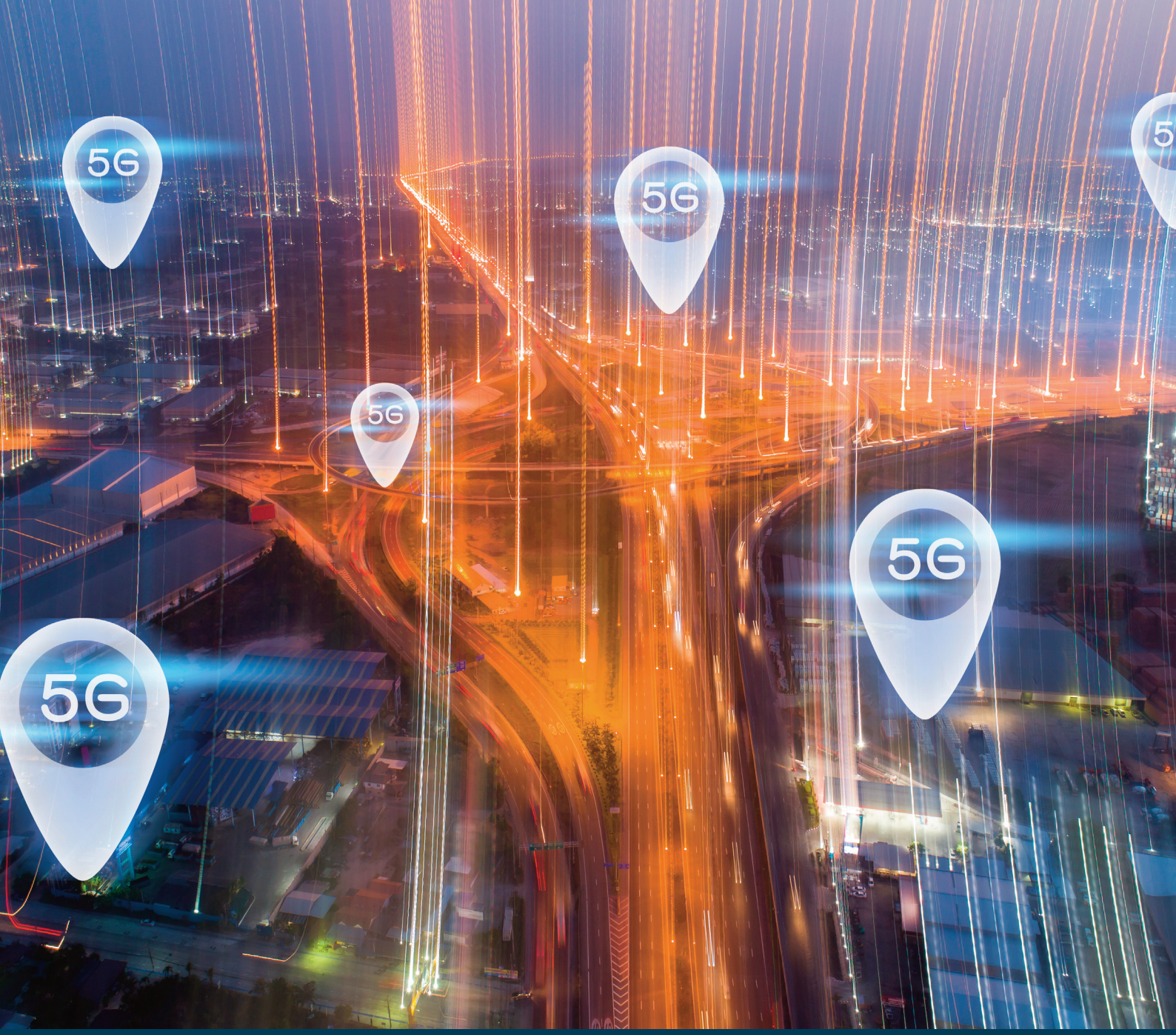

WHITEPAPER

Rewriting the Infrastructure Rulebook with OpenRAN

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Introduction

2019 was a breakout year for OpenRAN technology, and 2020 is starting with O2 UK becoming the latest high profile operator to throw its weight behind the technology with plans for widespread deployment. The technology promises to break the dominance of the traditional 'Big Three' vendors by allowing baseband processing to run via software on white label hardware. This opens the door to greater competition and innovation within the radio access network (RAN) space.

