5G NEW RADIO:
REVENUE AND DEPLOYMENT OPPORTUNITIES

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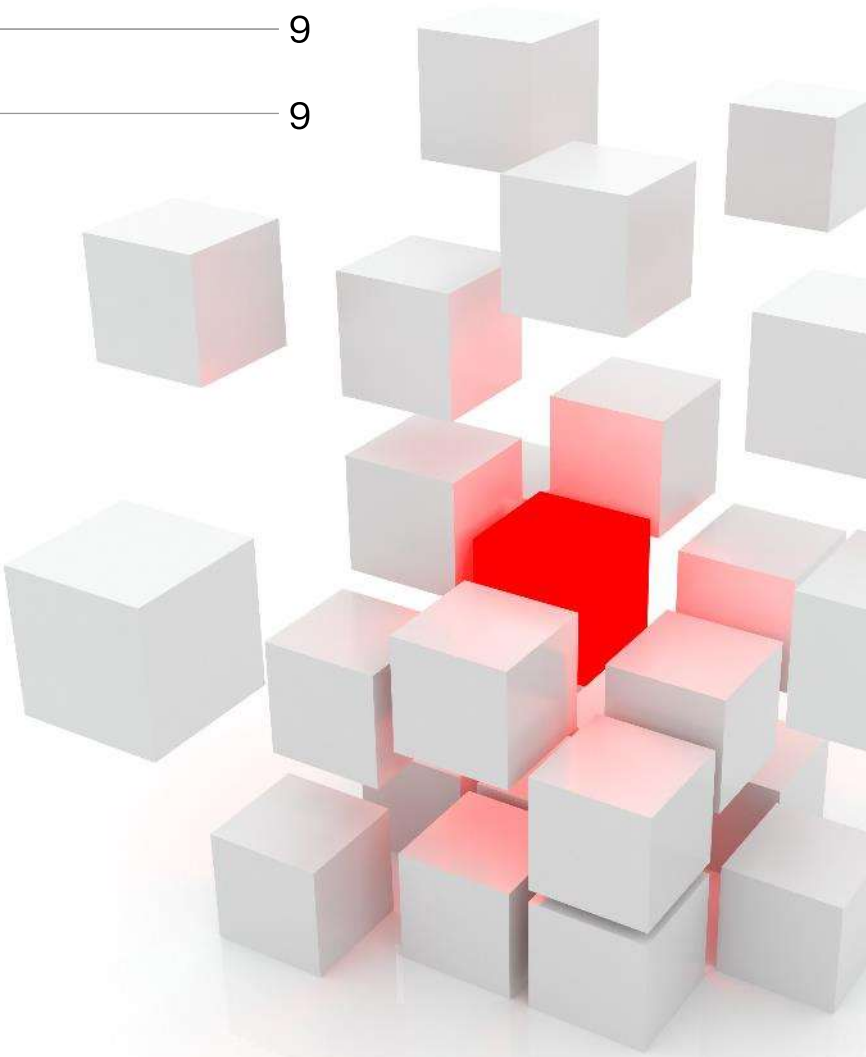
EXECUTIVE SUMMARY

The race to lead in 5G is underway.

But telecommunications operators face a dilemma over how to solve the 5G business case since previous strategies cannot be adapted to this new generational leap in wireless technology. The deployment of 5G requires significant capital investment and the rate of return is not as straightforward despite the potential of 5G technology. Radio access network (RAN) is the largest cost in wireless network architecture, pushing operators to rethink their current deployment paradigms. **Telecom Infra Project (TIP)** has created an ecosystem that is founded upon collectively designing and building new technologies to accelerate innovation. TIP's members have already made progress in 5G development. Operators that can evolve themselves and embrace collaboration will be able to compete in the race to the $619 billion opportunity.[1]

5G is expected to unlock new revenue opportunities. This revenue is projected to be realized through disruptive new use cases, such as fixed wireless access for home and small and medium business broadband, innovative and immersive entrainment products in augmented and virtual reality (AR / VR), and smart infrastructure projects for smart cities. Additionally, the global 5G push will enable broadband access to previously inaccessible customers in both developed and emerging markets.

The large capex and densification requirements for 5G will force operators to rethink their equipment and deployment strategies. For example, the radio network component remains the largest cost in networks, often accounting for approximately 70 percent of the network cost.[2] To remain competitive, operators must assess a new approach to building and deploying network infrastructure. Disaggregation will be attractive to operators as a way to reduce high densification costs.

