



# **TELCO STRATEGIES IN EDGE COMPUTING AND PRIVATE NETWORKS**

Webinar: Questions and answers

# Telco strategies in edge computing and private networks

This document outlines the questions and answers received from the STL Partners webinar, “**Telco strategies in edge computing and private networks**”, which was hosted on Thursday 16<sup>th</sup> September 2021. In this document, we seek to address the questions raised in the webinar that we were unable to address in the time available.

**You can watch the recording of the session, and also access the slides, using the link [here](#).** We have included the following timestamps for the webinar recording:

- **01:51** for the presentation of the research findings
  - **22:27** for the introduction to our panellists
  - **24:29** for the live panel session with:
    - Timo Jokiahho, Chief Technologist, Global Telco Ecosystem (Red Hat)
    - Andrés Escribano, New Business & Industry 4.0 Director, (Telefónica Tech)
    - Phillip Coleman, Director of Product Marketing Management (AT&T)
    - Naren Muthiah, Strategy and Business Design - New Growth & Development (Cox)
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If you have any questions not addressed in the webinar or this Q&A document, or want to hear more about our latest research or from our speakers, please contact:

- Yesmean Luk, STL Partners – [yesmean.luk@stlpartners.com](mailto:yesmean.luk@stlpartners.com)
- Timo Jokiahho, Red Hat – [tjokiahho@redhat.com](mailto:tjokiahho@redhat.com)

For more details on the research findings, stay tuned for the upcoming STL Report, “Building telco edge: why multi-cloud will dominate”, which will be published in October 2021.

# Webinar questions and answers

## 1. What is the relationship and interplay between private cellular and edge computing?

**Phillip Coleman, AT&T:** Private cellular and edge computing are both hot topics right now and there's a lot of education going on in both the industry and private business. With private cellular, there is a role for connectivity as a use case, but ultimately customers are looking for solutions. This requires operators to look more end-to-end from the endpoint device through the network infrastructure, all the way to where applications are being hosted. Operators need to have better orchestration between layers to support applications or solutions with dynamic requirements. Therefore, the holy grail is a model where you combine private cellular and edge computing to tackle some of those extreme use cases.

**Andrés Escribano, Telefónica Tech:** Use cases are the key driver, and the end goal is to build a technology framework that will solve problems for customers in the real world. We are seeing several industry verticals that are very eager to adopt these technologies for their business needs, for example, industrial manufacturing, ports, airports, and mining companies. Oil and gas companies are starting to see that they can address real customer needs through private cellular and edge computing. These technologies will play a key part in the digital transformation for these companies.

## 2. How you think the private cellular and edge computing opportunity for telcos has progressed over the last 12 months? Are you seeing more of an acceleration of interest in this area or has it been steadily growing over time?

**Naren Muthiah, Cox:** We see private networks as a catalyst for edge computing. Edge computing is simply a different form of network access, and private networks significantly accelerate the pervasiveness of access, which in turn drives the need for edge. Cox has seen a lot of tactical use cases and PoCs for edge computing over the last 12 months. The real driver of private networks is to be able to process data closer to where it is being generated, so naturally I'd expect to see private networks and edge computing come together in the next 12 months.

## 3. What are your thoughts on the results of the poll, are they a surprise to you? Are there any other industries that you would add to this or that you have seen a change of interest in in the last 12-18 months?

**Timo Jokiahho, Red Hat:** I don't think manufacturing coming out on top to be a surprise at all, but I assumed healthcare would be higher on the list, because we have seen a lot of activity combining edge and private networks in healthcare.

## 4. What are some of the key drivers that you're seeing for edge and private cellular, and how do these differ between industries, e.g. for manufacturing versus healthcare customers, for example?

**Timo Jokiaho, Red Hat:** From Red Hat's point of view, we don't see too many differences. What we are driving is to have more consistent, automated environment for both private networks and edge, so that you can more easily move applications from location to location. However, there is a lot of fragmentation at the moment, and the industry needs to work on this.

**5. Given this fragmentation, what do you see as the types of roles that CSPs (communication service provider) can play within the private cellular and edge space? Is it more of an ecosystem aggregator role, or a participation and others ecosystem role?**

**Phillip Coleman, AT&T:** The telecoms industry has had a huge transition over the past 10 years, from being connectivity- and consumer-focused to being more enterprise-focused. This requires an entirely different engagement model because you are bringing in new technologies to enterprises with their own incumbent infrastructure and ongoing operations. There are opportunities for CSPs to take that on in different ways, depending on capabilities or appetite. The CSP can stick to their strengths, which are connectivity and the knowledge of operating and deploying these networks. They can then build an ecosystem around that – with cloud partnerships and system integrators to support different customers requirements. You're not going to see the one-size-fits-all model – it will depend on what region you're in, what the market is demanding, and what is the most efficient.

