUD

Cloud services are pervasive. From individual users binge-watching video services to enterprises deploying software-as-a-service (SaaS), cloud services are how people and organisations consume content and data. For years now, centralised data centre and cloud architectures have provided access to these services.

CSPs see the huge potential that cloud computing holds. Telecoms.com's **2020 annual survey** showed cloud as a top investment priority area for CSPs — second only to 5G.

**According to IDC**, telcos are partnering with hyperscale cloud providers. "Telcos are keen on aligning their external partner-centric digital transformation approach with their internal digital transformation initiatives such as SD-WAN."

IDC claims “public cloud adoption not only defends telco connectivity revenues, but also pivots telcos to a services, or cloud-broker for enterprises.”

The research firm sees the provision of a multi-cloud ecosystem — with end-to-end orchestration, seamless lifecycle services, and secured and automated billing systems — as “the need of the hour for any enterprise.” IDC predicts that this need “positions telcos to lay the foundation to become ubiquitous cloud network providers and provide an exchange of cloud interconnect services on their platform.”

But that’s not how everybody sees it. Earlier this year, analyst Tom Nolle, President of CIMI Corp., **suggested** that hyperscale cloud providers might, in fact, constitute the biggest threat to telcos. “Microsoft’s decision to **offer Azure customers** the option to have their entry and exit traffic carried on Microsoft’s own network rather than on the internet is a signal that cloud providers may be flexing their own muscle in network services, as telcos stick their heads in the sands on services at a higher layer,” he said.

A more optimistic view comes from research company Twimbit. It **suggests** that CSPs can enable enterprises to manage multiple clouds using a single control pane or platform for cloud orchestration, and can offer professional and managed services to support enterprises with their cloud journey. “Opportunities would arise for service providers that can offer more modular service packages, easier procurement and delivery,” Twimbit said.

## CUSTOMER SERVICE

Consumers today want seamless omnichannel experiences. They want personalised services and experiences. For CSPs, it will be important to automate the provisioning of on-demand services. This will allow

them to adapt to market demands quickly and adopt an open, software-centric approach to operations. The best approach is to standardise the automation of end-to-end path computation and provisioning connections — on-demand, across multi-vendor, multi-domain infrastructure. For the CSP, the goal is to simplify the many steps involved in the multi-domain connectivity fulfillment process, reduce manual effort and OPEX, and decrease the time interval from quote to cash.

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Communication services providers already have access to multiple channels for providing services to customers, and for interacting with them, and they have rich stores of data about those customers. The challenge is to bring all this together in a meaningful way — efficiently, economically and securely — to realise the full potential of their data to improve customer service, offer more options, and improve retention.

According to **KPMG’s global head of telecoms & media**, Alex Holt, “Telcos are at a strategic crossroads, and success in the new reality requires putting consumers at the heart of their value propositions and designing seamless new solutions, backed up by meaningful data security.”

KPMG has **identified six pillars of customer experience excellence** — integrity, resolution,



expectations, empathy, personalisation, and time and effort — that are common to every outstanding customer relationship. It claims the top-ranked brand in each market typically outperforms the respective market average score for each pillar by between 10 and 12 percent.

Customer data, supplemented with data analytics and artificial intelligence, can help CSPs understand customer preferences in order to personalise customer service, which can improve loyalty and identify issues that could lead to churn.

## INTERNET OF THINGS

Every forecast for IoT — whether about connected devices, revenues, or productivity gains — is extremely bullish. Fundamental to IoT is connectivity, but IoT has specific requirements. This has led to the emergence of

new wireless communications technologies specific to IoT — chief among them LoRaWAN and Sigfox — and the emergence of low Earth orbit satellite networks dedicated to IoT such as Myriota and Fleet Space in Australia.

Cellular technologies CAT-M1 and NB-IoT have emerged specifically to cater to IoT connectivity requirements, and CSPs are well placed to offer these. However, they are not well suited to many IoT applications. More important from a telco perspective, connectivity and connectivity management account for only 17 percent of the IoT value chain, **according to Accenture.**

The largest sections of the IoT 'pie,' according to Accenture, are IoT business processes, integration and applications (49 percent), and devices and sensors (20 percent).

Some of these will be generic, but a great many, and most likely the most profitable, will be very specific to

particular industries — industries in which CSPs may have limited expertise.

Another approach — identified by the Boston Consulting Group and implemented by Deutsche Telekom — is to become an IoT orchestrator. **According to BCG**, “By making devices and data work together in perfect harmony, Deutsche Telekom IoT is bringing together relevant stakeholders across geographies to enable end-to-end solutions across the ecosystem tailored to their customers’ needs.”

Perhaps the most bullish view comes **from Bearing Point**. It is promoting its “new discipline of Digital Ecosystem Management” (DEM), claiming: “the telco industry can increase IoT revenues above current forecasts by up to 500 percent by adopting DEM.” It sees four strands to this strategy: providing connectivity; connectivity management and application enablement; service management and monetization; and customer management and billing as a service.

Bearing Point claims a DEM strategy “provides the best way to take full advantage of this opportunity by leveraging existing telco assets in new ways and tapping into the creativity and capabilities of third parties, such as go-to-market partners and suppliers of services.”

