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Webinar

Empowering Developers

The Future of Programmable Connectivity with Network APIs

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SPEAKERS

Stephanie Ormston
Assistant Vice President,
Digital Services Integration
AT&T

Joseph Torres
Director, 5G Service Design
& Lifecycle Operations
AT&T

James Crawshaw
Practice Leader,
Omdia

Vikram Srivats
Chief Commercial Officer,
GM Americas
WaveMaker

James Crawshaw: Hello and welcome everybody to this Omdia webinar, Empowering Developers: The Future of Programmable Connectivity with Network APIs. My name is James Crawshaw, I'm an analyst with Omdia. I'm joined today by Stephanie Ormston, AVP Digital Services Integration with AT&T and her colleague Joseph Torres, Director of 5G Service Design and Lifecycle Operations with AT&T. We also have Vikram Srivats, Chief Commercial Officer and GM Americas with WaveMaker. If we can just start off, Stephanie, with a few words about yourself, your role and how it relates to this topic of Programmable Networks and APIs.

Stephanie Ormston: Great. Thank you so much. Happy to do it. Thanks for the introduction, James. Hello everyone, It's nice to meet you and it's great to be here today. My name is Stephanie Ormston. As James said, I've been leading our strategy for AT&T to open up the network through APIs and make those network capabilities through advanced networks such as 5G, or even converged opportunities available to developers to accelerate first-party and third-party product development. I've been with AT&T for just over 10 years, and throughout my career I've held a number of roles across emerging business units at AT&T, including Big Data, Internet of Things, Advertising Technology, and of course, most recently, Network APIs. So, it's great to be here and I look forward to our conversation.

James Crawshaw: Great. Thank you, Stephanie and Joe, what's your connection to this topic?

Joseph Torres: Thanks, James. Appreciate it. How do I follow Stephanie? That's a hard act to follow. So, I head our Experience in Platform Design in our 5G ecosystem. So, think of the experience and then translating that into technology and network requirements. I have a little over 20 years; so, we'll double what Stephanie has. All over the business from consumer to technology to wholesale enterprise, and some SAP experience in ServiceNow platform for a short stint.

James Crawshaw: Fantastic. Thank you, Joe. And, Vikram, WaveMaker, can you explain a little bit about what WaveMaker is and how it fits into this topic as well?

Vikram Srivats: Yeah, absolutely. Yeah. Happy to be here. James. Good to meet everyone. My name is Vikram Srivats. I look after the global business operations for WaveMaker based out of the US. I've been with the company a little over four years. WaveMaker is an enterprise software platform provider. But think of it like a development accelerator for professional developers to build modern applications. We've been doing this for the last 11 years as an independent company, we used to be a part of VMware before that. Our connection, and frankly, our contribution to this whole agenda and topic, and hopefully, a solution for the market going forward, is the fact that

WaveMaker's platform enables developers to accelerate the adoption of Network APIs. Helps democratize the availability of these network APIs to, you know, absolutely brand new categories of developers, not just professional developers in large enterprises and IT houses. And, fundamentally helps cut down the total cost of ownership of sustaining these applications over their lifecycle. So, we'll talk more about all this, but happy to be here. Super excited.

James Crawshaw: Great. Thank you, Vikram. So, I'm going to start off with an introduction to this, this topic of Network APIs. Essentially, I think we should all know by now what an API is. It's about allowing computer programs to communicate with each other, and developers can use APIs to incorporate telecom services. Things like SMS and voice into their applications. So, you all have received your text messages and your parcel on its way. Or you might have booked a taxi and communicated with the driver, through the phone without actually knowing each other's telephone number. All done in a private and secure way, using these Network APIs that are hooking into telecom networks.

A number of companies grew up around this area of SMS and Voice APIs. They are collectively known as Communications Platform as a Service companies. You might be familiar with names like Twilio and Vonage and Infobip. They essentially act as intermediaries so that you as a developer can just use one API, to send an SMS to your customers or your application users, without having to worry about which particular network they're on anywhere in the world. So, they deal with all of that routing and have the connections into the various different operators.

