

Technology, Media & Telecommunications Practice

What it will take for telcos to unlock value from network APIs

Network APIs offer telcos a chance to finally generate sizable returns on their massive 5G investments, but doing so will require changing some of their traditional ways of doing business.

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Although telcos invested nearly \$1 trillion in network upgrades since 2018, they are still struggling to monetize 5G. This ongoing challenge has troubling echoes of other recent missed opportunities. The sector is now at risk of losing out on the chance to extract significant value from 5G’s unique capabilities, much as it has missed the opportunity from streaming video and enterprise messaging over the past 20 years, which left other players profiting from the sophisticated, costly digital infrastructure that telecom operators put in place.

However, there is growing interest—and hope—in the potential of network application programming interfaces (APIs) to turn the tide. Network APIs are the interlocking puzzle pieces that connect applications to one another and to telecom networks. As such, they are critical to companies seamlessly tapping into 5G’s powerful capabilities for hundreds of potential use cases, such as credit card fraud prevention, glitch-free

videoconferencing, metaverse interactions, and entertainment. If developers have access to the right network APIs, enterprises can create 5G-driven applications that leverage features like speed on demand, low-latency connections, speed tiering, and edge compute discovery.

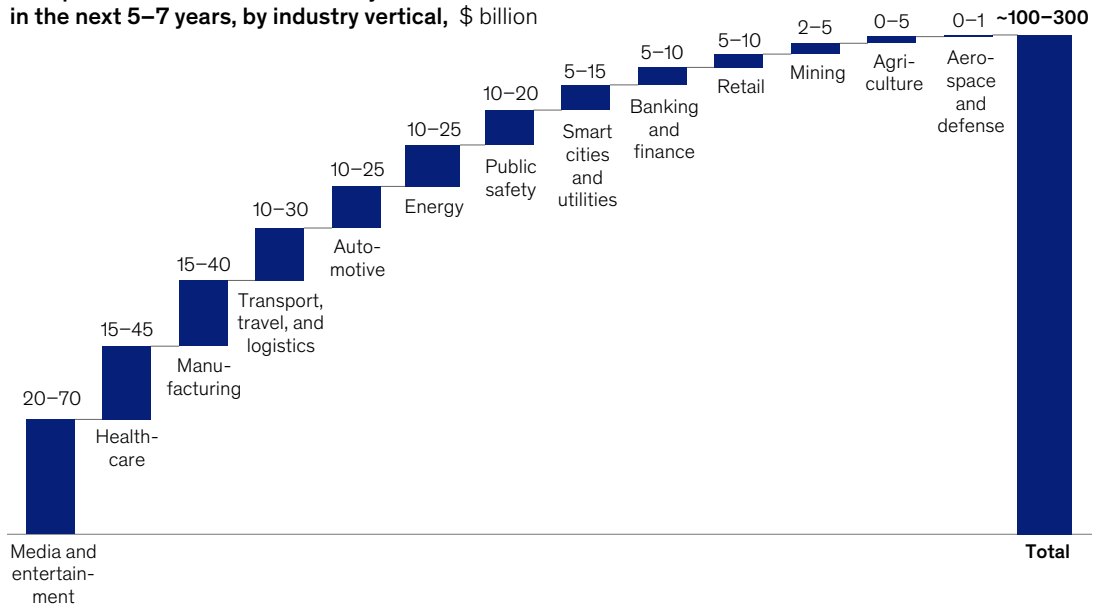
In addition to enhancing today’s use cases, network APIs can lay the foundation for entirely new ones. Remotely operated equipment, semi-autonomous vehicles in production environments, augmented reality gaming, and other use cases could create substantial value in a broad range of industries. By enabling these innovations, telecom operators can position themselves as essential partners to enterprises seeking to accelerate their digital transformations.

Over the next five to seven years, we estimate the network API market could unlock around \$100 billion to \$300 billion in connectivity- and edge-computing-related revenue for operators (exhibit),

Exhibit

Network APIs offer telcos a route to a multi-billion dollar market for connectivity and EDGE-related services in the coming five to seven years.