The Telecom Infra Project (TIP) has been driving progress in this area through its OpenRAN project group. It launched at Mobile World Congress in 2016 with 50 members and now has more than 500 participants across operators, technology companies, developers, integrators and start-ups from inside and outside the telecoms sector. In addition, the operator-led O-RAN Alliance has amassed more than 20 operator members since it was formed in early 2018. The alliance takes a slightly different approach by defining and specifying the needs of operators and working with the community to build a fit-for-purpose supply chain.

This is critical as RAN continues to dominate operator investment, with GSMA Intelligence research showing it will amount to almost 50 percent of network spending during the next 12 months. The majority of this spending will be opex. Advocates of OpenRAN technology argue that costs will be reduced thanks to the greater number of companies operating in this space and the use of open platform technology leveraged from the IT world allowing operators to diversify their infrastructure providers – a GSMA Intelligence survey found 65 percent of operators said they were likely or somewhat likely to source radio access network products from new players.

The technology is at an early stage in terms of commercial deployments. The most substantial to date is Telefónica Peru and its Internet para Todos project (IpT), which it owns with Facebook and Latin American banks IDB Invest and CAF. Japanese operator Rakuten is in the process of launching a 4G network based on OpenRAN technology and is planning a commercial launch in April 2020. It joined the Telecom Infra Project in November.

Moreover, O2's announcement of its OpenRAN plans in January 2020 signals the start of a busy and defining year for the technology. The operator's plans follow those of Vodafone, who broke the ice in late 2019 by announcing intention to tender its entire European network, opening up the possibility of OpenRAN players being part of this huge deployment. It is expected further announcements in this area will follow throughout 2020.

This whitepaper will explore what advantages OpenRAN can offer, how Telefónica, Vodafone, and the TIP initiative have been key drivers of it and what this means for the next generation network of the future.

The case for OpenRAN

The network equipment market has been in need of serious disruption for years. Operators, weighed down by legacy walled garden architectures from the days of 2G onwards, have been crying out for cost-effective, nimble infrastructure. These pleas have only gotten louder as the industry shifts to 5G with its promises of ultra-dense networks and new enterprise use cases.

But mobile network economics must be transformed. The traditional telco model lags behind that of the webscale industry, which has tapped into cloud economics, virtualisation and the corresponding transformation of their businesses for some time. According to Gartner, major enterprise categories have typically saved 55% in total cost of ownership over a three-year period, reducing the IT budget by up to a fifth.

OpenRAN promises to be the answer to transforming mobile operator network economics, and with significant cost reductions and new business models. But how does it break the chains of the traditional vendor ecosystem?

- **Cost:** GSMA Intelligence research has found 26% of operators are citing infrastructure costs as their biggest barrier to increasing their 5G spend. It is also the second most important factor after security in buying a new network product. The closed-system obstacles provided by the existing vendor model create a vicious circle for operators as they are held back from considering or implementing new technology and driven to substantial investment in 5G, which reduces their revenues, which in turn hinders the likelihood of investment. OpenRAN's ability to run on white label IT hardware offers operators the ability to opt for something notably cheaper than complex existing products. Mavenir, the industry's only end-to-end Network Software Provider and OpenRAN pioneer, estimates OpenRAN offers a cost saving of almost 40% over five years.[1]

- **Increased competition:** These cost savings will be stimulated by a much more dynamic RAN market. Operators will be given the opportunity to pick and choose from small start-ups to more established players. The market will be opened to innovative and nimble companies without the hardware legacy and quarterly earnings demands of Ericsson, Huawei and Nokia and they will be seeking to grow share through innovative, less expensive products and/or offering different features. This price pressure may force the bigger vendors to respond or face the possibility of losing substantial market share. There is a very real outcome that the size of the proprietary RAN market shrinks significantly as operators shift from traditional hardware to virtualised RAN.