There are other services, other capabilities that telecom operators can expose beyond just the basic SMS and voice, but they're a little bit more complicated. and in the past, they didn't get a lot of traction with the CPaaS companies because of this added complexity. But there's been some move towards standardization in the telecom industry. The GSMA has this initiative called Open Gateway. They're looking to create standard APIs for these kinds of services, SMS, voice and the more sophisticated ones. and collectively, they refer to them as Network APIs. The aim of this is to make it easier for the CPaaS providers and other aggregators to adopt and expose those APIs to developers, and they're doing this in conjunction with an organization or projects, open source project called CAMARA, that I'll come back to in a minute.

In addition to using these aggregators, telecom operators, of course, can expose these network APIs directly to developers, their own developers internally and also external developers. Apps in support of enterprise services, things like IoT. So, network diagram. I like network diagrams. This one's a bit fuzzy. So, go to the 3GPP website if you want to see a clearer version of it. Essentially, it refers to the various different network functions

that form part of the 5G core architecture. And there's one that's highlighted in red, the acronym NEF, standing for Network Exposure Function. So, the idea is that, this is taking all of these complicated protocols that are used within the mobile packet core and exposing capabilities to other applications outside of the mobile network. And, essentially, that's what the API is enabling you to do here.

The CAMARA initiative then, just to come back to that, so, that's an open source project hosted by the Linux Foundation. And, it's this community of largely telecom operators that are active in it, defining, developing and testing APIs. And the GSMA is then taking the ones that they think are most likely to be useful and commercial and, giving them their…sort of rubber stamp and making them part of their Open Gateway initiative. That Open Gateway initiative is bringing together various telecom operators, platform developers, and other market participants and creating this community. So, the CAMARA initiative or project rather, was started by a small number of telecom operators and was officially launched in 2022. So, it's a couple of years older.

These are the APIs and the different categories that the GSMA is currently promoting and trying to get operators around the world to launch commercially. You can see that the main categories here are Subscriber Identity and Fraud, Location, Quality on Demand. and then there's a sort of, a random selection of other APIs that don't really fit into those other buckets. The key ones out of this list here that I think are getting the most traction with operators at the moment, in terms of the most commercial launches, are Number Verification, SIM Swap and Device Location. Those ones are used in conjunction, often, by banks and e-commerce providers in order to try to make sure that the person who is making a transaction or trying to connect to an application is really who they're saying they are. And, trying to avoid fraud.

Another way to look at these different APIs is the various use cases they enable. So, I mentioned fraud. So, SIM Swap, the key use case for that is to prevent fraud, to prevent somebody from having your telephone number ported to their device, and then being able to essentially take over your accounts and your identity, and get hold of your email and various other forms of identity in order to steal from you. Number Verification, that one is used to authenticate the user. So, rather than having, for example, to request that an SMS be sent with a one-time code, and then entering that into a page on your phone, this verification of your identity can be done silently in the background. The application talks to the mobile network and says, "Is this device that's trying to connect to me really belonging to this user with this telephone number?" And the mobile network confirms, "Yes, that's the telephone number associated with that particular user that's trying to connect at this moment in time."

Know Your Clients, is another API that's got a very good use case. So, for example, if you are running a gambling site, and you need to make sure that the people who are using your site are over 18, then, the Know Your Clients API would connect to the mobile operator who's providing the service to that particular user and say, Hey, is this user over 18? and the level operator would look in their records and say, "Yes, you know, I've got some information that I've gathered. Perhaps, I see a photo of their passports; or there's been some other form of identification provided when they signed up with me that confirms that they are of age."