The TIP ecosystem is focused on accelerating innovation in the telecom industry by creating end-to-end disaggregated network solutions. TIP members provide insights and drive innovation aligned with standards bodies and industry groups, resulting in greater flexibility in the network architecture and reduced time to market. Operators that collaborate in TIP's 5G New Radio (NR) project group will collectively solve challenges that the telecom industry faces with 5G deployment. This group has already created specifications and issued RFIs that can provide an advantage to operators in the 5G race.

KEY TAKEAWAYS

- **5G is here and deployment costs will be expensive,** so operators need to be quick and strategic in their approach or risk being left behind.

- **New revenue opportunities from 5G will emerge** as operators enter new markets such as fixed wireless, AR / VR, smart cities and enterprises. This is only the beginning and operators need to be well positioned to take advantage of future opportunities.

- **Cost savings through network disaggregation** will be crucial to making the economics of densification feasible and the business case for 5G more attractive.

- **Partnerships and industry groups will be critical** to accelerating innovation and reducing time to market. Operators must embrace collaboration and define a 5G plan that includes developing a vibrant, multi-vendor supply chain.

THE STATE OF TELECOM NETWORKS AND 5G

As the fifth generation of wireless network technology is introduced, business executives in the telecommunications industry remain uncertain about the return on invested capital of 5G.[3] Despite high growth in both mobile subscriptions and mobile data traffic, network operators are seeing their revenue erode while operating expenditures stay flat or increase.[4, 5]

Although 5G would help address the network capacity problem, operators will not be able to apply past playbooks directly to 5G deployment. The challenge is that the RAN must be optimized to support extreme densification—meaning more cell sites and efficiently allocated capital. In the United States, Accenture estimates that telecom operators will need to invest **$275 billion over seven years** as they build out 5G.[6]

This deployment challenge will require operators to assess their current approach and consider collaboration models. TIP has created an ecosystem where industry players accelerate innovation and reduce time to market. In this ecosystem, operators and technology providers can collectively design, build and deploy networks to support 5G. The operators that can plan quickly and invest efficiently in the adoption of new technology will lead the 5G race.

PROBLEM SOLVING WITH 5G NR

As operators look to solve network capacity, latency and speed challenges, 5G NR will be a crucial piece in the 5G technology puzzle. Standards bodies and industry groups will be critical to capitalizing on 5G opportunities.

The TIP ecosystem has created a 5G NR project group focused on a 5G NR base station solution using standards defined by the 3rd Generation Partnership Project (3GPP). This group, co-chaired by Sprint and Vodafone, is defining reference designs of a disaggregated whitebox platform for 5G NR focused on the baseband, radio and antenna. The scope of the project group is currently focused on mid-band frequencies, but will also include high-band in the future to provide a comprehensive NR solution.
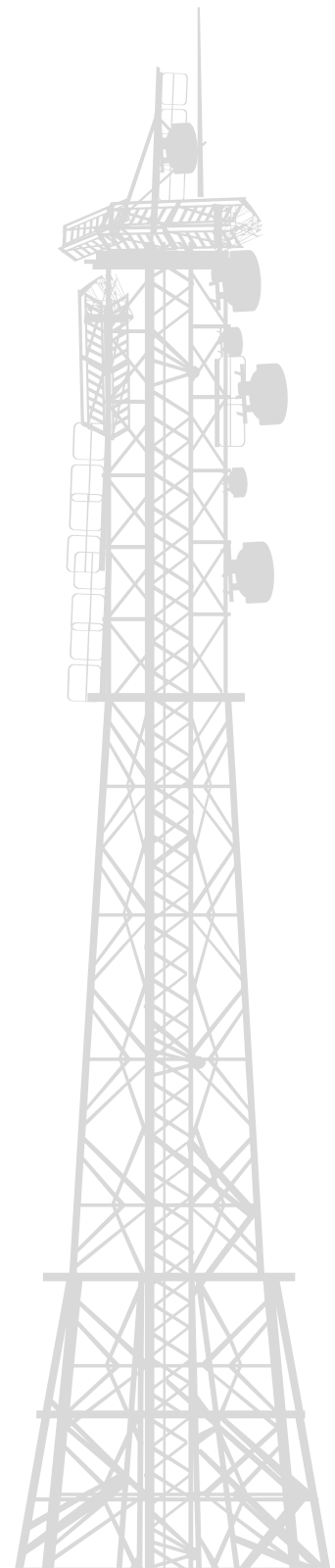
PROGRESS AROUND THE WORLD

There is no one-size-fits-all strategy for 5G deployment solutions. Operators must assess their network assets to quickly build network foundation that must be flexible and future-proofed to capture new 5G revenue opportunities. Industries and regions around the world are working to quickly deploy 5G.

