

OPENRAN: **THE NEXT GENERATION OF RADIO ACCESS NETWORKS**

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EXECUTIVE SUMMARY

Radio access networks must evolve with rising data demand.

Current telecommunications network infrastructure requires significant upgrades to keep up with increasing network demand. Operators will be compelled to evaluate new radio access network (RAN) technology from various technology providers.

Telecom Infra Project (TIP) has created an OpenRAN project group which focuses on developing a vendor-neutral hardware and software-defined technology based on open interfaces and community-developed standards. Unlike traditional RAN, OpenRAN decouples hardware and software. This gives operators more flexibility as they deploy and upgrade their network architecture in various deployment scenarios and geographies.

The RAN component traditionally accounts for approximately 70 percent of total network costs, making its reduction an attractive opportunity for operators.¹ As telecom enters a new generation of wireless network technology, operators must seek new strategies in network architecture to remain competitive.

OpenRAN is expected to lower the total cost of ownership (TCO) associated with the deployment and maintenance of networks. These savings will be primarily driven by general-purpose processing (GPP) platforms, disaggregation, virtualization and operations. Overall, the combined capital savings make a compelling business case for operators to switch to OpenRAN.

TIP has created an OpenRAN group to accelerate RAN innovation. The OpenRAN group focuses on the development of RAN solutions based on GPP platforms, disaggregated software and a multi-vendor ecosystem.

The TIP ecosystem is focused on accelerating innovation in the telecom industry by creating end-to-end disaggregated network solutions. Within TIP, there are diverse members which include operators, technology providers, system integrators and webscalers. 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 OpenRAN project group will collectively solve challenges that the telecom industry faces with increasing network data demand.

KEY TAKEAWAYS

- **Growing network demand requires operators to act now** in order to formulate a strategy that will let them effectively allocate capital to increase network capacity.
- **A multi-vendor RAN ecosystem** will be critical to address the complexities of greater network demand using cost-effective solutions.
- **Flexibility from network disaggregation** allows operators to optimize each component of the network, which will increase their ability to service new markets.
- **Partnerships and industry groups will be imperative** to accelerate innovation and move from trial to scale. Collaboration will be essential to quickly build and deploy RAN solutions.

THE STATE OF RADIO ACCESS NETWORKS

The current telecommunications network infrastructure requires significant upgrades to keep up with the growing number of mobile data subscriptions.² This will require operators to invest an estimated **\$275 billion** in the United States over the next seven years.³ To make a compelling business case, new solutions such as a multi-vendor RAN solution will allow operators to address the increasing network demand.

RAN traditionally accounts for approximately **70 percent of total network costs**, which presents an opportunity to reduce capex and realize cost savings.⁴ Traditional network architecture approach does present some cost savings through interoperability among hardware components, such as the remote radio unit (RRU) and the baseband unit (BBU). However, TIP's OpenRAN solution encourages technology providers to use open interfaces and GPP platforms to provide more flexible solutions and further cost savings. A multi-vendor approach could help operators meet the need for extensive small cell and macro site deployments as a cost-effective solution.

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 the disaggregated RAN of the future. The operators that can plan quickly and invest efficiently will remain competitive and meet consumer demand.



INTRODUCTION TO OPENRAN

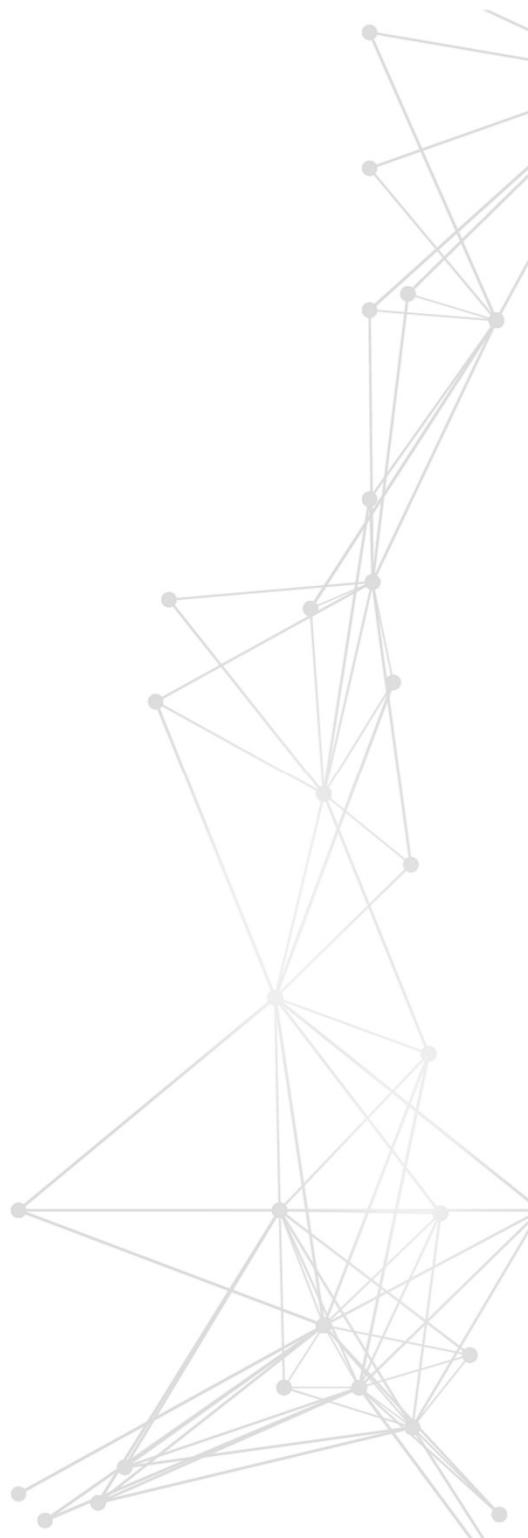
Unlike traditional RAN architecture, TIP's OpenRAN decouples hardware and software, utilizes GPP platforms and leverages software innovation. Overall, this provides more flexibility for operators as they deploy and upgrade their network around the world. Some key features of TIP's OpenRAN include:

- **General Purpose.** TIP's OpenRAN is based on a sustainable GPP platform and customization through field-programmable gate arrays (FPGAs).
- **Disaggregation.** The decoupling of the hardware and software and also the BBU from RRUs allows operators to optimize each component of the RAN and improve network performance through rapid innovation.
- **Virtualization and Pooling.** Operators are better equipped to handle network traffic spikes or fluctuations based on consumer demand. This dynamic approach provides a scalable network with the added benefits of higher performance and reliability.
- **Flexibility.** Operators have greater choice in selecting the best-of-breed RAN components and can support multiple generations (e.g. 4G and 5G) for their deployment scenarios.⁵

RAN APPROACH OF THE FUTURE

In order to remain competitive, operators must assess alternative network strategies through a multi-vendor RAN approach. This would open the network stack and enhance vendor competition, which will accelerate innovation. Interoperability across the network allows for disaggregation, which benefits operators by letting them choose each component of the network separately. Cloud economics, improved resource utilization and commercial-off-the-shelf (COTS) hardware will lower capital expenditures.⁶

As operators upgrade and expand networks, a vendor-neutral network architecture will provide flexibility for operators to expand their service coverage. This agility will allow operators to maximize capital investments and lower the cost to serve.



THE ECONOMICS OF OPENRAN

OpenRAN provides opportunities to reduce RAN spend. TCO savings can be found in both upfront and running costs for operators, from network deployment to maintenance:

- **GPP Platforms.** COTS hardware is a primary contributor to TCO savings in OpenRAN. Technology providers can use general purpose hardware, making procurement more flexible and reducing manufacturing costs. This will help operators accelerate the journey from trial to production.
- **Disaggregation.** Decoupling gives operators the option to select RAN components individually. This architecture reduces equipment costs and improves network performance through rapid innovation.
- **Maintenance and Operations.** Running cost savings will be largely attributed to the human capital reduction in maintenance and efficiencies gained in operations. Technologies will continue to improve, pushing towards a zero-touch model in the future.

Global OpenRAN Field Trials. In 2018, operators deployed multiple OpenRAN trials around the world. The results have been promising, fast-tracking additional trials in new regions.^{7, 8}