Device Location, quite a few X's there. So, that could be used for anti-fraud. For example, you're doing an ATM transaction and, before allowing you to get the money out of the machine, they're checking, is this really the user that I think they are, are they really in the location that they claim to be. Asset Tracking, so, that could be trucks, so, they're going around the country. Perhaps, they're getting close to a warehouse that triggers some sort of geofencing alerts that tells the warehouse to get ready, the truck is about to arrive and unload, it's... the goods. Or, Location-based advertising. So, I'll come back to an example later, of a pizza chain that wants to send adverts to people's phones when they're close to a pizza parlor.

Quality on Demand. Finally, a number of different use cases there. It could be about improving the connection for mobile video delivery, streaming of virtual reality content, connection to mobile games, or remote control of drones, for example. Just to go into some, some concrete examples here. So, anti-fraud, which I mentioned, is one of the key use cases. So, couple of Brazilian banks, earlier this year, they worked through the, the CPaaS provider, Infobip to connect to the major Brazilian mobile operators, and they've implemented the SIM Swap API, and they're using that together with Device Location, to verify where the transactions are carried out, where the customer is actually located. Dion, in Uzbekistan, has got similarly, they've used the geolocation API to determine if an individual is present during a transaction, like an ATM withdrawal.

Secure Authentication. So, a couple of examples here. Vinted is for selling vintage clothing. And, the operators in Spain have integrated the Number Verification API so that people can simplify the registration and authentication process. The young folk who use applications like Vinted don't want to be messing around, entering in one-time passwords. This makes life simpler for them. and TikTok, similarly appealing to the younger generation, they're using the Number Verification API to allow the use of mobile phone numbers to authenticate instead of those inconvenient one-time passwords. Some examples here where you combine the authentication and anti-fraud use cases together. So, Gameium, it's got a cloud platform for payments and secure transactions, they're using the Number Verification and SIM Swap APIs for user authentication and fraud protection. Terralogic, they do financial service solutions, and, they're using SIM Swap

and Number Verification to protect users from fraud.

The Brazilian operators, again, they've launched various APIs, Number Verification, SIM Swap, Device Location, to enable similar sort of authentication and anti-fraud. On the Identity Verification, there's an example again, in Brazil. The Brazilian operators have been very active in Open Gateway. freightos.com, they're a grand transformation platform and they're using Know Your Client API to make sure that the data they're getting, that they can validate the identity of drivers during registration and, that's making it more secure, and, providing a better quality of user experience. Asset Tracking, quite a lot of examples here: Cloud Hawk is using location APIs for fleet management and asset tracking in densely populated areas where GPS isn't always reliable.

Colony Networks is using the Location Retrieval API for equipment tracking. and a couple more examples from Colony Networks as well. Similar sort of use cases, Location Retrieval, for example, for some of their other services. Mobile video streaming. So, in Germany, Deutsche Telecom and Sony have tested a live video solution that basically, uploads the video, production quality video from a stadium. So, it's just a football stadium, back to the studio before being broadcast out to people's homes, and they're doing that over the mobile network with a Quality on Demand guarantee of low latency and stable bandwidth.

TV in Spain, they're using a Quality on Demand mobile API again to improve images, reduce image freezing, and have better resolution of images during live streaming. Other examples that come to my broad peak, again in Germany, Liberty Global. In Belgium, they're using the Quality on Demand API for high definition video that's delivered to captains of boats that are remotely located. So, they're not actually on the ship, and they're maneuvering these vessels through busy areas, and they've got to have a very reliable video feed. The Augmented and Virtual Reality for Microsoft, whose HoloLens is being used by a company called ApoQlar, for some sort of holographic medicine, they're using the Quality on Demand API to guarantee the quality of that imagery. Matsuko, in Japan, I think, they performed a demonstration using Quality on Demand and the Server APIs again for holographic communications.

There are other examples there, I won't go on. Mobile Gaming, so, China Telecom, they're using the Quality on Demand API with Tencent for all of their games, and it's improved the performance, there's less stuttering in the game and less congestion. So, mobile gamers are having a better experience. Blacknut in Spain, Telefonica trialed with them the Quality on Demand API. Again, a similar sort of use case to make the connection better for mobile gamers who are very keen on their connection. and the remote control, it could be controlling unmanned aerial vehicles and drones; it could be connecting and having Quality on Demand for connectivity to a remotely piloted rental car.