New potential revenues enabled by network APIs in the next 5–7 years, by industry vertical, \$ billion



Source: McKinsey analysis, GSMA intelligence

McKinsey & Company

while generating an additional \$10 billion to \$30 billion from APIs themselves. But telcos won't be the only ones vying for this lucrative pool. In fact, with the market structure currently in place, they would cede as much as two-thirds of the value creation to other players in the ecosystem, such as cloud providers and API aggregators—repeating the industry's frustrating experience of the past two decades.

Reaching the upper end of our market prediction will almost certainly require telcos to reconsider many of their traditional ways of doing business. Most significantly, they will likely need to collaborate with one another and with players across the value chain—including vendors, systems integrators, and enterprise developers—in order to create a robust supply of fully interoperable APIs, generate demand by illustrating their value, and develop new market structures that maximize telcos' role. Early collaboration among the world's more than 500 telcos will be critical. Unless operators quickly align on common standards for creating APIs that work seamlessly across global networks, they are unlikely to gain traction among enterprise developers.

This article presents a road map that telcos could follow to capture value from network APIs. If operators of all sizes move now, they have a chance to seize the network API opportunity. A delay could force many to cede this fruitful territory to a handful of their largest competitors and to players in other industries, who might leverage other technologies—predictive AI for gaming, low Earth orbit (LEO) satellites for guaranteed connectivity, and over-the-top solutions for data and edge computing discovery—to deliver the results that customers demand.

A road map for unlocking telecom value from network APIs

While telcos have yet to entice businesses and consumers to pay more for 5G connectivity, an emerging body of evidence suggests that both enterprise and B2C customers are, in fact, willing to pay to enhance the use cases that are important to them. Put another way, customers see value in experiences rather than in connectivity per se.

A McKinsey survey found that 14 percent of 18-to-24-year-olds are willing to pay for 5G boosters that can temporarily improve the gaming or video-streaming experience—and would use them seven times a month, on average, if the cost were \$1.¹ What's more, 15 to 20 percent of customers say they are willing to pay between 7.5 and 15 percent more for "business class" 5G plans.

Network APIs allow for the creation of subscriptions, services, and applications that move the 5G value proposition away from the abstract concept of enhanced connectivity and toward the relevant, real-world experiences that customers desire.

Still, when it comes to network APIs, the telco industry has a classic chicken-and-egg dilemma. Without strong demand from enterprises, most telcos have been hesitant to invest in this area. But without a robust supply of user-friendly, fully interoperable APIs—and proof points attesting to their value—enterprises are looking to other technologies to meet their needs.

The measures that follow have the potential to unlock 5G monetization and place the telco industry at the center of next-generation solutions. They involve building and nurturing the nascent network API market by generating both supply and demand. Once supply and demand are in place, telcos can begin shaping ecosystems and market structures that could allow them to maximize their share of the value network APIs can deliver.

Create common API definitions to ensure global interoperability

Last year, a major telco approached a large gaming company with an API that could give gamers instant access to best-in-class connectivity—as long as those gamers were affiliated with that carrier. The gaming company declined. Its leaders explained that they didn't want to invest in creating and marketing an offering that would be relevant for only 20 to 30 percent of gamers.

¹Ferry Grijpink, Jesper Larsson, Alexandre Ménard, and Konstantin Pell, "Unlocking the value of 5G in the B2C marketplace," McKinsey, November 5, 2021.

For the telco, it was a stark lesson in the primacy of interoperability. While there are limitless opportunities for improving customer experience through network APIs, developers and enterprises prize scalability. And interoperability is critical for scaling. Without an array of network APIs and the certainty that they will function across networks and geographic regions, enterprises are unlikely to invest in this area.

Early efforts to foster collaboration across the global telecom industry are gaining momentum, albeit relatively slowly. In the most notable example, GSMA, a mobile ecosystem industry association, has teamed up with the Linux Foundation, a nonprofit devoted to open-source software, to create CAMARA, an open-source project focused on developing a set of standardized network APIs. CAMARA creates common definitions for APIs so developers can use a single piece of code to access 5G capabilities across networks.²

GSMA has also set up a parallel initiative, Open Gateway, to identify the most marketable APIs and encourage telcos to introduce them using CAMARA's standards.³ Open Gateway is inspired by the SWIFT payment system, the secure communications network for fund transfers that was developed by 239 banks across 15 countries and is now used in most high-value transactions worldwide.