One thing that we found to be very important at AT&T is having a consulting practice within the company. The team has become the tip of the spear with customers and provides an end-to-end view beyond the traditional functional units within a CSP.

**6. What are the common questions that arise from a customer point of view – for example, how we define a private cellular network versus public 5G?**

**Phillip Coleman, AT&T:** There's the question of "good enough" – understanding where the technology meets customer needs and what is optimal. Ultimately, there is going to be a cost-performance trade-off. When we engage with customers in healthcare, manufacturing, or the industrial sectors, you have to understand how different technological capabilities, like low latency, map to their requirements. That's why there's a lot of focus on the infrastructure layer – it is about building the foundation with the right flexibility, products, and capabilities to meet the customer's needs.

**Naren Muthiah, Cox:** When you think about edge and how it exists, it is going to have to coexist and be complimentary to the centralised cloud and work in conjunction with workloads that are processed at the cloud. From a Cox Edge perspective, we believe that you need to keep it open and cloud-agnostic to enable a distributed environment for the customer. In terms of how you architect that, this will be depending on the industry vertical and the different use cases. We're collectively learning this with the customer as we engage with them.

**7. How important is the concept of ecosystems? Could you talk a little bit about what Red Hat is doing to address some of this?**

**Timo Jokiaho, Red Hat:** It is a fascinating time for the telecoms industry: we are talking about ecosystems, partnerships, and multi-vendor integration, and bringing in ideas of how to bring more value to the telecoms networks. This is driven by the disaggregation efforts in the core network and

open RAN, and onboarding edge applications above that. Going forward, we will see CSPs forming ecosystem partnerships across all the levels, including hardware platforms, applications, management, automation, system integration, equipment providers.

**8. How does private cellular compare to other connectivity technologies that enterprises are familiar with such as Wi-Fi and industrial Ethernet?**

**Phillip Coleman, AT&T:** We often get asked this by our customers. You're right – you need to have a conversation with them, you can't simply break it down into sound bites. In addition, another factor to consider is range – you have different power profiles between one versus the other. Therefore, private cellular has a special place outdoors as well as indoors, and maybe there's cost efficiency there. Secondly, you have the opportunity to capture licenced spectrum and integrate that into your private cellular networks as well which gives a little bit more protection from an interference perspective. The third thing to consider is that a private cellular or network is more sim based, they're inherently closed networks which gives a certain level of 'security'. In contrast, Wi-Fi networks are easier to build open from a roaming perspective. The way I usually think about it is that you need both Wi-Fi and cellular, it really depends on the venue and the traffic profile. For example, if I'm going to a stadium and want access for by 100,000 fans, you can offer that with a one size fits all Wi-Fi network, whereas, to support that access with cellular is a bit more complicated. But this is a big topic, I love talking about it and there is no right answer as long as you're saying that they're both good and they both have different attributes.

**9. Over the past few years, we've seen enterprises focusing heavily on their move to cloud. Have you seen any sort of resistance in bringing some of those applications back to a more on-premises based solution? If so, what are some of the challenges or ways of overcoming that?**

**Naren Muthiah, Cox:** You're right, enterprises have invested heavily in moving to a centralised cloud. But what enterprises are starting to see, especially in some of the conversations that we've had, is that there are certain limitations. For example, a lot of enterprises are using data intensive applications and have found that transporting all that data to a centralised cloud is too expensive and inefficient and the time for this to happen needs to be quicker. So, the edge would coexist with the cloud as a centralised cloud, but I think it will depend on the workloads and the applications that do need to get processed locally as well as some of the cost efficiencies that enterprises can gain by not needing to transport the data to a centralised cloud. So, these are some examples but it's going to vary between the use cases. Another thing to add is that latency is obviously one of the benefits of edge but there are also other benefits. For example, there are a lot of use cases where there's a need, from a governance perspective, to keep data locally. So, this benefit of regionalisation provided by edge is another driver, as it the autonomous aspect of it. So outside of latency there are a few other significant benefits of needing to keep data local.