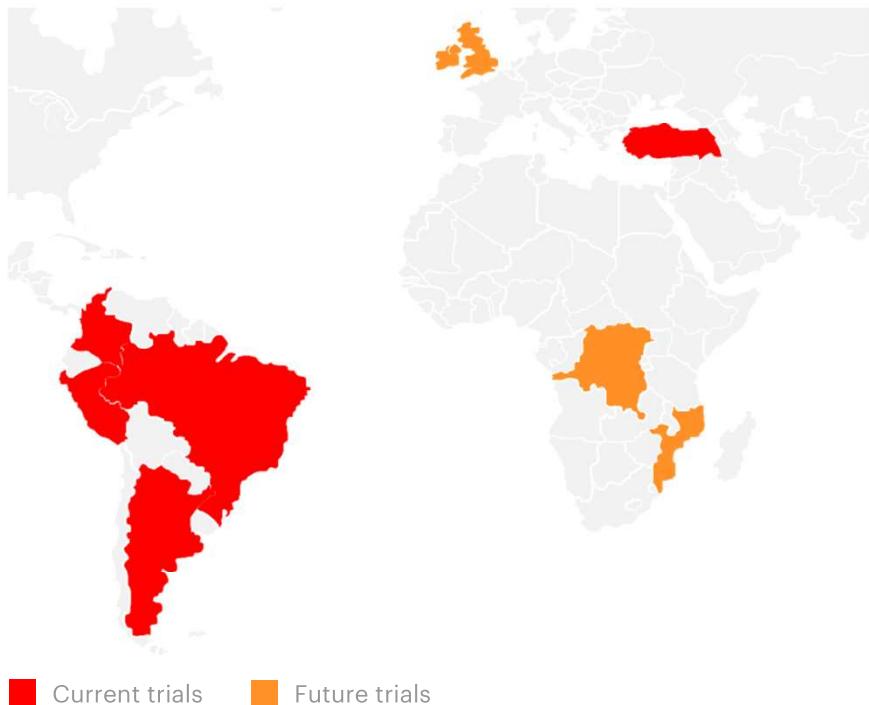


Figure 1. OpenRAN field trials around the world

Source: Vodafone; Telefónica; Accenture analysis

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 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.



"TIP's ecosystem provides a direct line to vendor ecosystems, drives innovation and commercialization, which then improves our efforts to scale."

—Andy Dunkin, Radio Access Center of Excellence, Vodafone Group Networks



CONSIDERATIONS FOR THE FUTURE

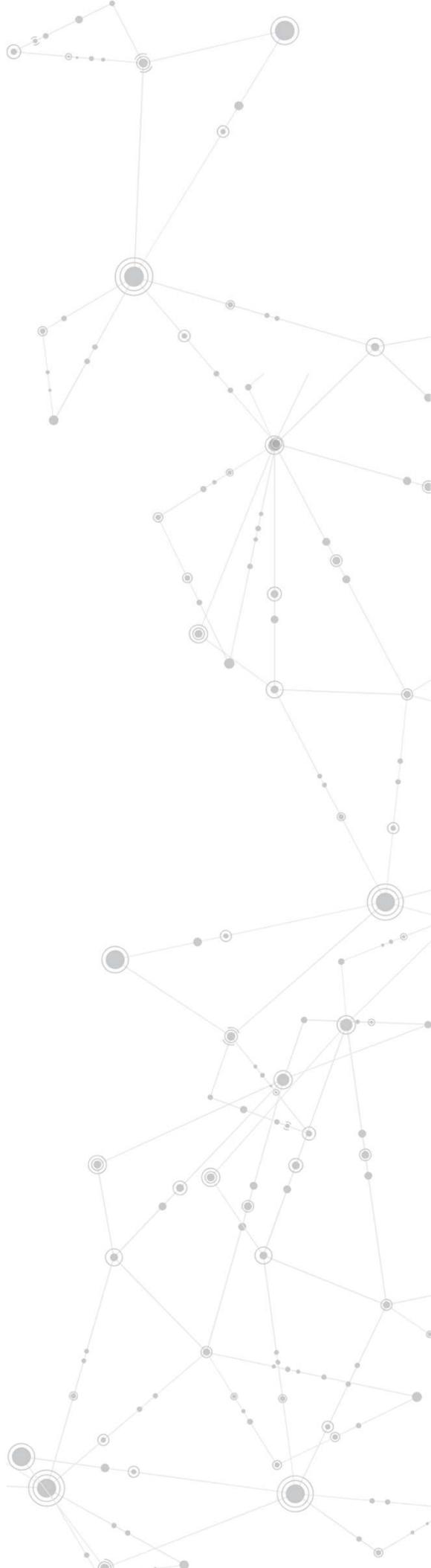
Disaggregation does introduce some complexity when compared to a legacy network architecture approach. System integrators will play the important role of an orchestrator of the ecosystem, guiding operators and alleviating complexities of network architecture. The net gain of disaggregation will be increased choice. Operators will be able to pick the best network architecture for any given deployment scenario and geography.

In some deployment scenarios, operators may consider using a disaggregated physical BBU. The network transport capacity may not be optimal and a vBBU may introduce higher latency. This use of physical BBU may also be preferred where hardware deployment is more economical than cloud. The introduction of this new architecture will require operators to develop strategies for varying deployment scenarios.

WHERE DO WE GO?

As network demand continues to increase, network architectures must be re-evaluated to meet it. The shift in solving the demand challenge will require extensive investment and comprehensive strategies must be developed to effectively allocate capital. RAN remains the largest component of network spend and a multi-vendor RAN solution provides an opportunity to more efficiently invest capital.

The new deployment paradigm requires solutions to be flexible for operators to optimize each component of the network. These network solutions must rapidly adapt to solve the increasing network demand and reduce TCO to enable service to new regions. Collaboration in building new network technologies will be crucial for operators to accelerate innovation and build the future of RAN.



ENDNOTES

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

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