Although limited in reach and scale, early use cases stemming from the Open Gateway initiative are already happening. In November, three Brazilian operators—Claro, TIM Brasil, and Vivo (Telefônica Brasil)—announced a joint effort to launch three CAMARA APIs to improve digital security. The operators are partnering with Infobip as a technical integrator and Microsoft Azure as a services platform provider.⁴

However, while more than 40 of the world's leading carriers have agreed to adopt CAMARA's API

standards, few have made CAMARA APIs available for developers to use commercially. Among the reasons for this reluctance are operators' wariness of investing in a fledgling market and uncertainty about the business model. Additionally, operators with superior networks may fear that their competitive advantage could be eroded, since the lowest performers in each market will likely end up setting the standard for key features such as speed and latency.

The most successful example of telco collaboration on this scale resulted in international mobile roaming capabilities. Though most people take it for granted now, the ability to make calls in every country, from and to every network, requires sizable and sophisticated orchestration. Roaming, backed up by bilateral contracts between operators and operator consortia, has truly created a global capability for users, with limited to no friction.

The industry can also look to its own past for a striking cautionary tale of how the failure to collaborate can squelch substantial opportunities. When WhatsApp was introduced in 2009, telcos were charging customers as much as 20 cents for each text message they sent. Telcos could have created a product allowing people to use the internet for free to send text messages, photos, and videos. But they were reluctant to relinquish lucrative texting revenues and were slow to align on common standards to ensure interoperability. By the time they had come to an agreement, most of the messaging volume had already shifted to WhatsApp (now estimated to be worth \$50 billion to \$100 billion,⁵ if not more) and iMessage.

Some carriers are taking a different approach by introducing CAMARA APIs on their own networks. In September, Deutsche Telekom and Vonage launched MagentaBusiness APIs, a platform allowing developers and businesses to build apps and services using CAMARA APIs that tap

² "Linux Foundation announces new project 'CAMARA—The Telco Global API Alliance' with global industry ecosystem," GSMA, February 28, 2022.

³ "Mobile industry deploys open network APIs and prepares for new era of digital services and mobile apps," GSMA, February 27, 2023.

⁴ "Brazilian mobile industry launches three anti-fraud network services and becomes pioneer for GSMA Open Gateway," GSMA, December 11, 2023.

⁵ Thomas Lott, "Examining Meta platforms on the sum of parts basis," Seeking Alpha, September 29, 2023.

into Deutsche Telekom's network.⁶ This approach doesn't bring about the necessary interoperability, but it allows developers to experiment with CAMARA APIs in live networks.

Even if telcos agree on the principle of having common API standards, they may disagree about how to define specific APIs' performance levels (for example, five- versus seven-millisecond latency). Pricing could also generate debate; it's much easier for users to offer global services that are uniformly priced. Countries' differing regulations on data consent requirements could be another complication. However, if operators leverage initiatives like Open Gateway to reach agreement on a set of harmonized APIs, they can differentiate themselves by creating innovative solutions.

Align on a coordinated timeline

To gain traction with enterprise developers and offer the scalability they prize, telcos can align on an industry-wide timeline detailing which APIs they will release first, in what order, in which geographical regions, and exactly when. Alliances like GSMA's Open Gateway initiative can play a role in bringing telco leaders together to determine which APIs to prioritize and establish a clear timeline for rolling them out.

Before telcos begin substantive discussions, they may want to establish clear decision-making protocols, as they will inevitably encounter sticking points while working toward a coordinated road map. For example, telcos might have different strategic priorities based on the needs of their current customers, the strengths of their partner ecosystems, or their systems' abilities to support certain APIs without costly upgrades.

Telcos may also want to lean into the APIs that emphasize their existing competitive advantages. For instance, those that have invested heavily in 5G stand-alone (SA) core may want to focus on APIs that only sophisticated networks can enable, like the one for quality on demand. Those without SA core will likely prioritize simpler APIs, such as location verification, number verification, and SIM

swap (which checks whether a phone number has recently changed SIM cards before approving transactions made with that number). Finally, telcos may have vastly different estimates of each API's market potential and likelihood to boost connectivity revenues. This divide could be eased by jointly investing in market research that gets everyone on the same page and continues to track the market's evolution.