**10. What are some of the key challenges that enterprise customers face in, firstly, exploring private cellular and edge and, secondly, in the latest stages of scaling existing deployments?**

**Naren Muthiah, Cox:** We are trying to understand how this migration is going to happen from the centralised cloud to the edge and trying to make it as uncomplicated as possible in terms of migrating

some of the workload. This is not just with enterprises because when you think about the developer community as well that wants to build applications, you need to be able to be open to that from an edge perspective and enable the developers to have the right platforms and tools to create applications from a more distributed cloud perspective versus the centralised cloud. Then from an enterprise perspective, it really boils down to which applications it makes sense to move to the edge. It's the business driver that needs to be analysed on a case-by-case basis before determining that everything needs to move to the edge or that some existing systems should be kept in the cloud, for example. The way enterprises are doing that is by working with existing partners to determine the right approach and the right architecture in terms of looking at their existing cloud infrastructure.

**11. Do you see a resurging interest in applications interfacing much more with networks? Edge computing is one manifestation of this need for more network intelligence or insights in the way you intelligently distribute workloads to provide ultra-low latency for example. Are you this kind of demand from an application developer point of view?**

**Naren Muthiah, Cox:** Absolutely. From Cox's perspective, we are bringing the right tools in place to attract developers to build distributed cloud applications. Whether it is PaaS, IaaS, CaaS, the right sets of SDKs or APIs...making sure those are available to enable developers is going to be key in this next evolution of edge-centric applications versus moving certain workloads from a cloud native application to the edge.

**12. What are some of the key requirements and priorities that you are seeing in terms of how you're driving private cellular and edge with your customers?**

**Andrés Escribano, Telefónica Tech:** There are two things. The first is an integrated solution that is able to be delivered in a very easy way to the different application or use case that we need it to cover. The second is integrating a kind of application that really helps the companies in this transformation. This includes the two components we mentioned before, the 5G or the private network components as well as the edge computing that analyses all this data, this is valuable because the private on premises function is very related. Our idea is to deploy an infrastructure that is able to deploy a built wireless network function and has the capabilities to compute efficiently additional space that can also optimise the storage of data efficiently that we transfer. I work in a different use case but imagine something that is far simpler such as remote operation, we are able to combine the processing of the media with the place that we are in, that is connected information, you are then able to offer a completely different perception and quality for different components. This is our reality, how is combining the centre space computing capabilities and communication capabilities and be able to deploy them in a realistic way, not a complex and boring way, but in a very simple environment that can guarantee that we can reach a whole type of customer in a helpful way.

**13. For larger enterprises or even small and medium businesses, is there a demand for having fully managed services, for example for edge applications that they're deploying?**

**Phillip Coleman, AT&T:** Yes, there is definitely demand for operators or system integrators to provide a managed services capability, which will help reduce the ramp-up time for enterprises. There is interest in that bridge from installation to onboarding the first few use cases, or even extending it out

to a full managed service where the operator monitors KPIs and configurations over time, especially for businesses that don't have the resources or the appetite to operate the network themselves – there will always be an opportunity.

**Naren Muthiah, Cox:** Just to add to that, as enterprises are looking to deploy more microservices and containers, we're starting to see managed Kubernetes, for example, as a clear area where you have a clear area of interest, especially from enterprises. And there are new players that are coming in to provide that type of capability as well.

#### **14. Do you see the need for managed services capabilities increasing as this market matures?**

**Naren Muthiah, Cox:** It's certainly going to boil down to the ability to be agile and be able to deploy services quickly. Managed services is going to be a key capability to enable enterprises through that process rather than having to organically build resources and the capabilities required to do that. With all these new technologies evolving I think managed services are going to be a key capability that we're going to see.

#### **15. What is the impact of edge computing on analytics and the need for that real time insight? What kind of use cases or workloads are you seeing that demand some of that edge analytics and real time capabilities?**

**Naren Muthiah, Cox:** Some of the use cases we're seeing from edge analytics is really around IoT. With huge deployment in IoT we're seeing use cases in different verticals, this is what edge analytics is. Previously you would have an aggregator that's pushing all the data out to a centralised location where you're seeing a lot of the analytics happen which then push the insights back. So some of the real time interaction type of applications require edge analytics to be closer to the data but it doesn't have to be on prem, it could be at a meta edge or network edge. But still, from a latency perspective, having those analytics close is going to be important. Analytics is also interesting from a retail use case perspective, especially looking at shoppers, their demographics, real time analytics is going to drive some of that engagement with the customer, so retail is a good use case there where edge analytics is going to be important.

