



WHITEPAPER

# Five reasons to adopt Open RAN now

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# Executive summary

Open Radio Access Network (RAN) is one of the most debated topics in mobile. Participants in the discussion are split between those who see the Open RAN glass as half-full or half-empty. The result is confusion on whether Open RAN is hype or whether it can deliver the disruption that many hoped.

In this paper, we provide 5 reasons why operators and vendors should adopt Open RAN today. These arguments are provided in full recognition of the current state of Open RAN including experiences with initial trials and deployments and the work that continues to be done on meeting cost, security, performance and energy efficiency goals.

## The 5 reasons we propose for Open RAN adoption today are:

- **Reason 1: Operators see Open RAN as a trigger for transformation**  
5G requires new technologies and concepts to be mastered, but also transformation of operator operations and organizations where many operators see Open RAN as a trigger for this necessary transformation.
- **Reason 2: Open RAN is here to stay**  
The committed efforts of major operators and leading vendors, like NEC, working collaboratively in industry organizations, has ensured that Open RAN has matured quickly. Organizations like O-RAN ALLIANCE and TIP OpenRAN have been extremely successful in establishing broad and diverse ecosystems with hundreds of participating companies that have successfully collaborated in specifying, implementing and deploying innovative Open RAN solutions.
- **Reason 3: Supporting the original 5G vision**  
5G was designed to enable operators to address new markets with new solutions with the ability to provide bespoke solutions requiring flexibility and openness. This was captured in the 5G vision of supporting Ultra-Reliable Low Latency (URLCC) and massive Machine Type Communications (mMTC) services designed to address enterprise rather than consumer needs. Open RAN provides the capabilities and ecosystem to realize this vision.
- **Reason 4: Open ecosystems critical to 5G success**  
Delivering new 5G solutions to new markets requires collaboration with industry vertical vendors and other specialist vendors, which in turn requires the open architecture and collaborative models that Open RAN provides.
- **Reason 5: Building the foundation for 6G**  
The vision and requirements for 6G are already being discussed where Open RAN is broadly accepted as being critical, but the foundations for 6G solutions are already present today in Open RAN.

Open RAN has the potential to not only transform both operators and vendors, and thereby the mobile industry, but also to enable new industries that have yet to be conceived thanks to the disaggregation of networks and open interfaces enabling a broader community of specialist, innovative vendors to contribute and collaborate. The time to get engaged is now.



# The state of 5G Open RAN

Open architecture in telecoms is not a particularly new concept. However, attention started to increase around Open RAN in the mid-2010s, driven by cost-related driving forces - the enormous, but predictable, costs of 5G deployments. In parallel, consolidation of the equipment vendor market also reached a new level: by 2019, the combined market share of the top three biggest equipment vendors reached 64% in the global network market. In 2018, politics and vendor bans brought a new Open RAN driver to the surface. Many operators wanted to get rid of the duopoly market structure, secure vendor diversity and in general: reduce their vulnerability and improve their negotiating position in the 5G era.

The combination of these factors catalysed the interest and accelerated the Open RAN test and commercial deployments.

GSMA Intelligence constantly monitors Open RAN commitments, deployments and public announcements. As of January 2023, GSMA Intelligence counted 92 unique operators commercially

launched or actively testing, planning or designing an Open RAN network launch. While there are a number of high-profile, marquee plans and deployments, the interest is global and widespread – touching all regions in developed as well as developing countries. Asia leads with about one-third of the commercial deployments and plans, followed by Europe (20%). The remaining activity is spread roughly evenly across the globe.

Disaggregating and aggregating a complex value chain necessarily includes a certain amount of risks and extra costs. Beyond the technical challenges, there are also organizational, process and cultural challenges that require time, effort and resources to overcome. Lower efficiency, structural issues, system integration and security were areas where challenges could appear in the beginning.

According to the Gartner Hype Cycle theory, the maturity lifecycle of new technologies and innovations is divided into five phases: Innovation Trigger, Peak of Inflated Expectations, Trough of Disillusionment, Slope of

Enlightenment, and Plateau of Productivity. By now, Open RAN is mature enough that we can conclude it's globally transformative. Open RAN is here to stay, it already survived the peak of inflated expectations and outgrew most of the initial, below-mentioned early-stage challenges. Open RAN is now in the slope of enlightenment: Operators are currently making enormous investments, building test labs and sites, and committing themselves to adopt Open RAN all over the world.

