DR: [00:00] Moving network infrastructure to the public cloud is a significant undertaking. I assume the business case for this project highlighted a significant reduction in network operational costs, and so give us a range. How much you think this will improve business performance?

Mallik Rao: [00:15] Yeah. The biggest saving or biggest advantage for us is time to market. Time to market in terms of infrastructure deployment. In terms of the software deployment, I would say I'm able to bring two times faster than on-prem.

DR: [00:29] Wow.

Announcer: [00:35] This is “Telco in 20,” a podcast that helps telco execs achieve a competitive advantage with AI and the public cloud. It is hosted by Danielle Rios, also known as DR. Today we're talking to Mallik Rao, Chief Technology and Enterprise Business Officer at Telefónica Germany.

DR: [00:54] Hi, guys. I'm DR. You all know I've been advocating for telcos to move to the public cloud for what feels like forever. For years I've watched operators cling to the idea that network workloads can only run on-premise in their own data centers and that the latency of the public cloud would never work.

[01:13] But the conversation changed in 2021 when DISH announced it was building a new greenfield 5G network 100% on the public cloud. DISH knew it was a breakthrough idea and estimated it could be done for only $10 billion, a fraction of the cost of building a traditional network.

[01:32] We all know now that it did work. Still, skeptics were quick to note that most telcos don't build networks from scratch and insisted that brownfield operators would never move network workloads to the public cloud. Enter Telefónica Germany.

[01:48] In May of last year, it announced it was launching a cloud-native 5G core network on the public cloud. That's right, we're talking about the first brownfield core network migration in telecom history.

[02:00] Built entirely on AWS infrastructure with Nokia's cloud-native core, Telefónica has already moved more than 1

million 5G subscribers in just six months, and it plans to move 30 to 40% of its customer base by 2026.

[02:14] Today I'm talking to the visionary behind this groundbreaking work, Mallik Rao, Chief Technology and Enterprise Business Officer at Telefónica Germany. We're going to dive into how his team migrated the network core to the public cloud, its work with AWS to add critical telecom features to its infrastructure offering, and why, like DISH, they are combining a cloud-native core with Open RAN to save boatloads of money. So let's take 20.

[02:44] Mallik Rao is Chief Technology and Enterprise Business Officer at Telefónica Germany. Hi, Mallik, welcome to “Telco in 20.”

Mallik Rao: [02:53] Hey, Danielle. Pleasure to meet you again.

DR: [02:54] Yes, it's so great to see you. I'm super excited to talk to you about your awesome project. When I read the news I was like, "It's a project of my dreams, and Mallik, my friend, is doing it."

[03:06] For those of you guys who don't know, Telefónica Germany is the first brownfield mobile operator to fully shift its 5G core network to the public cloud, and you've selected Nokia and AWS to be your primary vendors in this project. And so let's just tell the world about it and why did you decide to do this?

Mallik Rao: [03:24] Yeah, this journey started about four years back. And for me, the cloud is about disrupting us as an operator. Cloud as a technology need to have a disruption to my organization and my way of deploying different applications into this technology.

Mallik Rao: [03:41] So for me, cloud is not about on-prem, cloud is about public cloud, because public cloud disrupts the way of working.

DR: [03:48] Absolutely.

Mallik Rao: [03:50] So when I started cloud journey, we said we want to touch the workload across a different section of technology. We started with the IT side of it, we moved the entire BSS into the public cloud. I don’t know if you remember we were talking

three, four years back about can I move charging into public clouds?

Mallik Rao: [04:06] It was a significant challenge because of data security, data privacy and encryptions. So today I run close to 15 million commercial customers on public cloud GCP infrastructure. So these things really changed my team, the way to operate, the way to build, the way you architect the whole solution from the redundancy to resiliency.

DR: [04:27] Yeah. It's a mindset shift for your organization.

Mallik Rao: [04:30] Absolutely. In fact, I always said I want to over invest in people and culture. So we kicked off the cloud journey with roughly 1,600 people going through a cloud introduction program. And I launched it not just for technology. Even in fact about 100 people outside technology, from HR, from marketing, from sales joined this journey, and that was a great step.

DR: [04:54] Yeah. It really is about bringing your people along and equipping them with the right skills and trying to get them to think and act in a different way.

Mallik Rao: [05:03] Absolutely.

DR: [05:04] And so as you guys have embarked on starting to move the core to the public cloud, what have been the biggest challenges that you guys have encountered?