**Phillip Coleman, AT&T:** I second that, a lot are starting with the infrastructure and then they are experimenting with use cases on top of that. Whether it's video analytics, which has application in retail, manufacturing, safety, dwell times, things like that where you don't want that data always going all the way back to the cloud because it's a lot of video. Even AR/VR, we've seen the government defence areas looking at war games and things like that. There is a lot of experimentation that is trying to take advantage of the capabilities, but they are all justifying starting with the infrastructure first.

#### **16. What your predictions are for when the private cellular and edge market will start to mature and maybe what some of your priorities are as well in the next 12 months?**

**Timo Jokiahho, Red Hat:** I think the progress is quite rapid as we speak. It won't take long to say that this market is mature, maybe 12 months maybe even less. From a Red Hat point of view, everybody knows that we are not an open-source company, we don't have applications, we don't have edge applications, we are an open source platform company and we provide automation tools, API

management tools and all of those things. We are an enabler in this ecosystem and it's an interesting place to be obviously but it's also a challenging place to be because we need to run all the time because our platforms need to be able to host any of the applications that you guys invent or whatever it might be, we need to have the capabilities to do that. It's an ongoing process but the pace is very fast at this point.

**Phillip Coleman, AT&T:** I think it's less of a technology problem, in the private cellular space the infrastructure is there. It's more about figuring out the business model, getting in those first case studies and solutions because then it becomes more repeatable. A lot of people are watching very closely to see what is going on in this space so that they can then jump in. I like the 12-month window as well.

**Naren Muthiah, Cox:** To add to that, I think we're migrating from this experimentation, POC type of timeframe over the course of the last 12 to 18 months in essence when mid band spectrum opened up and shared spectrum comms took off. The next phase is seeing which of these use cases are scalable and then there will be an acceleration in the adoption of these specific use cases because, at the end of the day, there has to be clear business drivers that are moving this forward, not just acceleration. Obviously, we're currently in this phase of working and understanding what use cases are scalable where edge and private networks to coexist, but I think that private networks definitely accelerate the adoption of edge because of the fact that the clear value drivers that exist from being able to process some of this information closer.

#### **17. How do you see the relationship between the established providers of private cellular/edge solutions and disruptive scaleups/start-ups? Will the established players run the market or is there room for disruptors?**

**STL Partners:** There has already been an emergence of new types of private mobile network service providers that are involved in the business of configuring the network, provisioning the service and maintaining the private network infrastructure. We see four categories of possible private network service providers:

- Mobile network operators: i.e., public, regional, and national MNOs
- Major telecoms stakeholders and other network service providers: Fixed and cable providers, MVNOs, FWA and WISPs, tower, and infrastructure companies
- Enterprise connectivity and solution providers: e.g., neutral host players, specialist IoT connectivity providers, hyperscalers and cloud service providers, systems integrators
- Vertical specific players that might use private networks at their own facilities or deploy them for their clients

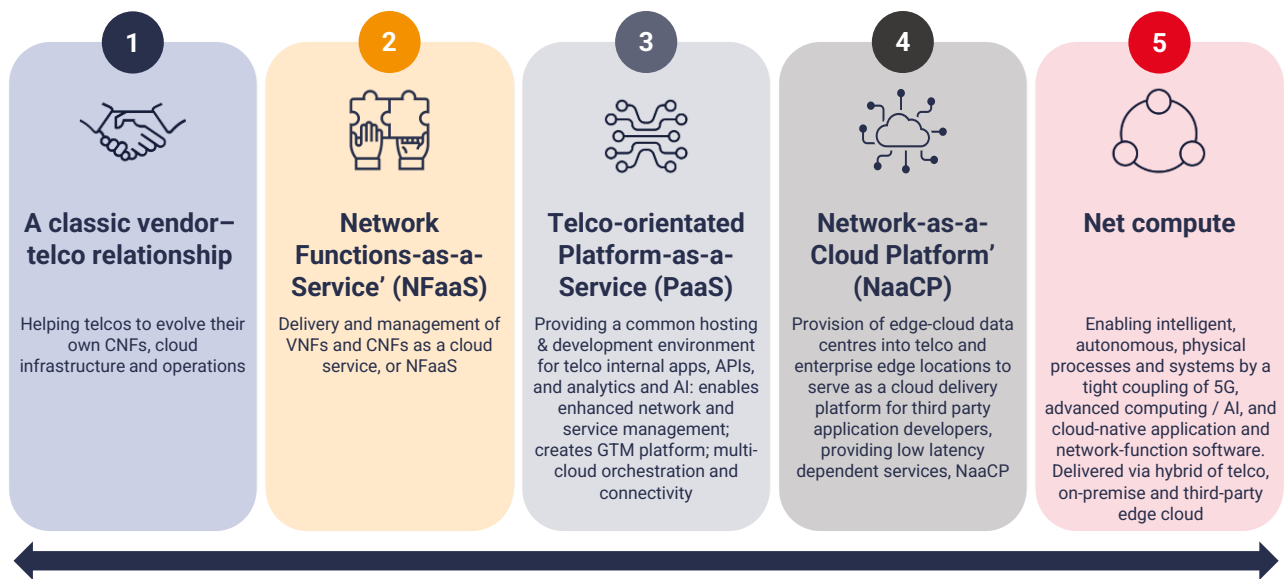
We see this fragmentation continuing. Many of these 'new service providers' have been able to address private networking opportunities and we have seen examples of deployments today with these entities.