UNITED STATES
Commercial deployment in select cities and regions

EUROPEAN UNION
Committed to launch in at least one city in each member state by 2020

SOUTH KOREA
Commercial coverage of 5G started in 2019 and continued expansion

JAPAN
Pre-commercial deployment in 2019 followed by commercial service in 2020

BRAZIL
Spectrum auctions set for early 2020 and initial field trials have begun

UNITED ARAB EMIRATES
Nationwide launch of 5G by the World Expo 2020

CHINA
Broad commercial launch by 2020

AUSTRALIA
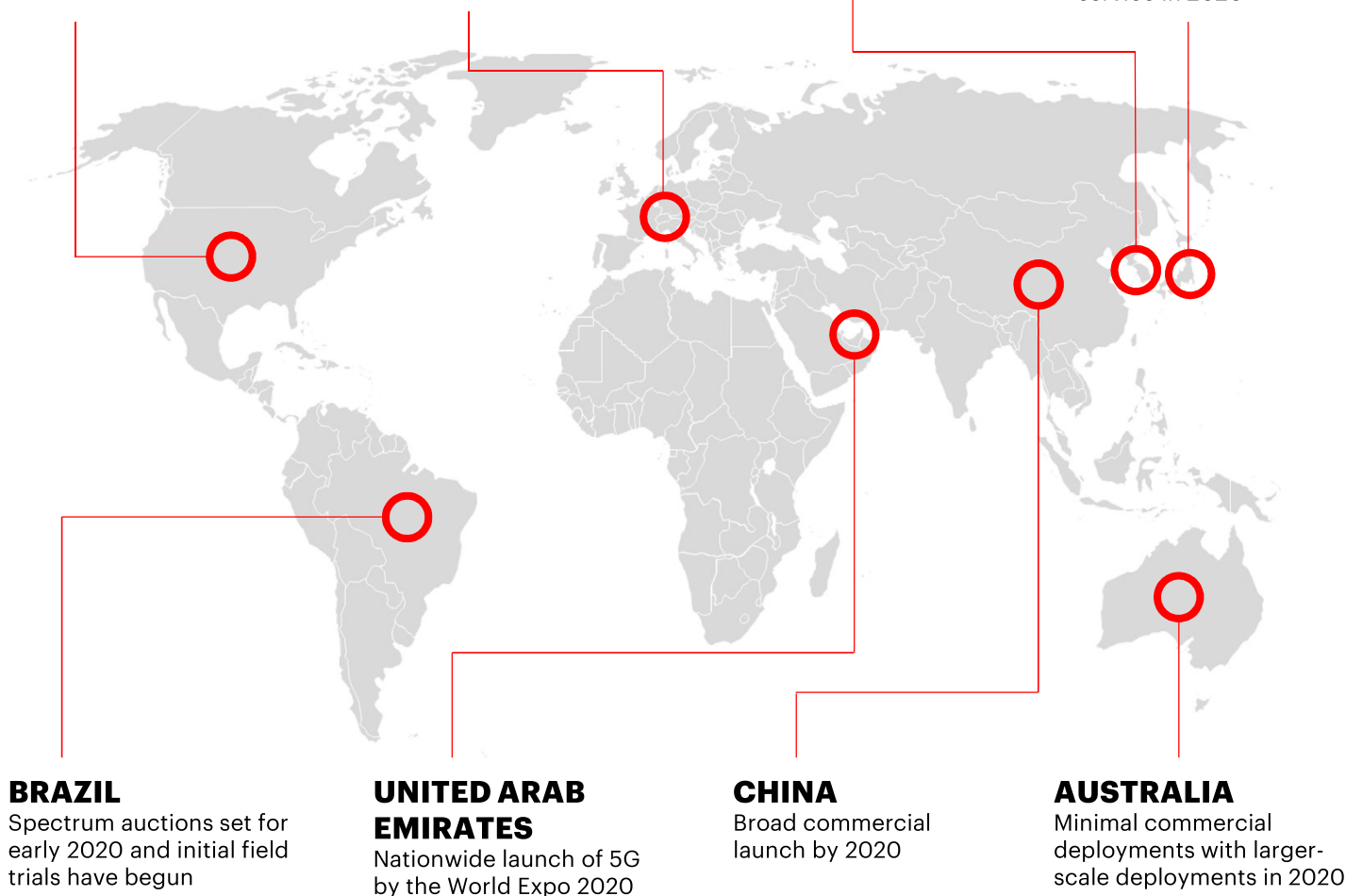Minimal commercial deployments with larger-scale deployments in 2020