Adopting new technologies is always a challenge and Open RAN is no different. Many operators are building partnerships, accelerating knowledge, developing Open RAN capabilities. Those, who are left out of the Open RAN development, can miss out on the opportunity and later suffer from long-lasting competitive disadvantages.

Despite barriers and challenges, the industry is moving forward and while a number of reasons can be proposed, we focus on 5 reasons that we believe are most important for operators to not only adopt Open RAN, but to do so today.



# Reason 1: Operators see Open RAN as a trigger for transformation

5G is a radical, but necessary departure from previous generations of mobile networks. While 5G is partly an evolution of concepts introduced in 4G, there are also new concepts, technologies and architectures that challenge how mobile networks are deployed and services delivered to customers.

The 5G RAN represents a significant investment and is the frontline where networks and services meet customer needs. Open RAN is focused on opening the RAN to enable a diverse set of specialist vendors to deliver innovative solutions. One of the primary motivations often cited is the stimulation of greater competition to lower costs and to avoid lock-in and dependence on a limited number of vendors. While the latter is directly addressed by opening the network, the former goal of lowering costs is dependent on scale deployment, which obviously leads to a “catch-22” paradox if

operators wait for costs to come down before deploying at scale.

Several studies have shown that an Open RAN can lead to lower Capex, Opex and TCO once scale deployment is achieved, but this cannot be the only motivation for Open RAN deployment. Open RAN, and 5G for that matter, are about more than just cost savings. The overarching motivation for 5G is to establish a foundation for operators to both improve customer experiences in existing markets as well as pursue emerging opportunities in new markets. Operators realize that this requires new technologies, architectures and competencies, as well as an operational transformation.

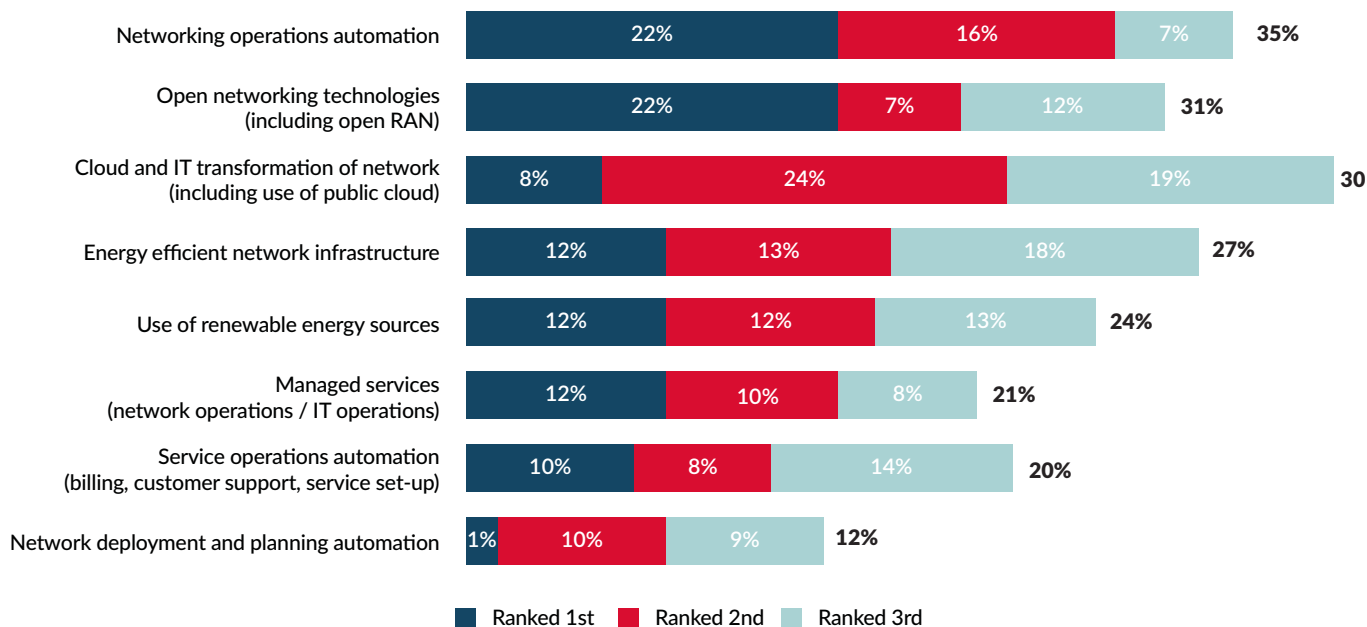
GSMA Intelligence research shows that the majority of operators see 5G, and Open RAN in particular, as a means of achieving a transformation of their networks, operations and organization.