- **Flexibility:** Breaking the traditional vendor model will afford operators the opportunity to be more creative and timely in how they deploy their networks. OpenRAN's advocates are welcoming the fact that operators could choose to use products from different vendors at the same base station. In the future, base stations will be transformed in the way that mobile phones were transformed - operators will be able to tap into the network infrastructure equivalent of an app store in order to deliver different services.

- **Performance and testing:** Despite its status as a new technology, OpenRAN offers a much more robust model of testing. By buying equipment elements with transparent open interfaces, operators can plug a product straight into a live network, without having to go through a cumbersome lab testing programme. In doing so, operators can move quicker and counter the criticism that they are less dynamic than they should be.

- **Innovation:** Given there are only three incumbents, there is less pressure on the established vendors to innovate. These companies also have their hands full with the need to support products dating in some cases back to the 2G era. OpenRAN suppliers lack that obtrusive legacy and can focus on what operators need from day one. Operator deployments will reveal gaps in the market which in turn can be capitalised upon by software companies.

- **Business model:** OpenRAN fundamentally changes the way operators do business by moving from dedicated hardware to IT/cloud-based technology. Instead of the traditional procurement methods from the Big Three vendors, operators instead will buy equipment and configure it in the same way as its technology.

[1] *Senza Fili Research 2019*

Operator appetite for OpenRAN is growing

The growth in membership in both the Telecom Infra Project (TIP) and the O-RAN Alliance is starting to lead to notable announcements and deployments as operators look to grow their networks or rip and replace existing infrastructure. In the last six months, Telefónica and Vodafone have been notable in placing OpenRAN at the heart of their network plans.

O2 UK hails OpenRAN's ability to "deliver better coverage, in more places, more of the time"

In January 2020, O2 UK became the latest Telefónica company to launch plans to deploy OpenRAN technology in a move it said would redefine network economics, delivering a better and more cost-effective mobile network.

Over the next 18-24 months, it is aiming to accelerate commercial OpenRAN technology deployment to solve not-spot coverage issues and improve coverage in dense urban areas.

It is working with Mavenir on the latter, deploying infrastructure in London that will offer enhanced connectivity and a better customer experience. The operator highlighted stadiums and shopping centres as two areas that would particularly benefit.

However, wholesale operator Internet para Todos (IpT) is the best example of Telefónica's commitment to OpenRAN technology. It co-owns the company alongside Facebook and Latin American banks IDB Invest and CAF Bank. Since launching in May 2019, it has connected more than 650 sites covering 800,000 people, with 450,000 signed up as customers. In total, 3,000 sites have been supplied by Telefónica. At the TIP Summit in late 2019, IpT's CTO said it has turned to OpenRAN as it needed "low cost, scalable and disruptive technology" in order to connect remote parts of Peru.

> *"We can look forwards, we don't have to look backwards"*
>
> **John Baker**

Vodafone looking to OpenRAN to build digital societies

Vodafone made good on its promise in October 2019 to fast track OpenRAN technology into its networks. Just a month later, it announced plans for a tender spanning the entirety of its European footprint, covering over 100,000 sites and 400 million people across 14 countries. The site ambitions represent 1.5 percent of all global operator sites.

This is in addition to trials in rural parts of the UK and the Republic of Ireland, with Mavenir the sole vendor on the former pilot. It is also planning further tests in the Democratic Republic of Congo and Mozambique.

Its first experience with the technology was in late 2017, when it held two trials in India. It then launched lab testing in South Africa and outdoor pilots in Turkey, where it deployed OpenRAN technology across 25 cities in urban and rural parts of the country.

The operator has noted how network equipment supply has become concentrated and by widening the base of suppliers it could increase flexibility, innovation and its ability to lower costs and connect rural areas.

Speaking in late 2019, Vodafone Group CEO Nick Read said, "OpenRAN improves the network economics enabling us to reach more people in rural communities and that supports our goal to build digital societies in which no-one is left behind."