Mallik Rao: [05:12] As I said, I started with IT, really went well. Then we said, "Okay, if you want to change telecoms, you have to bring the core telecom workload into public cloud." So that was the decision we made about three years back. I started off with Ericsson and AWS. We learned it in roughly 12, 18 months, and honestly I killed the program.

DR: [05:32] Wow.

Mallik Rao: [05:33] I killed the program because it is not about technology, it's about how do you really want to work together? Each one of us has a different set of ideals and interests. For me, it's significant learning in the organization, because cloud infrastructure is good for IT, but really, really difficult for telco workloads.

[05:50] I'm in an extremely close collaboration with AWS and also with Ericsson in the beginning, then we switched Ericsson with Nokia. The purpose of switching essentially is for us to have different options so that the heartbeat of different companies coming together.

[06:06] I mean, what we learned with this experiment with AWS and Ericsson and Nokia in the initial days is in IT workload, IT can behave the way the hardware is designed. The cloud infrastructure is there, the IT workload will have to behave the way the cloud infrastructure is. But in telecom, we realized the telecom software will tell how the hardware should behave. And that's a significant learning. AWS had to redesign the entire Outpost for telco.

DR: [06:36] Yeah, so let's talk about that. I saw this year at MWC, AWS announced exactly what you're talking about, which is what I'm calling Outpost 2.0 of their rack and server offering, which seemed to be more specifically designed for network workloads and for telco.

Mallik Rao: [06:52] Absolutely.

DR: [06:53] And so what were the changes that they needed to make for you to make the network work?

Mallik Rao: [06:58] Yeah. It's very simple. In IT, you need compute-intensive and storage-intensive applications. That's what is IT. But in telco, you need to be network-intensive, because the transaction per second is significantly larger with the telco workload. They had to redesign the entire backplane.

DR: [07:15] Wow.

Mallik Rao: [07:16] It's not about just compute, it's not about storage, it's about networking here. The layer three, layer two, the way this was architected from switching from different components of the entire Outpost, the guys had to redesign.

[07:27] So that's where we said, "Okay, let's launch this Outpost 2.0 with a close collaboration with Nokia and us working together." And of course Nokia also had to change a lot of the way the software is coded. You cannot just take out from an

on-prem workload into the public cloud, you've got to really change it.

[07:45] They refactored the entire application. As a part of the process we learned a few things also. One is the hardware definition, one is the software, and at the same time, how do you want to operate this one? What kind of CI/CD do you want to have? And do I go for a CI/CD pipeline separately for Nokia, separately for Ericsson or separately for IT? We said, "No, we want to have one single CI/CD pipeline." So these are the things we learned.

DR: [08:08] Well, what's so nice, I think, about this project, you're going through some very groundbreaking experiences here to redesign all of this software to handle network workloads. And what's great about it is AWS is turning around and giving it to the world. Anyone can buy Outpost 2.0, any of the mobile network operators, and learn from and stand on your shoulders, which is fantastic, and buy it for themselves and they don't have to reinvent the wheel.

[08:37] And I think that's a really big difference from how telco has worked previously where every single telco was doing it their own way, but basically solving the same problems. Right? Outpost 2.0, it's publicly available and people can grab it.

[08:50] And so last year when you announced this project, you said you were planning on moving 1/3 of your customer base by 2025, 2026. We're headed into the middle of 2025, so it's still early on that timeline. Where are you on that journey and how is it going?

Mallik Rao: [09:06] When we announced it about a year back, I said, "I don't want to do any more pilots. We want to put the commercial workload at scale." And that's what we have done. Today we have roughly about 1.2, 1.3 million customers working for the last six months successfully. It's in the Frankfurt region.

[09:23] One is moving the workload there. Second is ensuring that you have data security, data privacy. So we went into something called a port-to-port encryption. It's a bit of confidential computing, data in motion, data in rest, and data in transit, completely encrypted.

DR: [09:38] Yep. The whole way.

Mallik Rao: [09:39] So those are the learnings we've had. And today we are running about 1.3 million customers on public cloud infrastructure. The Outpost is coming into my test lab right now, it's getting installed, and once we have it, we will move at least another 1 to 2 million customers. So we are on track in terms of moving there. At the same time, it's also a significant change for my team to operate it, going into DevOps, going into CSCD environment, getting these in-service software updates.

