

Open source and 5G: A perfect partnership for wider deployment?

Overview



As 5G technology becomes the industry standard in mobile telecommunications, enabling new levels and areas of connectivity, how can it be deployed in industry? What processes and platforms need to be in place to maximize the technology's wider potential? Open source software is increasingly being seen as a means of helping developers extend 5G's use cases and applications.

Question: As a software stack supplier and developer, what does 5G mean to Capgemini?

Shamik Mishra, Vice President and CTO – Connectivity, Capgemini Engineering: It's a major opportunity. We work in over 11 sectors and industries, from manufacturing and telecommunication to automotive and transportation, and nearly all want to leverage 5G. For us, it's a big opportunity to take our connectivity knowledge and capabilities to all of these.

We interviewed more than 1,000 executives from these different sectors to better understand what 5G really means for them. We were quite surprised to find that over 60% are already early adopters of 5G, at different levels. That's extremely encouraging.

Question: What do you see as the main obstacles for different industries in adopting 5G?

Mishra: There are certain issues that we will have to navigate, particularly for enterprise networks, most of which have not yet used 5G at all; it is completely new. For example, how their IT infrastructure will integrate with 5G is a fairly new challenge. They may have invested in devices that don't have 5G capability, so do they trash these, or do they develop new kinds of architecture that can enable non-5G devices to connect to the 5G network? There are gateway and aggregated architectures that can do that.

Question: Are there differences between mature and emerging markets?

Mishra: People in mature markets tend to understand that 5G needs a top-down approach—what is the application, the business case, and the return on investment? In the more developing markets, the solution tends to be to go for a hyperscaler, to integrate everything, and see what works. Neither approach is bad, but a lot will depend on the speed of adoption and how much we can accelerate the market.

Question: Is there a tipping point in deciding to deploy a RAN or a core first? Where does a provider start?

Mishra: In the wireless market, innovation comes from outside the telecommunication space. For example, before 3G we had the internet on our mobile phones, but it was difficult to navigate and we didn't know how to consume online content. Then came the Apple and Android ecosystems—introduced apps; suddenly we knew how to consume the internet on our phones. Then as 4G made internet connectivity more reliable, new kinds of mobile commerce businesses came up.

For 5G, the network has to come first. Industrial organizations will have to create smaller testbeds and more playgrounds for 5G, and use cases will happen. It doesn't matter whether it's RAN or core, the 5G radio network at least has to come in.

Question: What is the impact of cloud and virtualization in terms of RAN and core deployment?

Question: Do you believe O-RAN is truly open, or is there still more to be done in that space?

Question: So, if you push in the direction of economies of scale, the outcomes will be far better?

Question: Where do hyperscalers fit into the mix, and how are telcos viewing that?

Question: How can open source accelerate the development of 5G?

Mishra: The benefit of virtualization when it comes to cost and innovation is that it misses out the RAN ecosystem. But to get into cloud and benefit from its economies of scale, RAN cannot be left out, so virtual RAN comes into play. The elephant in the room is how to reduce costs for RAN.

A second issue is to open up innovation on the radio network side. How can we improve the quality of experience? How can you create better spectral efficiencies for deployment? How can we improve and better leverage indoor connectivity? All these use cases did not become mainstream prior to 5G, primarily because the RAN was closed. RAN virtualization is the most important element, and the radio intelligent controller of O-RAN, and the O-RAN ecosystem itself, is driving a lot of innovation.

Mishra: It's work in progress. What we are trying to achieve out of O-RAN is greater ability and flexibility to better manage the network. In order to do that, we need three things.

First, most of the radio network has to run on a cloud-native architecture so it's scalable and agile. You can change software easily and run industry-tested models like DevOps. Secondly, if you have to disaggregate the hardware and software, then you need to open up the interfaces and define APIs. You cannot have one set of vendors developing one set of APIs and another set building others; you need to at least standardize those APIs. The third is how to make best use of the overall open ecosystem. You need controllers; you need better orchestrators; you need to develop; you need to collect data from the RAN and then leverage it to build new use cases.

System integration with so many different vendors will be costly, but the benefits of O-RAN will be realized over time. And if operators can commit near to 80% of the network over the next five to 10 years, it would become O-RAN or virtual O-RAN and there will be benefits.

Mishra: Absolutely. If you look at the hyperscalers and how they became such big players in the economy, it is primarily because they provide a platform for innovation and economies of scale. We cannot yet say that everything can become O-RAN tomorrow; it's a journey, but you need to start somewhere and then we'll reach the destination. I don't think we can really think of a network without virtual RAN.

Mishra: Most operators believe they can scale on their own, but hyperscalers should be in the 5G network in some form. With the public network, the core is well suited to hyperscalers as long as the regulatory aspects are taken care of.

The chosen platform for application developers globally is cloud-native platforms on hyperscalers. Whether they use Red Hat OpenShift on top of that is a different matter, but the default sandbox for an application developer is a cloud. That's where the application developer ecosystem exists. If you have to build applications for a private 5G network, not having a hyperscaler doesn't work.

Mishra: We have to empower the application developer and figure out a way to build use cases, so operators will have to attract developers, and the best way to do that is open source.

On the infrastructure side, can we have a 5G core network, an open source project, that can really be the de facto standard for core networks globally? Who would distribute it unless companies like Red Hat do it? You get the best stuff for free, but somebody has to make it into a product, so we are looking at it as an opportunity.

Open source enables innovation, but if it is not adopted at scale then people will lose interest, so operators have a major role. If they have to commit to open source builds and invest in labs, they have to commit to testing open source software, which will make it mainstream.

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