When it comes to Opex reduction, operators rank open networking technologies as the second most promising means of driving savings. However, it should be noted that network operations automation, the use of cloud and IT technologies and energy efficiency are all part of the Open RAN initiative.

However, cost reduction is no longer the primary motivation for operators. In the GSMA Intelligence Network Transformation Survey 2022, operators were asked their primary goals for transformation with the following response:

- 38%: Generating revenues
- 37%: Improving customer experiences
- 14%: Capex savings
- 11%: Opex savings

This shows that operators clearly see their transformations as enabling new business opportunities and improving customer



Source: GSMA Intelligence Operators in Focus: Network Transformation Survey 2022

experiences rather than focusing on cost reduction. Open RAN is also supporting these goals by enabling mobile operators to take advantage of automation, cloud technologies and more agile processes.

5G is inspired by technologies and concepts that require new competencies that are not traditionally operator strengths. Concepts like disaggregation, virtualization, cloud-based services and software-defined management and orchestration. These are concepts familiar to enterprises, but new to mobile operators, which is why operators need to transform their networks to support these concepts, their operations to manage their transformed networks and their organization to think in a new way about procurement, validation, deployment and management.

Open RAN has leveraged the knowledge of non-traditional telecom vendors to deliver 4G and 5G virtualized functions on COTS hardware, but have also gone a step further by addressing the need for

efficient and automated Service Management and Orchestration (SMO). For example, the O-RAN ALLIANCE definition of Near-Real-Time and Non-Real-Time RAN Intelligent Controllers (near-RT-RIC and non-RT-RIC respectively) and O-Cloud. The RICs are essentially software hosting platforms that can run automation applications developed by third-party specialists referred to as either rApps (non-real-time) or xApps (near-real-time). This allows an even broader ecosystem of specialist vendors to deliver innovative software solutions.

The significance of the O-RAN ALLIANCE intelligent controller concept cannot be overstated. This is the first time that RAN intelligence is provided as an entity completely separated from RAN equipment and the RAN network itself. It allows the management and orchestration of the RAN to evolve independently of the RAN network, which in turn enables AI and ML mechanisms to be leveraged for both RAN optimization as well as

innovative solutions and services. It is in this context that specialist vendors of innovative software solutions can bring outsized value to mobile operators.

Operators today see the benefit of adopting Open RAN to facilitate the necessary transformation of their network and organization to meet the new challenges and opportunities 5G presents. In addition, Open RAN, and the use of cloud, IP and x86 platforms, enables operators to merge their IT processes with their RAN operational processes leveraging the same competencies and experience making it easier to recruit and retain skilled IT and operational employees. It also enables a common approach to important topics, such as security, where many solutions and processes can be streamlined across both IT and RAN operations. Open RAN enables the disruptive innovation of the telecom industry and the potential creation of entirely new industries that we have difficulties in conceiving today.



## Reason 2: Open RAN is here to stay

Since the establishment of the Telecom Infra Project (TIP) in 2016 and the merger of C-RAN Alliance and xRAN Alliance to form the O-RAN ALLIANCE in 2018, a significant amount of progress has been made in delivering Open RAN specifications and solutions to the market.

However, the success of open initiatives is only possible with committed engagement from operators and vendors willing to drive the effort. Large operators have long seen the benefit of

opening the RAN and while some major vendors are skeptical, their involvement in Open RAN activities underlines the success of the initiative. Other vendors, like NEC, understand the need for more agile and flexible RAN infrastructures and are willing to make the investment in time and resources to ensure its success.

The experience operators have gained over the last decades has ensured that Open RAN has succeeded in defining truly open interfaces allowing Open RAN to

mature beyond the lab and enthusiastic first adopters. While deployment of Open RAN networks is still modest, there has been a continuous increase in the number of deployments and trials over the last few years. This includes commitments by major operators like NTT DOCOMO, Telefonica and Vodafone to deploy Open RAN, the success of Rakuten Mobile from Japan, DISH in the US and their plans to deploy Open RAN as well as the recent launch by 1&1 AG of the

# OpenRAN Trials and Deployments



Source: Telecom Infra Project

first fully virtualized Open RAN network in Europe.