Key considerations

As telcos work together to overcome any obstacles and agree on priorities, they can benefit by weighing the following considerations:

- *Applicable use cases:* The most effective way to stimulate demand for APIs is to illustrate what they can help enterprises accomplish. In considering which APIs to prioritize, telcos will want to consider which use cases each API can unlock and how difficult it will be for enterprises to bring these use cases to life. For example, banks can easily deploy location APIs, which can guard against fraud, by integrating them into existing processes. But it's much more complicated for hospitals to deploy quality-on-demand APIs, which could allow doctors to assess patients over video when they're still in the ambulance, as this would require hospitals to rethink current processes.
- *Market demand:* A thorough assessment of demand would include what the market demand is for applications and services leveraging different APIs. Other questions for telcos include which industries are most eager for capabilities that APIs can enable and whether there is evidence that enterprises in these industries are willing to invest in this area.
- *Implications for connectivity revenues:* Some APIs enable use cases that would require enterprises—and their customers—to increase their connectivity spending over the long term. If enterprises aren't currently expressing an

⁶ "Telekom commercially launches network APIs," Deutsche Telekom, September 20, 2023.

interest in these APIs, telcos could evaluate whether it might still make sense to invest in creating a market that could potentially boost connectivity revenues.

- *Network requirements:* Certain APIs require more advanced telecom networks. APIs related to quality on demand, for example, require SA core, which is widely available in some markets, including North America, but is not yet available in many European markets.
- *Regional landscape:* While the ideal scenario is for APIs to be interoperable on a global scale, developers and enterprises value an API's ability to work for all users in a particular geographical area. If APIs are introduced by country or region, enterprises can begin activating use cases for all customers in that country or region and potentially spur momentum in other parts of the world. From a regional standpoint, the North American market has characteristics that make it attractive to focus on at the outset. There is the market's sheer size, of course, but also its superior 5G network infrastructure (including the maturity of its SA core), the small number of major telco players (just four, making alignment easier), and the large developer community.
- *Competition from non-telco players:* Telcos might consider which APIs enable use cases that hyperscalers or other competitors are already trying to address and how successful these efforts have been. Starlink, for example, is already using LEO satellites to help companies remotely monitor and manage their vehicle fleets. Given the status of the competition and the projected value at stake, telcos may choose to prioritize these areas or, alternatively, relinquish them to the competition and focus on underexplored areas.

High-potential, high-priority API classes

Assessment of the key considerations should help telcos narrow the set of APIs they are best positioned to introduce to the market. In general, two main classes of APIs seem to be likely choices for telcos to prioritize initially. First, simple APIs

related to location and fraud prevention are relatively uncontroversial, easy to implement, and relevant to a variety of industries or use cases, including banking, fintech, and insurance for SIM swap; mobile gaming, ride share apps, logistics, and delivery for location verification; and social media networks for number verification, which can reduce the need for cumbersome authentication processes. The other category is quality-on-demand APIs, which offer increased bandwidth for specific applications and could generate substantial revenue from connectivity.

These priority areas could serve as valuable proof points, after which telcos might focus on APIs that can help them access edge computing, cloud, and information and communications technology (ICT) markets.

Stimulate demand among enterprise and independent developers

Enterprises across industries stand to unlock tremendous value from network APIs. The stakeholders most critical for beginning the journey are in-house developers, as they are best positioned to understand the types of products and use cases network APIs can enable. They are also charged with integrating APIs into their products and services.

Telcos also will want to generate excitement among enterprise developers and independent developers, who are another vital source of innovation. By cultivating deep, ongoing relationships with both groups, operators can generate momentum that builds on itself, with early adopters sparking broader enthusiasm. These relationships can also give operators valuable insight into developers' evolving needs and pain points.