Siemens Energy is testing the Quality on Demand API for onsite technicians using HoloLens augmented reality applications and the pizza example, I think, that one again, is revealed in Uzbekistan. Other examples here are about remote control. I'm sorry, here's the pizza example; using the Geolocation Gateway, Geolocation API, for that precision marketing for a pizza chain. Other examples I won't go into now, but Carrier Billing is one that's talked about and Edge Discovery.

So, a little bit about the technology landscape at the bottom of this picture, you've got the core of the network itself, which is, obviously, very complicated, great for network engineers, not so great for general enterprise developers. What happens next is that information is abstracted, into, you know, the high level systems, the operational and business support systems. There's this element on the right, the NEF, the Network Exposure Function, or its 4G equivalent, SCEF that's taking that sort of complicated network, protocols and translating them into something a little bit more simplified, but not quite yet easy enough for developers to use. So, the next stage is to transform or translate these APIs from network level into service level APIs and that's a key function that needs to take place in this architecture. Beyond that, you know, API management, things like API gateways and security is fairly standard IT infrastructure that most enterprises will already have, including telecom operators, and then it's about exposing those APIs safely, either through aggregators, and I talked about CPaaS and public cloud before or through the telecom operators' own marketplace, and so, the people consuming these APIs are the developers themselves.

So, in terms of route to market, you know, at the bottom, you've got the telecom operators' own portal on the right, and at the top you've got those aggregators, the public cloud and the CPaaS providers, and then on the left, there are other aggregators, if you like. So, for particular, ecosystems like Mobile Identity. there's a number of existing players that have served the needs of banks and e-commerce providers, in terms of, trying to identify, fraud and, they will take the gateway APIs, they'll mash them up, and then perhaps, add some other indications of their own that proprietary in order to add some value provides more, better risk mitigation for banks.

With that, that brings us to panel discussion. We have back Joseph, Stephanie and Vikram. Let me start off with relatively straightforward questions. So, Stephanie, you recently presented at the Network X events earlier this year in Dallas. I watched the video recently. In it, you talked about the four network APIs that AT&T has launched. and, you said that two of them are CAMARA-based or Open Gateway-based as the device status and the SIM Swap APIs. The other two, you said, are proprietary to AT&T, so, there's something different. So, one was networking sites where you got some sort of information about the performance of the radio access network, and, the other one was about mobile threats and anomaly detection that could be useful for IoT devices. So, can

you tell us a little bit about how you are looking to expand the number of APIs that you offer, combining, these sort of standardized industry, Open Gateway APIs that are coming out of the GSMA in CAMARA, as well as the ones that are going to be unique to AT&T?

Stephanie Ormston: Yeah. Thank you, James. At AT&T, we look at the opportunity space provided by network APIs much more broadly than just the industry standard conversations that are happening right now. So, for us, Network APIs are really about what allows developers to know or create network conditions that can then optimize their application experience. So, historically, mobile network operators have been the ones who understand the performance of the network, we know what's happening on the network. We have ways to control and create conditions in the network again, to make sure that the network is performing at an aggregate level in the way that we, you know, want you to serve our customers.

But at the same time, application developers know very, very intimately what their application needs to fit their customer requirements and their customer expectations. and historically, those two sides haven't really met up and they haven't really had a lot of conversations to be able to say, okay, what is it that a specific application and device level, that needs to happen to make this customer experience, everything that it needs to be whether that be, as you said, a mobile gaming application, a financial services application, you name it, could be any of that. And so, when we think about Network APIs, honestly, I never really like that we talk so much about APIs because APIs aren't new to the technology landscape, like you've talked about. So, the Network APIs are unique in that way as they're really the exposure of network capabilities. and they're the exposure of capabilities that we've never really been able to put in the hands of developers before.