What is most impressive is the success that both the TIP OpenRAN project and O-RAN ALLIANCE have demonstrated in attracting a broad and diverse ecosystem of members that bring new competencies and expertise that are important to 5G success. The O-RAN ALLIANCE has over 330 members while the TIP OpenRAN project has over 650 participants. Over the last few years, both organizations have held several Plugfests, which have proved critical in accelerating the implementation as well as the maturing of Open RAN solutions. The Plugfests are open with transparent reporting of results that provide confidence and trust to operators as they report the true

status of Open RAN solutions. Operators are then in a position to commit to resources necessary to conduct their own tests, trials and even deployments.

While experiences with initial deployments and trials have highlighted challenges, what should be recognized is that the Open RAN community has succeeded in delivering viable solutions in a very short time-frame and established an impressive ecosystem of vendors that are already contributing to innovative solutions addressing the highlighted challenges. This is establishing an inertia and momentum that can be difficult to resist.

The significance of industry organizations like O-RAN ALLIANCE and TIP OpenRAN is that they provide a forum where

operators, telecom vendors and new specialist vendors can collaborate and drive Open RAN and the industry forward. The continued efforts and progress in these organizations ensures that operators and vendors remain engaged and committed, which in turn attracts new specialist vendors with non-telecom backgrounds to contribute with their expertise and insight. This not only ensures that Open RAN is here to stay, but also that it becomes the source for innovative solutions to new challenges as the mobile industry expands into new markets.



## Reason 3: Supporting the original 5G vision

5G was designed not only to provide better and faster consumer services, but also to provide more efficient solutions for non-consumer markets. 4G LTE made it possible for operators to address enterprise needs for advanced solutions beyond connectivity. It is this experience that formed the basis for URLLC and mMTC requirements in 5G and drove the architectural choices that ultimately made 5G what it is today. Open RAN with its focus on both horizontal and

vertical disaggregation allowing virtualized functions to be instantiated on COTS servers make it possible to meet these requirements.

For example, for URLLC services, network slicing and horizontal disaggregation of virtualized Centralized Unit (CU) and Distributed Unit (DU) functions enables operators to meet diverse latency requirements on a service-by-service basis. For this to work, it must be possible to quickly instantiate DU functions wherever

they are required at multiple locations in the network, including as close to the edge as possible. By supporting COTS servers, various data center locations can be leveraged, both those owned by the operator and those owned by other entities. NEC, together with AltioStar and Airtel successfully demonstrated the world's first interoperability test of O-RUs and O-DUs running on COTS servers at the O-RAN ALLIANCE plugfest hosted by Airtel already in November 2020.



For mMTC, the focus is on adapting quickly to sudden changes in traffic patterns that can occur when a massive number of devices, such as Internet of Things (IoT) sensors, are communicating at the same time. The O-RAN ALLIANCE has defined the O-Cloud for cloud-based hosting of Open RAN functions like O-CU and O-DU functions. The O-Cloud can be hosted on one or several data centers. Thanks to virtualization and cloud-based hosting, it is possible to elastically scale capacity of RAN functions to meet unexpected demands, as can occur in mMTC scenarios, but also in URLLC and eMBB cases.

The virtualization, cloudification and disaggregation of 5G enables a broad variety of service needs to be addressed simultaneously, but also leads to a complex, dynamic network with traffic patterns that can be difficult to predict. This calls for a new approach to managing and orchestrating mobile networks that relies on intelligent, closed-loop control and autonomous operations. The O-RAN ALLIANCE has defined a Service Management and Orchestration (SMO) framework to support this new intelligent approach enabled by xApps and rApps hosted on near-real-time and non-real-time RAN Intelligent Controllers (RICs).

NEC and its subsidiary Netcracker have been at the forefront of Open RAN developments from the start, including SMO and RIC. NEC and Netcracker were selected by Rakuten Mobile in 2019 to develop solutions for their Japanese Open RAN network. This included an NEC-Rakuten jointly developed RU as well as end-to-end BSS/OSS solutions. This was followed by an agreement with NTT DOCOMO in 2021 to jointly

develop RICs leveraging the Netcracker Open RAN Domain Automation solution, which includes SMO and RIC capabilities aligned with O-RAN ALLIANCE specifications.

