

Open Networks Ecosystem Competition

Supplementary Information

Hardware Theme

Background

The Open Networks Ecosystem competition is designed to build on what we have learned in the first year of the Open Networks R&D fund and support trends and tackle challenges emerging from the fast developing open networks ecosystem taking shape in the UK and around the world. In the first year of the Open Networks R&D fund we have learned from the Programme's early investments and also undertaken extensive research and market engagement to find out what are the most significant challenges facing the ecosystem. That research has been informed in large part by industry and we have designed this competition with that information in mind. This supplementary information document summarises what that research has shown in regards to open networking hardware development.

The Open Networks Ecosystem competition has been designed to encompass all of the ecosystem's emerging priorities and challenges in one competitive grant funding process to maximise the time available for delivery and give the market an opportunity to help determine how funding is targeted through the proposals that the market develops.

The Programme's grant funding is available only through March 2025 so it is important to maximise this by making it available across all priority and challenge areas at the earliest opportunity. By having one application process, we hope the process will be simplified for consortia tackling multiple challenges and allow for larger scale and more ambitious projects. We recognise that there are a broad range of challenges across the open networks ecosystem and appreciate that we are not able to determine for certain which are the most important. We intend for this wide ranging competition to enable the market to guide us towards investing in the most crucial areas by making compelling cases through their proposals.

Research and Stakeholder Engagement

Government's stated ambition is for 35% of the nation's mobile network traffic to be carried over open and interoperable radio access network architectures by 2030. DCMS conducted intensive research, both direct and drawing on external services, to engage the market, perform analysis and compile reports to inform intervention options that will support that stated ambition and the strategic objectives set out in the Diversification Strategy. The research attempts to identify which areas of the ecosystem are in most need of support. The research highlights the key challenges raised by the market through stakeholder interviews and expert analysis. The stakeholders engaged during the market research includes both small and large companies across equipment vendors, systems integrators, and operators.

DCMS is already supporting a range of diversification focused projects funded through the Future Radio Access Networks Competition (FRANC). Although conclusive findings from these projects are not yet available, their experience of working at the leading edge of the ecosystem is still informative. We engaged particular FRANC projects to learn from their early experience in network hardware development.

The Open Telecoms R&D Workshop, an in-person event held in January, brought together stakeholders from across the ecosystem with our Programme Development team and technical experts. We discussed in detail our approach to supporting the network hardware ecosystem and recorded a great deal of feedback which has gone into designing this competition.

DCMS also regularly engages with the telecoms industry and we recently completed a stakeholders stocktake where all major stakeholders are engaged 1:1 and invited to share their views on the current state of the ecosystem and government's role in supporting it. This, together with some internal lessons learned and analysis, has helped inform the Open Networks Ecosystem competition.

Summary of Findings

- Stakeholder engagement based research identified a number of challenges to widespread adoption of open networks, primarily through analysis of the Open RAN ecosystem. These challenges span technical, commercial and operational barriers.

Key challenges in the hardware ecosystem

- **Performance and features of components** relative to incumbent solutions. Challenges around power efficiency, quality and security of components are all seen as key barriers to commercialisation in the current market.
 - **Interoperability** between open components and with legacy systems. Standards such as Open RAN are deliberately flexible and this can lead to uncertainties regarding the ability of Open RAN components to work and perform well enough in hybrid legacy and open RANs.
 - **Total Cost of Ownership (TCO)** challenges based on smaller economies of scale and less maturity. TCO of open networks is widely believed to be higher than that of traditional RAN and the necessary inclusion of systems integration capability and lack of economies of scale facing open networking vendors creates uncertainty.
- Many stakeholders suggested that the open networking ecosystem generally has difficulty **accessing processing chips** at feature, performance and cost parity compared to traditional networks from incumbent vendors.
 - The open ecosystem often relies on generic chips with lower performance at a higher price - due to a lack of volume - compared to incumbent vendors that have access to custom ASICs due to their greater scale and R&D resources.
 - These less custom chips result in higher energy costs and less competitive performance could require the need for additional sites, thereby increasing the total energy requirements and adding to challenges around TCO.
 - The way Open RAN is designed and developed means it is **far from a plug and play** solution between smaller suppliers and requires additional support and testing. Most MNOs are reliant on existing 2G and 4G network infrastructure which are predominantly sourced from traditional incumbent vendors and have used the non-standalone (NSA) deployment method for 5G which makes use of the 4G core to

carry 5G traffic and the same RAN vendor is used per site to enable bandwidth enhancement features such as carrier aggregation. The market is expected to move to stand alone in the future but in the present this complicates the competitiveness of open solutions as support for previous generation networks is and NSA 5G is often required in commercial procurement tenders.

- In the case of Open RAN, **standards** are still in the early stages of evolution which leads to inconsistencies between the feature sets supported by vendors. This is a challenge for Open RAN as different vendors may prioritise different feature sets at any given point or take different interpretations of the standards, leading to challenges in integration.
- The **radio unit (RU)** was identified as a key component impacting both features and performance parity with traditional RAN and TCO through its impact on power consumption. The research estimated that as much as approximately 40% of energy consumption in a base-station comes from the RU therefore improving performance of the RU is closely tied to the total cost of ownership.
- The **complexity of integration** is a barrier to adoption of open networks. Our research indicates that while demand for 3rd party system integrators is currently low due to limited commercial deployments of open solutions, they are still expected to play a key role in scaled adoption by reinforcing MNOs integration and management capabilities and working with vendors on pre-integration efforts, reducing time-to-market and helping solve interoperability challenges.
- An open RAN introduces **security challenges** that if not understood and mitigated could hinder adoption, such as the challenge of keeping multiple suppliers updated and the introduction of new, open interfaces. This new security paradigm still needs to be explored by some potential scale adopters, particularly in public network deployments.

The Full Guidance for Applicants sets out in more detail our views on what the Department is seeking to achieve by funding this technology.