So, at AT&T, when we think about it, we start with the network and we start with the network capabilities that we have that, we believe, are unique or differentiated assets. AT&T has a massive converged scaled network, we have both wireless, we have fiber footprint, you know, we're doing work towards satellite to cell communications. So, we have multiple different access types and access methodologies across our footprint. and so, for us, it's more than just wireless. It's all of that. Anything that sits within that footprint is open. and, it's game on, for what you could say, what is it that developers need to make a better customer experience for their customers, and, to fit their needs. So, with the APIs that you discussed, those are the APIs that we launched, that we announced as part of our Network API Accelerator Program, which is the opportunity for developers to gain early access to these APIs so that we can get feedback to say, "Hey, are these the right APIs?" "Do they fit your needs?" "Do they do what you expect them to do?" and, "Oh, by the way, do you want more?" "What else could you use?" "What else could you see coming?" So, it's really about creating that feedback loop between us and

developers to make sure that we're hitting the mark and make sure that we're hitting the needs.

So, when you talk about the CAMARA APIs, those are great for, what we call, multi CSP use cases. These are your traditional mobile phone apps B2B2C type of opportunities. and, so, that's where CAMARA is really pushing and driving those conversations, and that's fantastic. We continue to support that, and we will continue to grow that portfolio of CAMARA APIs that are available. But at the same time, we have a lot of enterprise customers, and we have a lot of customers who operate only on the AT&T network, and that's fantastic. And so, that allows us to do a little bit more than what CAMARA is ready for right now. And so, that's where we're taking a lot of the feedback from the customers. And so we've seen a lot of interest in quite simply network insights getting that network information. I don't have device-level information about the network performance, and if I knew that then I could do better autonomous route planning. I could do all sorts of things. And so, we can make those capabilities available to our customers in such a way that we don't necessarily need to wait for the standards' bodies.

Obviously, we see this all evolving; this is a highly dynamic space. And so, we think that some of these things are going to start to converge. Certainly, we're even seeing more CAMARA APIs come out that have similar capabilities to network insights and the like, but, I think, what you'll start to see from AT&T is a much more converged portfolio. How do we think about this? Like I said, across all of our different access types and methodologies, and how do we make sure that they become available to developers to meet their very specific needs and requirements.

James Crawshaw: Excellent. Okay. Very, very comprehensive. Joe, Stephanie touched on it a little, but if you could just elaborate a little bit about, what are you hearing from developers within your enterprise customer base, about the sort of benefits that they're seeing, or they're expecting from the standardized APIs as well as the the AT&T proprietary ones that Stephanie mentioned?

Joseph Torres: Yeah. Sure, James. It's a great question, and so, let me just give you a little bit of context of the group that I'm in. I am in the Mobile Virtual Network Operator space. So, we support those customers, within the partnerships within AT&T. And, so I'm going to broaden my response to more than just developers because we're interacting with more than just developers in that space. It's almost like a convergence of entrepreneurs, innovators and developers all coming together and those innovators, developers, entrepreneurs, in a traditional MVNO space, it's very easy, they understand telco, etc.

In addition to that space, we're seeing innovators and entrepreneurs who want to leverage AT&T's connectivity, but really don't understand the connectivity or the complexity of porting or how to do an activation. And so, they need an abstraction and they need to be able to understand and connect those, and standardization certainly helps with that. There's a really exciting space that we're getting a lot of interest on, and it's really around embedded wireless. So, not traditional wholesale MVNO like, we saw, wholesale and handset to end user. It's how do I embed connectivity in the experience of my app? And, I think when you think about some of the use cases, you talked about developers trying to embed in a pizza app, you know, the connectivity components, security venues wanting to embed security or, advertising in that space. Developers want to be able to abstract that embedded wireless into their application, and they don't want to have to know all the nuances of the telecommunications space. So, standardization certainly helps that, with that CAMARA, TM Forum and solutions like WaveMaker simply, kind of abstract that complexity as well.