With Netcracker Open RAN Domain Automation solution, operators can automate all aspects of RAN planning and design, deployment, optimization and assurance as they evolve from traditional RAN to fully decomposed, cloudified and Open RAN. By combining hybrid RAN automation integrated with RIC optimization and an extensive partner ecosystem, we are helping operators to innovate faster.

The SMO and RICs provide a unique framework, which is essential for realizing the vision of 5G. Established vendors and new entrants alike are adopting this management framework. This is because SMO and RIC do not need to be confined to Open RAN. The concepts and solutions can be used to manage any RAN, which enables all operators to benefit from SMO and RIC deployment independent of their Open RAN priorities.

Nevertheless, it is clear that to succeed with this approach, a broad ecosystem of specialist vendors is required as well as deep expertise in a range of technologies including virtualization, cloud-hosting and management, AI, ML and advanced programming. It is only by establishing a broad and vibrant ecosystem of partners that innovative solutions to new and unforeseen challenges can be delivered as 5G opens new opportunities in new markets.



## Reason 4: Open ecosystems critical to 5G success

As operators enter new markets offering new 5G-based solutions, a broader set of competencies and expertise need to be brought to the table, which is why the establishment of broad, diverse ecosystems that include non-traditional telecom vendors is important.

The advantage of an Open RAN approach not only includes the intelligence that Open RAN RICs provide, but also the openness to accommodate third-party vendors. Enterprises already have well-established, trusted vendor partnerships and ecosystems that have the insight to provide

software solutions that they require. The open nature of Open RAN deployments enables collaboration where enterprise vendors can provide xApps and rApps or can host their software applications on the 5G MEC.

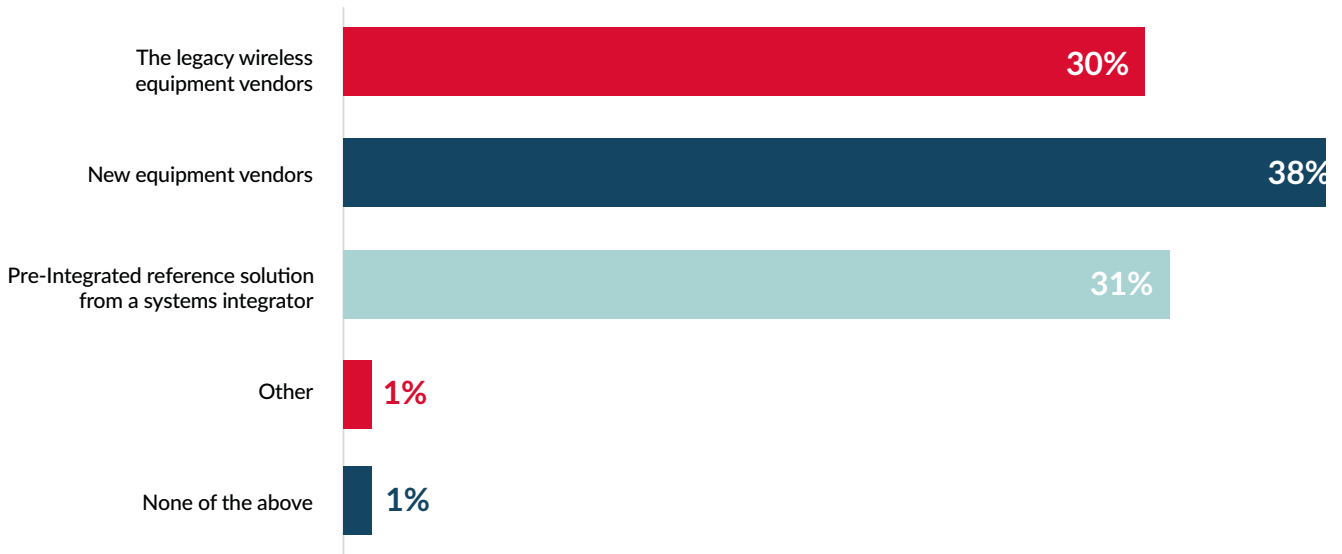
The success of mobile operators in expanding their enterprise footprints and addressing new opportunities lies in their ability to meet bespoke requirements in a flexible and cost-effective manner. Open RAN provides the openness, intelligence and ecosystem that operators require to ensure success. However, one of the

major challenges in delivering solutions based on Open RAN is system integration.