Figure 1. Current state of regional 5G deployments

Source: Expert interviews; Accenture analysis

CAPTURING 5G REVENUE POTENTIAL

By 2026, 5G will present an estimated $619 billion incremental revenue opportunity across industries and geographies for operators.[7] However, the potential applications are at various maturity levels, making the rate of return unclear. **These use cases are just the beginning** and additional revenue streams will emerge as 5G becomes more prevalent. Speed will be critical and players who waver will be unable to capture 5G opportunities. Calculated experimentation and partnerships can expedite new ideas and revenue generation.

- **Fixed Wireless Access**. 5G will allow operators to expand their service portfolios through broadband service to new consumers in areas with no or limited coverage. Operators can unlock new revenue streams and improve the customer relationship by offering more than traditional mobile subscriptions.

- **AR / VR**. High bandwidth and ultra-low latency connections will enable new partnerships between operators and AR / VR ecosystem. As AR / VR adoption increases, operators can explore potential revenue sharing opportunities and provide more services to their customers.

- **Cloud Gaming**. Technology companies are moving the gaming engine to the cloud, and 5G will allow tech companies to further expand these offerings. In the United States, Sprint aims to evolve its customer experience through its partnership with Rovio to launch a 5G unlimited cloud gaming platform, Hatch.[8]

- **Smart Cities & Enterprise**. 5G networks will serve as the connectivity backbone for various smart city features, such as smart parking and energy grid management. Enterprises will be able to capitalize on 5G connectivity by driving new efficiencies. Operators will play a key role in a 5G reality where everyone and everything is connected, unlocking future revenue opportunities.
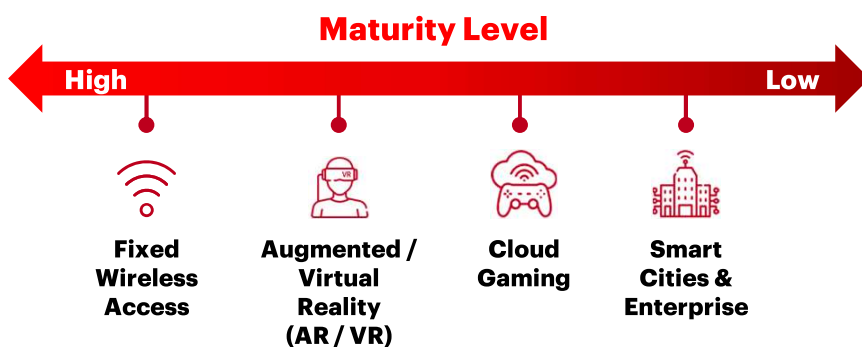

Figure 2. Maturity level for potential 5G revenue opportunities

Source: Expert interviews; Accenture analysis

THE ECONOMICS OF DISAGGREGATION

Mobile data demand is set to increase at a CAGR of 46 percent between 2017 and 2022.[9] In order to meet data demand and costly densification requirements, operators will be compelled to explore cost-effective strategies. By 2026 in the United States alone, it is estimated that network demand will require 800,000 small sites, which cost between $35,000 and $45,000 per deployment.[10] This makes the business case for 5G challenging as existing network architecture solutions make the ROI of 5G ambiguous.

A multi-vendor approach would enable operators to take advantage of significant cost savings by leveraging disaggregation and commercial-off-the-shelf (COTS) hardware—some technology providers estimated up to 49 percent capex savings.[11] As operators look to be competitive in the race for 5G, disaggregation will be key to making the economics of wide-scale 5G deployment work.

RAN ARCHITECTURE OF THE FUTURE

In order to remain competitive, operators must assess alternative network architectures, which would further open the network stack and enhance vendor competition. The radio network component traditionally accounts for **70 percent of total network costs**, so operators will see an attractive opportunity in reducing the high densification costs of 5G.[12] Interoperability across the network allows for disaggregation, which benefits operators by optimizing each component of the network and supporting a vibrant, multi-vendor supply chain. Cloud economics, improved resource utilization and COTS hardware will lower capital expenditures.

As new 5G use cases are discovered, a flexible network architecture will be needed to support network traffic created by these new use cases. This agility will allow operators to control spend and capture new revenue opportunities.