[10:06] For example with Ericsson, we do in-service software upgrade with on-prem cloud infrastructure at scale. We do all the 45 million customers. This is the second wave of in-service software upgrades. It used to take months earlier. To date, in few hours we're able to update at least half of my network, and that's the power of cloud.

DR: [10:26] That's amazing. Such a change. Imagine being someone in your organization who's worked for Telefónica Germany for 20 years and now having to change. It's scary.

Mallik Rao: [10:37] It is scary. Yeah.

DR: [10:38] It's scary to think we're going to do it in hours when we used to be so careful, and so I applaud this project. It's amazing. One thing I noticed, in addition to moving your core to the cloud, Telefónica Germany is also an advocate in using Open RAN as part of your network strategy. DISH Wireless who also famously built their greenfield network on the cloud is also using Open RAN.

[11:00] And so why are you guys using Open RAN for this pilot? Is it just really trying to maximize the CapEx savings? Are you really just trying to see how efficient you can build and support a network?

Mallik Rao: [11:12] Yeah, look on IT, on core, I think we proved that okay, it can work at scale. However, on RAN, there are a lot of discussions which we're having. First of all, for me, the most important thing is disaggregating the hardware lifecycle with the software lifecycle. That's what I want to do in RAN.

DR: [11:28] Yeah, absolutely.

Mallik Rao: [11:30] We are looking at what problem are we solving on the rooftop wherever we're putting our radios? So by bringing AWS or a Google on the rooftop, what problem am I solving? I'm not saying I don't want to buy hardware from Ericsson, Nokia. I'm happy to buy the radios at scale with my existing telecom providers. We're also trying out with Samsung right now, the Cloud RAN, Open RAN, whatever you define as. But for us, the most important thing is disaggregating the hardware and software on the radio.

DR: [12:01] Yeah. And is that so every time you have a new gen or you need new features, you can much more easily and cheaply update the software then having to rebuy and reinstall all that hardware, which is logistically difficult.

Mallik Rao: [12:16] Absolutely. Because the moment you disaggregate software and hardware, the lifecycle of software is much faster than the hardware requirement.

DR: [12:22] Absolutely. Yeah.

Mallik Rao: [12:23] And that is where we're really focused on. That's what we're doing right now. Our aim is that towards the end of this year, we should really go for a large-scale deployment in terms of software disaggregation on the radio. It doesn't mean that I have to put a hyperscaler on the rooftop, but I'm just looking for anybody, even Samsung or Ericsson or Nokia, to come on my rooftop as usual and then disaggregate the software and hardware.

DR: [12:47] Right. Just make this idea work.

Mallik Rao: [12:49] Absolutely. And at the same time, critically important is performance. I have roughly seven different frequency allocations. Now I need all of them to work together, carry the aggregate, and deliver almost a gig in every sector of a radio.

DR: [13:05] Wow.

Mallik Rao: [13:05] Yeah. Performance matters.

DR: [13:07] Yeah, absolutely. So let's talk about business performance. Moving network infrastructure to the public cloud is a significant undertaking. I assume the business case for this

project highlighted a significant reduction in network operational costs.

[13:20] And so can you share what you're expecting in terms of that business impact and the savings you think you'll get once you've proven all this works, you've disaggregated the software and the hardware, and you're using that cloud spectrum, the CI/CD pipeline? Just give us a range of how much you think this will improve business performance?

Mallik Rao: [13:42] Yeah. The biggest saving or biggest advantage for us is time to market, number one. Time to market in terms of infrastructure deployment, in terms of the software deployment, I would say from a time to market perspective, I'm able to bring two times faster than on-prem.

DR: [13:58] Yeah, double. Mm-hmm.

Mallik Rao: [14:00] The second thing is on the total cost to operate, even if I took in absolute numbers, public cloud comes as more or less equal or even better, but provided you deploy at scale. Telecom is about scale. It's not about moving a small 5% of your workload into the public cloud and you're able to make a saving, because you have on-prem as well as this one.

[14:23] My experience has been that if you can move 20% of your workload, and that is the reason we were talking about going at least 20, 25% of my entire packet core infrastructure into public cloud, then I start seeing the scale. The scale benefits will come, time to market will come significantly faster, and at the same time, the organization heartbeat significantly changes.

DR: [14:46] Yeah, and I've always said that to really achieve the savings, you have to do public cloud as it was designed.

Mallik Rao: [14:53] Absolutely.