There are basically two challenges in addressing diverse industry vertical needs:

- Integration: each industry vertical, and potentially each company within a vertical, will require bespoke solutions that meet their specific needs and already deployed equipment. This will require system integration capabilities that encompass mobile technology, IT, networking and vertical-specific solutions and systems.

**Figure 9: Which type of vendors do you plan to select to help you migrate to Open RAN Technology?**



Source: Industry survey on Open RAN adoption, Aspire Technology, 2021

- Product development: each industry vertical will require products that can solve specific challenges and use cases unique to that vertical. This will require a broad ecosystem of potential solution providers with the necessary expertise and insight to develop the required solutions as well as a framework to support integration of their solutions quickly.

Open RAN provides the frameworks and interfaces along with detailed specifications to enable operators to address both of these challenges.

Open RAN initiatives like TIP OpenRAN and the O-RAN ALLIANCE are now mature with large ecosystems of vendors with diverse competencies and expertise. This, together with the ability of Open RAN architectures and interfaces to integrate new solutions and vendors relatively quickly, provides a solid foundation on which to approach enterprise customers who normally would not turn to operators to fulfil their

solution needs. O-RAN ALLIANCE specifications are also being adopted by ETSI with the release of ETSI TS 103 859 in September 2022 based on the O-RAN ALLIANCE 'O-RAN Fronthaul Control, User and Synchronization Plane Specification v7.02'. Agreements with standardization organizations provides another layer of maturity where specifications now become standards.

The OpenRAN project and O-RAN ALLIANCE OSC have also been successful in attracting innovative startups who see a commercial opportunity in developing xApps and rApps for 5G. Both OpenRAN and the O-RAN ALLIANCE OSC have released open-source implementations of O-RAN ALLIANCE specifications, which have then formed the basis for additional work by other open-source initiatives. For example, the SD-RAN project of Open Networking Foundation, which is implementing a near-real-time RIC together with xApps to control the RAN and a Software

Development Kit (SDK) for other xApps developers.

In addition, the ability to incorporate xApps and rApps for network automation developed by specialist vendors as well as service applications running on 5G Multi-Access Edge Compute (MEC) platforms enables operators to offer more than just connectivity. The 5G MEC can be instantiated at the RAN edge in the public 5G network or can be part of a private 5G network controlled by the enterprise.

The capabilities provided by Open RAN are vitally important in meeting the diverse needs of enterprises, which are an important target segment for mobile operators. Enterprises encompasses many industry verticals including finance, manufacturing and utilities, each with their own particular technologies, architectures and vendor ecosystems. In the past, mobile operators struggled to provide bespoke solutions that could meet the specific needs of

individual enterprises, but with 5G and Open RAN capabilities, it is now possible to deliver services that are tailored to the individual enterprise's needs.

It is no surprise that initial 5G RAN deployments are dominated by large operators and established mobile infrastructure vendors. Software integration is notoriously difficult and far from the "plug-and-play" perception that the availability of open interfaces often implies. It takes time and resources to successfully integrate software solutions from multiple vendors, not to mention the testing and validation required to ensure that hardware implementations also meet requirements. Open RAN is particularly challenging as system integrators need expertise in telecom, enterprise, and data-center technologies and concepts to succeed. Few system integrators master all of these disciplines.

This has led many smaller operators to turn to established vendors for their RAN needs as they do not have the size to command best pricing from alternative vendors and do not have the expertise to perform the system integration required. Finding an external system integrator can be challenging and there can be a concern in becoming as dependant on a system integrator as on a one-stop-shop vendor. However, there is one major difference; once the Open RAN solution is established, the individual hardware and software can be replaced and other system integrators can be used to integrate new solutions. It is therefore a dependence on outside competence, but not a lock-in.

These smaller operators are therefore faced with a tough

choice between adopting Open RAN at a short-term higher cost and the need to rely on an external system integrator or choosing an established vendor and their proprietary RAN offering with the risk of lock-in to the vendor.

The big difference between the two scenarios is whether the smaller operator is short-term or long-term focused. Choosing an established vendor's proprietary solution can result in a faster, lower-cost 4G or 5G RAN deployment, but with the risk of a lack of flexibility and innovation going forward. Choosing an Open RAN approach provides flexibility, long-term lower cost and the potential to access innovative solutions in the future. While the smaller operator relies on the system integrator to ensure the end-to-end implementation works, it does not need to result in lock-in as the RAN is based on open solutions. For the smaller operator, it is basically a choice between short-term and long-term goals.