## SHAREHOLDERS

Transformed telcos can offer investors the advantages of speed at scale that they have come to expect from the digital giants and hyperscalers: strong, sustainable, and growing returns. Impact investment funds — which have attracted almost \$US30 trillion since the middle of the last decade — are also attracted to the technology sector’s track record of improving operational sustainability through more efficient operations. This is a critical issue at a time when data centres already account for two percent of the world’s carbon emissions.

The rapid digitalisation of business brought about by the COVID disruption has reinforced the need to change.

Yet while the new class of digital giants are being recognized for their strong growth, the halo effect has not extended as far as the telecommunications sector.

According to Bain & Co, despite providing indispensable services during the pandemic, telecoms companies created less value for shareholders than almost every other sector.

While new technologies like 5G promise considerable upside, massive investments will be needed to realise their full potential. At the same time, the virtualisation of network connectivity and other long-term industry trends are reshaping the basis for competition, making it a matter of urgency for CSPs to adapt — or even transform — their businesses.

In September 2020, the Financial Times **reported** that 2020 should have been a golden year for CSPs providers, with millions of people worldwide forced to work from home pushing up demand for broadband and mobile connectivity for work and entertainment. Yet it observed: “the value of listed telecommunications companies has dropped almost 20 per cent on average over the past year.”

Listed CSPs face the challenge of convincing shareholders that huge investments in new networks to capitalise on the data boom will create better value than divesting to private funds.

A transformation — based on faster networks, faster delivery, automation, speed to revenue, reduced cost to serve, efficient spending, and clear evidence of future-proofing — offers a path to this goal.



## ANALYSTS SAY IT'S TIME TO ACT

According to Arthur D Little, its discussions with senior telco executives “revealed universal urgency to ensure that shareholders and management boards are aligned on the needs and approaches for reconfiguring telcos.” And it adds: “As the markets are evolving fast, the opportunities available today may not be in the medium to long term. Therefore, CSPs must move decisively and get execution right the first time.”

From its discussions, Arthur D Little identified a number of key questions that it says need to be addressed by shareholders and managers jointly:

- Where should we invest for our core business, and how fast?
- How should we slice and monetise the assets? How should we structure the deal in terms of control, type of assets assigned to a JV, and rights to use the assets?

- What capabilities and what future products/markets should we invest in to build our next-generation telco beyond the core, and what type of assets are to be acquired?
- In pursuing inorganic options beyond the core, how should we align the interests of the shareholders and management board? What is the best execution path toward success?

## THE ENDGAME: NETWORKS THAT ADAPT TO CUSTOMER NEEDS

Predicting the future is never easy, but in the case of telecommunications there are a couple of certainties.

The importance of telecoms networks of all kinds — fixed, cellular, satellite — will continue to grow. These networks will support an ever-growing range of services, their scope limited only by entrepreneurs’ imaginations, their scale by their appeal and/or usefulness, and by the marketing skills of their providers.

The great uncertainty is what roles the builders and operators of those networks will play, and how much of the revenue ‘pie’ they will be able to capture.

Deloitte has **proposed four scenarios for 2030** based on possible ways in which things could play out. Its most optimistic scenario is where CSPs providers are able to retain control over both their networks and their customer relationships and to exploit these to the full.

In other scenarios, CSPs are reduced to being wholesale connectivity providers — losing control of end customers, retaining the customer relationship but being displaced from the networking business.



A worst-case scenario is where they lose both. CSPs are reduced to “mere ghosts of their former selves, and serve as the wholesale sales and service teams of their parent tech companies for B2B customers.”

Deloitte labels its most positive scenario “the engineer strikes back.” Deloitte explains that in this scenario “a new generation of hands-on, cutting-edge, software-based network engineers enable innovative revenue generation. CSPs offer services that penetrate and connect different aspects of people’s lives by providing individual, tech-based services that are tailor-made to meet the requirements of their B2B and B2C customers.”

CSPs have never been short on engineering expertise. But it’s one thing to come up with innovative revenue-generating services based on network technologies — it requires a different skillset to leverage the potential of those to attract and retain the customers. As Deloitte puts it, to “own the network technology domain and

infrastructure as well as the customer relationship ... master the customer relationship and thus focus on the whole value chain ... [owning] the revenue control points, having direct access to their B2B and B2C customers.”

One thing is certain. Deloitte calls “the network layer” — the combination of networking technologies that underpin all telecom services — the foundation of the entire industry. The distinctions widely used today, such as the intense focus on the potential of 5G, will become almost irrelevant, says Deloitte.

By 2030, when 5G is mature, it “will not be a purely mobile standard, but rather a networked convergence of wireless (based on 5G, Wi-Fi and LTE) and fixed networks, involving software-defined networking and network functions virtualisation,” Deloitte predicts.

This network must be highly reliable, flexible, and as seamless as possible across multiple network technologies to meet the needs of customers. Deloitte suggests that, while communication services providers might own and operate this layer, it could be “dominated by vendors as the main source of innovation.”

That’s not a great prospect for CSPs, unless it’s rephrased: network technology is dominated by the vendors, innovating at the behest of the CSPs.

Networks exist to serve customer needs. So long as CSPs continue to ‘own’ those customers, they are best placed to translate customer needs into network innovations, and network innovations into customer services. By having an intimate understanding of customer needs and opportunities, and the tools and technologies to analyse customer preferences and behaviours, they can communicate effectively with them.

So if CSPs play their cards right, the future should be bright. ■

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