Until now, hyperscalers and tech companies have done a much better job than telcos at establishing strong relationships with the global developer community. A prime example is Twilio, a cloud communications company whose customer engagement platform is used by more than ten million developers worldwide. The company's decision to prioritize developer relations from the

outset has been critical to its success. Twilio now has five teams devoted to different aspects of this work: Worldwide Developer Relations, Developer Enablement, Builder Content, Community Experience, and Ecosystem Evangelism.⁷

In recent years, many telcos have tried to engage developers by building platforms where they can access network-specific APIs. These efforts have largely fallen flat because telcos haven't been able to offer the cross-network interoperability that developers prize. If this changes, telcos could find themselves with a much more appealing proposition. At that point, they may adopt some of the same developer-focused strategies that have fueled the success of software as a service (SaaS) and other cloud-based products, including the following:

- *“freemium” plans* that offer developers basic access at no cost and then charge for upgraded features, removing the barrier to entry
- *developer education programs* that raise awareness of 5G capabilities, demonstrate existing API use cases, and coach developers on the technical aspects of integrating network APIs into their applications, products, and services
- *around-the-clock support teams* to assist developers in all parts of the world as they build applications that leverage network APIs
- *university partnerships* that involve educating computer science and software engineering students on network APIs and offering free access to API platforms
- *hiring developer “evangelists”* to generate momentum within the global developer community
- *simple self-service platforms* that make it easy for independent developers to experiment with building applications that leverage network APIs (backed up by a

simplified payment process so developers don't need to sign complicated, long-term contracts)

- *forging partnerships with enterprises* to educate teams on network APIs' potential to drive value within their industry, co-develop industry-specific use cases, and illustrate how network APIs can meet business objectives

It's impossible to predict the full range of use cases that network APIs will enable in the future. But telcos that generate excitement among developers and make their experience seamless can create the conditions for innovation and experimentation to flourish.

Create new market structures

As telcos build the network API market, they will have an opportunity to create new market structures that expand their role beyond connectivity and allow them to shape the next wave of digitization. In particular, the following two market structures are likely to develop:

- *Aggregated model:* The prevalent structure for communications-platform-as-a-service (CPaaS) players is an aggregated model in which a third party operates a central hub or platform for related APIs. This model would make it relatively easy and affordable for developers to access APIs. It could create a large, global market with many participants but comes at a potential cost. Aggregators might build developer relationships independently, relegating telcos to the supplier role. If aggregation becomes the standard model for network APIs, operators might focus on forging win-win partnerships (such as distribution deals) with aggregators and build novel, value-additive solutions on top of the aggregated APIs. This approach could give operators the benefits of aggregators' global reach while allowing them to maintain a central role with developers and enterprises.

⁷ “Developer relations at Twilio: Then and now,” Twilio, April 5, 2022.

— *Federated model:* The structure that governs international roaming capabilities is a federated model, in which operators orchestrate behind the scenes without the help of a third-party provider. This approach would allow operators to carve out a larger role in the ecosystem. For example, a payment-related API could enable operators to capture part of the payments ecosystem. An API that helps identify the nearest edge compute node could be bundled with edge computing solutions that leverage telcos' own edge infrastructure or capabilities that telcos buy from hyperscalers. While this model is promising, it would require operators to invest further in building their own developer platforms and to negotiate a complex set of one-on-one contracts with each other. There is also a greater risk that developers could face a more fragmented, less harmonized set of APIs.

In the end, both models will likely coexist. While the aggregated model is a better fit for global, consumer-facing use cases where commonality and ease of implementation are more important than peak performance, the federated model is more suitable for local, high-performance use cases. The federated model ultimately may also be easier to implement, as it limits the number of one-on-one agreements each telco must make with a third-party provider (or aggregator) and allows

those with superior capabilities to lean into their competitive advantages.

As the ecosystem develops and new structures emerge, it will be important for telcos to pay close attention and make course corrections where necessary. Regardless of how the market evolves, telcos can enhance their ecosystems by investing in sales capabilities specific to network APIs, cooperating with leading independent software vendors and systems integrators, and continuing to prioritize developers' needs.

Network APIs could be the elusive key that finally allows telcos to unlock 5G monetization. But telcos will need to work well together to build the market by creating a solid supply of fully interoperable APIs and by generating global demand and momentum. Network APIs can allow enterprises to tap into 5G's formidable capabilities to limit fraud, guarantee bandwidth for mission-critical applications, and enable real-time interactions and insights. But if telcos don't move quickly and collaboratively, organizations will look elsewhere to meet their needs—forcing the industry, once again, to watch most of the action from the sidelines.

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