> **"Sprint is a proponent of the power of TIP to accelerate network transformation. We are collaborating with other operators and technology providers to accelerate open and disaggregated 5G network solutions."**
>
> **—Dr. Durga Satapathy, Sprint, Director Technology Innovation & Architecture**
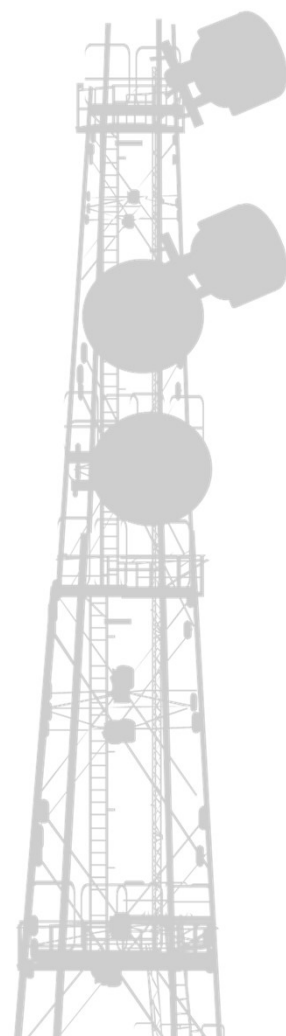
COLLECTIVELY ACCELERATING THE INDUSTRY

Collaboration can help solve the challenges facing the telecom industry. TIP has created an ecosystem for operators to focus on creating end-to-end disaggregated network solutions. This supports more technology providers entering the market, which creates a more vibrant supply chain by leveraging:

- **Diverse Members.** The members include operators, technology providers, system integrators and webscalers which can provide insights across industries, geographies and deployment scenarios. For example, webscalers can provide operators with insights in virtualization and analytics to help strategically deploy networks.

- **Accelerated Innovation.** TIP members are co-creating and optimizing reference designs that can be deployed at scale. As a result, operators benefit from increased choices and faster innovation.

- **Interoperability Testing.** The complexities of interoperability and multiple vendors are alleviated through TIP's Community Labs, where technology providers are testing integrations and validating potential deployment scenarios. These labs are located throughout the world, currently in Brazil, Germany, India, South Korea, the United Kingdom and the United States.

- **Trial to Scale.** By collectively partnering, members can share lessons learned from trials to effectively scale production networks. This enables operators to quickly deploy new technology across markets.

- **Industry Collaboration.** TIP is working with industry groups, including Open Network Foundation (ONF), to drive collective innovation and open platform solutions. TIP's liaison with ONF allows ecosystems to leverage each other's efforts.

500+
Global TIP Members

78+
Operator Members

9+
Community Labs

4+
Ecosystem Accelerators

"Vodafone has been working with TIP through the OpenRAN project groups to build and deploy more flexible network infrastructure to address critical cost challenges in order to serve more places across the world"

—Vanesa Fernandez, RAN Product Manager, Vodafone Group

CASE STUDY: COLLABORATION IN ACTION

The problem that TIP is solving for telecom resembles what the **Open Compute Project** (OCP) did for the data center industry. Data center equipment was traditionally created by a few vendors that collectively owned a majority market share. As webscalers started to grow rapidly due to consumer demand, they realized that the existing data center equipment architecture would not be cost-effective or sustainable. OCP created a movement where companies can collectively build new data center equipment specifications and efficiently meet consumer demand.

CONSIDERATIONS FOR THE FUTURE

Spectrum has always been critical to telecommunications, and the story remains the same for 5G. Operators will need to formulate a strategy that accounts for a more calculated mix of mid-band and high-band spectrum to meet future network demand and alleviate capacity challenges. These spectrum strategies will be critical and different for every operator.

Disaggregation does introduce some complexity into the network compared to legacy architecture due to the management of multiple vendors. System integrators will play the important role of orchestrator for operators in this new network architecture. Although there will be new challenges, the net gain of disaggregation will be increased choice and lower costs.

WHERE DO WE GO?

5G is here and the necessary densification for network infrastructure will require extensive investment. The rate of return is unclear since revenue generation opportunities are at various maturity levels as 5G deployments increase across the world.

Flexibility in deployment scenarios will be fundamental in realizing the value of 5G. Operators must choose the best equipment for their networks to meet densification requirements. Network solutions must rapidly adapt and reduce the time to market in order for operators to effectively capture 5G revenue opportunities. Collaboration in building new network technologies will be crucial for operators to accelerate innovation and lead the 5G race.

ENDNOTES

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An Accenture thought leadership paper commissioned by the Telecom Infra Project.

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