However, we have been seeing some M&A activity within this space too, mostly focusing on strengthening technology offerings and driving synergies across the horizontal and infrastructure layer. Recent examples include Cellnex’s acquisition of Edzcom, Microsoft’s acquisition of Affirmed Networks and Metaswitch, and VINCI Energies’ acquisition of Sysoco just to name a few. We explore this in more detail in our [Private networks: Lessons so far and what next](#) report

**18. What is the business model that will be used in the relationship between HCP and operators in edge computing deployments? Based on traffic, locations and applications supported.**

**STL Partners:** We see a few potential business models between the hyperscalers and operators in both edge computing and in the transformation of telcos’ networks. These are summarised in the diagram below:



For more detail on these business models and how AWS, Microsoft Azure and GCP are addressing these, see our [Microsoft, Affirmed and Metaswitch: What does it mean for telecoms?](#) report

**19. Do enterprises need their own spectrum to classify as private networks? For example, do you classify network slicing schemes, where MNOs own all the infrastructure and provide NaaS, as private networks?**

**STL Partners:** Not necessarily, but dedicated spectrum is a key part of how we define a private cellular network. More specifically, our definition uses the following characteristics:

- **A dedicated local on-premise network** designed to cover a specific location, site or premises (e.g. port, factory, warehouse, mine, shopping mall, industrial or educational campus). In this specific case, we do not include wide area private networks to address the need for national coverage to serve transport, rail or utilities<sup>1</sup>;

<sup>1</sup> See our full definition of private networks in our [Private and vertical cellular networks: Threats and opportunities](#) report

- Uses **dedicated spectrum**, which can be leased by a mobile network operator (MNO) or a third party, or owned by the enterprise. In certain instances, it may be possible to use unlicensed spectrum in a “quasi-dedicated” manner, for example in isolated locations;
- Has **dedicated operating functions** (radio, core and management). These can run on the enterprise’s own dedicated infrastructure, leased dedicated capabilities from an MNO or third party, or on dedicated assets under a managed services contract from an MNO or third party. Alternatively, some functions may run off infrastructure that is shared (on-premises with other edge workloads, off-premises with other entities as a public-private cloud).

We also see network slicing as part of the private networking menu but feel it is still early days given the concept is still very new and largely unheard of by many enterprises.

**20. Can you elaborate on the ‘reduced cost’ benefit for both private networks and edge? Is it CapEx or OpEx costs of both? How can private networks or edge be less expensive than Wi-Fi networks? What are the assumptions around this claim?**

**STL Partners:** Today there is significant fragmentation in enterprises’ connectivity solutions and most have to manage a myriad of networks and systems<sup>2</sup>, therefore there is a significant opportunity for enterprises to consolidate the number of interfaces they have. At face value, a private cellular network is a significant investment and can be more expensive to deploy than a Wi-Fi network but that depends significantly on the requirements (e.g., coverage, mobility, reliability, latency, bandwidth etc.). For example, if the enterprise customer has a relatively large site and needs to have reliable coverage to support mobility use cases (e.g., AGVs or AMRs) then at some point, the cost of Wi-Fi access points required can often exceed the cost of private cellular access nodes given the latter can cover a much greater area than the former.

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<sup>2</sup> In more detail in our [Navigating the private cellular maze: When, where and how?](#) report

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