Large multi-national operators, on the other hand, may have the capability and capacity to perform system integration themselves. Open RAN has always been driven by large multi-national operators and they are now benefiting from the large Open RAN ecosystem who have the ability to deliver innovative solutions to emerging 5G challenges. While it takes time and resources to integrate and deploy solutions based on multiple vendors, large operators have the motivation and financial capability to invest in this long-term initiative. In the meantime, however, these operators will still work with established mobile

infrastructure vendors to meet immediate, short-term 4G and 5G rollout needs.

While large operators can choose to perform Open RAN system integration themselves, many operators are choosing to work with an external system integrator as it leverages the experience that these integrators have built from previous efforts. For example, NEC has been a driving member of Open RAN initiatives from the beginning and engaged in several Open RAN deployments in the role of system integrator. NEC has acquired significant experience from its participation in Open RAN activities and has also invested in a broad portfolio of solutions including Open RAN equipment, software, RICs and SMO solutions. NEC has also acquired companies like Aspire Technology and Blue Danube Systems to add elemental technology and strengthen its system integration capabilities. This combination of expertise and experience reduces risk and provides a lot of value to mobile operators, even large mobile operators, as they embark on their Open RAN transformation.

System integration is a challenge and operators need to find the balance between addressing short-term and long-term goals and the consequences of these decisions. It is these realities, which are playing out in the market today, but it would be a mistake to consider this a confirmation of the status quo. In the long-term, 5G will require new and innovative solutions, like the Open RAN ecosystem, to challenges that are yet unseen as operators move into new markets and opportunities.



## Reason 5: Building the foundation for 6G

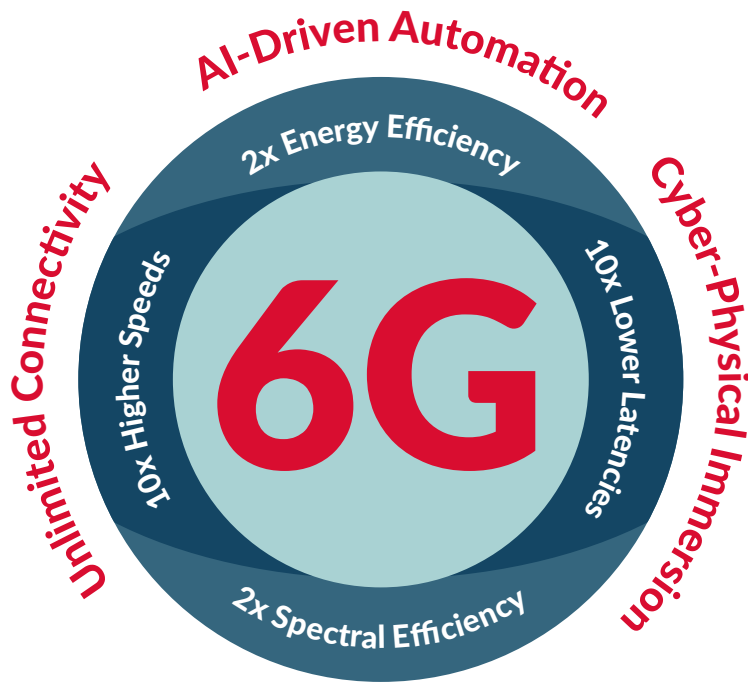
While 5G is the current focus, discussions have already begun on “Beyond 5G” and 6G requirements. Many vendors have already shared their visions for a 6G future, while calculations have already been made on what could be delivered by a 6G mobile network that could be available as early as 2030.

While it is still unclear what 6G will actually include, some of the goals already shared are a 1,000 times improvement in both speed and latency based on current extrapolations of technical

capability. The driver for even higher speeds and lower latency are what are termed “cyber-physical” systems. Cyber-physical systems have traditionally referred to systems where physical and compute components are deeply intertwined. Lately, they have been the focus of Industry 4.0 smart manufacturing initiatives where closed-loop control is enabled by analysis of data from IoT sensors throughout the factory. In the context of 6G, the cyber-physical vision refers to deep immersion and integration of the cyber world

with the physical world. This is the next step beyond AR/VR/XR and is related to the metaverse vision. Enabling this vision requires unlimited wireless connectivity and extremely low latencies, which are the initial goals of 6G.