DR: [14:54] You can't sit there and move an on-premise workload or a private cloud workload and keep it designed that way, because you might as well just keep it on-prem. You really got to use that elasticity as you're scaling so that when your network's a little bit quieter at night, all those resources come down, and then as the day starts again, you start scaling. And if you're really doing that, I think that's where massive savings should really happen.

Mallik Rao: [15:21] Absolutely. I see that in charging. For example, now I have 15 million customers sitting on public cloud infrastructure. Now, if I want to move charging into another infrastructure, it doesn't take six months for me. From on-prem to cloud, it took almost 1 1/2 year for all of us, but if I want to move tomorrow, it should be much, much faster.

DR: [15:41] Super easy.

Mallik Rao: [15:42] Yeah, and at the same time, the disaggregation when I'm mentioning the hardware and software, I think telecom software providers need to really start thinking about auto-scaling. If you don't do auto-scaling in the software, you cannot really use the advantage of the public cloud infrastructure.

DR: [15:58] Yeah. That's what my company, Totogi, is all about. Our charging as a service is multi-tenant, and so you can deploy multiple chargers. You could deploy a charger for an enterprise or your main business and it's completely separate from each other.

Mallik Rao: [16:11] Absolutely.

DR: [16:12] And automatically scaling, we can handle a billion subscribers on one charger. We have continent-level support. It's insane. So you know what's great about Telco is it's super small, and as I go around and I meet people, I find people have moved vast distances for jobs. And so currently you're in Germany. Tell us all the different places you've lived as a telco executive.

Mallik Rao: [16:38] This is my 17th house which I moved to in the last 20 years.

DR: [16:42] Oh my gosh.

Mallik Rao: [16:43] No, I started of course India, Singapore, the US, Sweden, Netherlands, Turkey, Germany.

DR: [16:50] Yeah. It was one of the first things I noticed about telco when I came into it. There's only about 800 MNOs in the world, so people moved not just countries but continents.

Mallik Rao: [17:01] Absolutely.

DR: [17:01] Which is crazy.

Mallik Rao: [17:02] Yeah. Once technology is pervasive across the globe, it's easy to move because you don't have a problem of moving technology, you just adapt to the culture and you're able to be part of the people.

DR: [17:13] And then do it again.

Mallik Rao: [17:14] Yeah, absolutely.

DR: [17:15] So yeah, I met you back in 2020. You're one of the first telco executives I talked to about moving to the public cloud. And so watching this project come to life and watching you embark on moving your network, it's really fun to watch. And Mallik, as always, I know you're super busy. I really appreciate your time for coming onto the podcast. Thank you so much.

Mallik Rao: [17:32] Thank you, DR.

DR: [17:33] Yay.

Mallik Rao: [17:33] Thanks a lot.

DR: [17:38] Stick around. We end each podcast with a “Telco in 20” takeaway. I've got two minutes to tell you something you need to know.

[17:49] Ericsson, let me start by saying I love you. If it weren't for you, MWC21 CLOUD CITY never would've happened. And I'm so proud of you for realizing the public cloud is the future of telco and for building your new 5G public cloud SaaS network core. Welcome to the Cloud City Army.

[18:09] And because I care so much about you, I want you to listen carefully to what Mallik just said about disaggregating software from hardware.

[18:17] Everyone knows software and hardware updates move at completely different speeds. How often do you buy a computer? Once every four or five years? But how many software updates do you install on that same computer? At least one or two per month. That's more than a 30 to one ratio. So when your network equipment vendor is telling you that you

need to buy new hardware to get a software update, that is no bueno.

[18:42] I understand why these guys don't want to disaggregate. They make a ton of money on the hardware. But when your vendor controls both your hardware and software roadmap, you're basically paying them to dictate your innovation timeline. That's not a partnership, that's dependency.

[18:58] Forward-thinking telcos like Telefónica, AT&T, Verizon, Vodafone, Orange, and others are testing Open RAN for a reason. When you can update your network software without ripping and replacing hardware every few years, you're looking at saving up to 50% on TCO. When you're not locked into one vendor's ecosystem, you can innovate at software speed instead of hardware speed.

[19:23] Want to find out how to get started on your public cloud journey? Then shoot me a DM on LinkedIn or X @TelcoDR and we'll set up a time to meet. Until then, tune into more “Telco in 20” episodes, like and follow, and leave us a five-star review.

[19:37] Don't forget to sign up for my game-changing email newsletter on TelcoDR.com, and check out our awesome YouTube channel. Later, nerds. Bye, Ericsson.