"We build together" - The Telecom Infra Project looks to collaboration to rewrite telco infrastructure landscape

The Telecom Infra Project has been one of the highest profile advocates of OpenRAN technology, which sits alongside work on new kinds of other access, transport and core and services technologies. Its goal is to create/accelerate the telecoms infrastructure of the future, creating cost efficiencies and new kinds of businesses for the next billion subscribers and the underserved.

It does this via project groups building end-to-end network technology, and 12 Community Labs focused on experimenting, validating and integrating these technologies. TIP is also hosting regular PlugFests to validate technologies and its next event, during the first half of 2020, will focus on 4G and 5G RAN. In November 2019, it launched TIP Exchange, a marketplace for companies to find the right solutions from the right companies, with 45 solutions from 28 TIP members already on offer.

It seems inevitable that other operators will follow Telefónica and Vodafone's lead by announcing further OpenRAN technology plans of their own during 2020. Late last year, Sprint released an OpenRAN 5G New Radio RFI and is expected to announce its results soon. The US operator is hosting its own Community Lab and also released draft specifications for a sub 6GHz white box 5G New Radio base station.

While many network operators are excited about OpenRAN technology, Telefónica and Vodafone encapsulate its advantages. Telefónica is looking to the technology to help it deploy in areas that previously would have been too financially onerous. Vodafone is seeking to cut costs and safeguard its financial performance, especially in the UK where geopolitical concerns could reduce the number of vendors it could tap into.

OpenRAN technology vendors are not expecting a revolution in network infrastructure; a rip and replace policy takes time and there are very few greenfield opportunities to build a network from scratch (Japan's Rakuten the most high-profile exception). However, existing opportunities include using OpenRAN technology to extend coverage areas, introduce hotspots and deploy small cells. These are particularly pertinent in markets with few plans to introduce fresh spectrum to operators. There is also scope for OpenRAN technology to upgrade existing networks or on smaller scale infrastructure projects replacing hardware.

Given the collaborative spirit among participants in both the O-RAN Alliance and TIP, there is consensus that the current model needs to change and as quickly as possible given the investments required for 5G and the opportunities it will bring to operators. And it's abundantly clear that doing nothing is not the answer. Total revenues from mobile voice and data are falling and avoiding investment in 5G is impossible. If operators choose not to face up to these realities, their existing debt could swell and the inaction will also have a wider effect on their financial performance.[2]

Ultimately, the case for OpenRAN is competition. Every single advantage - from cost to innovation - comes from a more open market with a wealth of different vendors competing for space. Operators have been arguing for years that they want to break the existing model of the telecoms industry and follow the lead of more dynamic digital players. With OpenRAN, they now have that opportunity.

Findings from Mavenir's survey with Senza Fili

Key results were:

- 100% of operators are considering using OpenRAN in key scenarios
- 43% of respondents are open to replace current vendors
- Cost savings were mentioned by 25% of respondents as a reason to consider multiple vendors
- 84% operators will consider deploying RRUs and BBUs from different vendors in OpenRAN deployments.
- Lower cost radios seen as a key component to OpenRAN interface adoption

[2] *Rethink Research 2019*

Mavenir is the industry's only end-to-end, cloud-native Network Software Provider focused on accelerating software network transformation and redefining network economics for Communications Service Providers (CSPs) by offering a comprehensive end-to-end product portfolio across every layer of the network infrastructure stack. From 5G application/service layers to packet core and RAN, Mavenir leads the way in evolved, cloud-native networking solutions enabling innovative and secure experiences for end users. Leveraging industry-leading firsts in VoLTE, VoWiFi, Advanced Messaging (RCS), Multi-ID, vEPC and OpenRAN vRAN, Mavenir accelerates network transformation for more than 250+ CSP customers in over 140 countries, which serve over 50% of the world's subscribers.

We embrace disruptive, innovative technology architectures and business models that drive service agility, flexibility, and velocity. With solutions that propel NFV evolution to achieve webscale economics, Mavenir offers solutions to help CSPs with revenue generation, cost reduction, and revenue protection.

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