The unique capabilities of the Open RAN SMO and intelligent controllers as well as their ability to host a broad ecosystem of specialist software solution vendors is potentially the only viable foundation for meeting 6G requirements.



As mentioned above, industrial automation initiatives like Industry 4.0 already require the capabilities that Open RAN provides in transforming their operations. Requirements for connectivity to support smart factories, but also smart robots, Unmanned Ground Vehicles (UGVs) and Unmanned Aerial Vehicles (UAV), which can all be considered cyber-physical systems, are here today and are a target for 5G already.

Many operators and vendors have provided their visions for 6G. Most of these visions emphasize two critical points; automation and the need for 6G to be “AI native”. Most anticipate even more automation in 6G given the higher speeds and lower latencies involved. This in turn requires a higher level of AI to automate and accelerate decision making. The principles introduced by Open RAN with regard to vertical disaggregation of hardware

and software, the separation of management and control from the network itself and the use of AI in SMO/RIC implementations to automate decision making provide the path to achieving the 6G vision.

While some interpret the consensus around the use of Open RAN in 6G as an opportunity to “wait and see”, the reality is that the blueprints for solutions that will be supported by 6G are being drawn today in Open RAN. Open RAN should be one of the critical 6G architectural foundations in a similar way that virtualization is an architectural foundation for 5G RAN today. Operators and vendors who engage now will not only be better positioned to meet 6G requirements, but also be in a position to establish a beach-head in new markets, like industrial automation, with 5G solutions based on Open RAN.



# Start your Open RAN journey with NEC

NEC has been a pioneer of Open RAN from the beginning. While NEC provides a complete portfolio of Open RAN solutions, NEC recognizes the need for a broad, diverse ecosystem of vendors and an operator's need to choose the best available equipment and software solutions for their specific needs.

5G and Open RAN are elements of the digital transformation journey for operators and mobile infrastructure vendors.

Opportunities are no longer a "winner-takes-all" approach, but instead a "where-can-I-add-value" collaborative effort in ensuring operator success. This is in recognition of the fact that the role of the operators is changing where large cloud, data-center and enterprise vendors, not to mention vertical industry vendors, all have a role to play in meeting emerging consumer, enterprise and government needs.

It is with this recognition that NEC has invested to build the solutions, competencies and expertise that mobile operators require both today and in the future:

- NEC is a leading provider of O-RAN ALLIANCE compliant O-RU equipment as well as O-DU and O-CU software solutions.
- NEC along with its subsidiary Netcracker provides an award-winning Open RAN Domain Automation solution, incorporating AI-driven Non RT-RIC and fully aligned with the O-RAN ALLIANCE SMO framework and standards.
- Netcracker is a leading provider of modern, cloud-native Digital BSS/OSS for operator digital transformation programs globally.

- NEC is a driving member of both the O-RAN ALLIANCE and the TIP OpenRAN project with regular participation in several PlugFests and has been awarded a number of TIP ribbons and TIP bronze badges for compliance with TIP OpenRAN requirements, including 3 ribbons for mMIMO O-RU and 12 badges for O-RU implementations in general.
- NEC is renowned for its AI/ML solutions including biometric solutions for facial recognition and more deliverable as value-added RIC applications.
- NEC has also invested heavily in system integration capabilities including the acquisition of Aspire Technology and Blue Danube Systems for elemental technologies enhancement in 2022.

- NEC is a leading system integrator in many Open RAN projects integrating solutions from multiple vendors.

NEC can therefore bring value at multiple levels from system integration to value-added AI/ML applications to SMO and RAN functions in collaboration with the Open RAN ecosystem. NEC has a proven track record in delivering Open RAN solutions with (at time of writing):

- 5 commercial Open RAN customers
- 23 ongoing trials
- 30+ prospects
- 50+ partners

NEC has the expertise, portfolio, experience and partners to contribute to your Open RAN transformational journey success.



\Orchestrating a brighter world

# NEC

5G has the potential to enhance every aspect of the way we live, work and play. But delivering on that promise requires a commitment to openness and collaboration. NEC is committed to working openly with operators, vendors, industry bodies and even competitors to change how we think about mobile networks and create a better 5G future for all. That's what we mean when we say we're radically open.

**For more information, visit NEC at**  
**[www.nec.com/en/global/solutions/5g/index.html](http://www.nec.com/en/global/solutions/5g/index.html)**

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