James Crawshaw: Interesting. Okay! Seems like you're getting some good feedback from the market there. So, Stephanie, if I come back to you just for a minute. So, as you said, the telecom industry is no stranger to APIs or indeed exposing APIs to the developer community. Many telecom operators, including AT&T, have got their own developer portals and, but, they also use the CPaaS companies that I talked about earlier. Well, what do you think the route to market will be for these newer Network APIs? Do you think the aggregators, the CPaaS companies, public cloud providers, etc. are gonna be the main channel? Do you think it still makes sense for telcos to try and cultivate their own direct relationships with developers?

Stephanie Ormston: Yeah, no … that's a burning question that is still hot in the industry as folks try and really figure out what this is. And again, the way that I would say it and the way that I would position this is. I think, Joe teed it up really well. You know, we have a tendency to talk about developers as the only audience for this, and, we have a tendency to say that developers are this monolith, that they are just one segment and, they operate as, you know, one hive mind kind of concept. And that couldn't be further from the truth, right? Developers are across all different segments, all different demographic types, all different behavioral types. They're in different developer ecosystems. You know, we see many developers operating in multiple developer ecosystems at the same time. and so there's a lot of different considerations.

So, when you think about go-to-market, it's really about what is the customer problem that I'm trying to solve? Where are my customers? Who are my customers? How are they behaving? and how do I make sure that I package up a compelling value proposition, that makes it so easy and, so obvious, that my solution is the only one that makes sense, right? So, that's your standard go-to-market approach. So, Network APIs, this is where my

answer to this is always very disappointing to folks is, because it depends, it really depends, what is the use case. The beauty of the network APIs is these are components, these are atomic level piece parts, that can be applied to multiple verticals and can be applied to multiple industries, multiple target segments. They can be bundled, they can be repackaged, they can be picked up in any multitude of ways. So, that's going to require a very thoughtful and intentional go-to-market strategy, to ensure that, when they all hit the network, the network is, you know, healthy and robust and can process, and can manage all of those requests. But that, those requests are targeted appropriately to each of their ideal end segments. And so, what I would say is, you'll see multiple go-to-market models.

In some cases, you know, as I said, you will see a more direct model because we have strong relationships with those enterprises. Those enterprises are interested in consuming directly. You will probably see indirect motions, certain verticals, certain industries, we might not be as dominant in; and so, we might ask a systems integrator or a third party to come in to package up and bundle those APIs in such a way that, they are much more easily consumable for those end users. Certainly, you have a lot of robust and established developer ecosystems. Why wouldn't we try and make these available in a place that developers are already used to operating in a way, that they have a whole set of tools and services that we're not going to provide. So, of course we want to offer these alongside those value added opportunities that developers are already used to.

James Crawshaw: Very good. Joe, I think when, when Stephanie did that video earlier this year, she mentioned that the APIs, the Network APIs were still pre-commercial, you know. The two CAMARA ones that you're working with, and the two AT&T proprietary ones. So, when you're ready to commercially launch these, what are the sort of commercial models that you'll be looking at? Do you think it makes sense to charge for these things on a sort of per API call basis or, you know, do you think you'll end up monetizing these APIs as part of a package of connectivity that you're offering to an enterprise or an MVNX type customer?

Joseph Torres: Yeah, it's a great question. and, and I think, Stephanie did a great job, kind of, talking it through. I think it depends, right? What's the supply and demand? What distribution model are these APIs going to be consumed in? Are we, you know, hyperscale route or direct to a B2B? I think, it just depends on, you know, and then there's also the scarcity of network capacity, or the overabundance of network capacity. There are multiple variables there that kind of, you know, levers that have to pull to say whether it's monetizable or are you, simply, just exposing. So, I think, you know, looking at the various use cases, I think, we evaluate it and then we say, you know, What's the addressable market in this space? Does it make sense? and, you know, we build that business case around that. Right? I think that's ... and we let the market kind of guide,

where we're going in these journeys that are being still yet to be discovered.

James Crawshaw: Yeah, yeah. Fair enough, fair enough. Still early days. Vikram, let's come to you for a second. So, I mentioned abstraction earlier on in my introduction course, Computer Science is all about abstraction. So, do Network APIs, these CAMARA ones, is that sort of ultimate level of abstraction that we need, or are there other steps that operators can take that would make these APIs even easier for developers to build with?

Vikram Srivats: Yeah, that's a great cue to what we do here. So, this, what you heard from Stephanie and Joe, I think one common strain is the fact that there are multiple routes to market. There are multiple animals in the food chain, if you will. If you look at, today, the MVNO business, it's a pretty straightforward licensing, providing of that, you know, network to MVNOs. But then, you could have a platform provider who actually adds value in between MVNOs and AT&T, you could have a brand that actually embeds wireless into their offerings, for their loyal subscribers or customers.

So, you have, you know, the dimensions, starting to explode. You have these APIs, which are primitives, like Stephanie pointed out, the atomic level. But then, you have these, suddenly, you know, you're moving from a singular, monolithic provider of connectivity, to a very disaggregated world, in which you have many different players, who have, many different offerings that they can take to market for their customers and add value for their customers. It could be more than that. I missed, for example, enterprises or corporations who couldn't even offer, you know, custom wireless programs for their employees as, sort of, a perk. and, think about it, today, there's a software vendor that provides human capital management, you would probably use that system at some point called, let's say, Workday or ADP that processes your payroll.

An employer could actually use embedded wireless sitting inside this platform, and sort of roll that out to their employees. So, it also behooves, you know, telcos to start thinking about ISVs, perhaps, as sort of, you know, a marketplace, if you will, and embed such things there. So, I think that's sort of a nice, sort of segue to, you know, what we try to do on the platform. The platform, fundamentally, is an acceleration platform. So, that doesn't change. But, the platform is able to build components that are API infused. and, these components sort of demystify, simplify, take away all the, you know, friction that potentially, developers, application developers might face working directly with network capabilities. Right.

And, these components could also be sort of, you know, steps in a journey. So, think about it like an IoT application. and, if you're doing device monitoring, of cameras or gunshot detectors or what have you, theoretically in a city, you could actually build out a

prefabricated component that, you know, integrates with the Device Location API, that shows all these devices spread on a map. So, it's like your device distribution, and, if you integrate that with the device status API and orchestrate that you can actually show, maybe in some color-coded manner or some sort of like a toggle switch. Whether it's a green or red, indicating whether the device is functioning, or not, right. So, that whole experience component that I'm talking about is actually a web or a mobile experience component that can literally be available in a library, offered by either AT&T or AT&T's platform providers, or some third-party SI (System Integrators) that could be accessed by creators, who want to build these new, powerful, imaginative experiences. Right.

So, WaveMaker enables developers to take these APIs, treat them as first class citizens inside the platform, and build these beautiful things called Prefabs, which basically, you know, you probably, have heard of Shopify in the commerce world. So, this is almost like Shopify for wireless, where you're enabling these whole spectrum of new businesses, service providers, operators, to use these APIs, but in a very democratized, easy to access, powerful and cheap way. Right. So, that's kind of what we're trying to solve.

James Crawshaw: That's very good. Very interesting. Okay, let's come back just to Joe for a minute. Joe, I think you mentioned MVNX in one of your earlier answers. It was something I saw on AT&T's developers portal. There's a section there that talks about MVNX APIs, but I couldn't really figure out what it is. Can you just elaborate a little bit about that?

Joseph Torres: I'd love to, James, that's a project near and dear to my heart. It's essentially exposing, not only, TMF-based APIs, but the CAMARA APIs in a way, that a developer can go and look, and test and try in a playground or sandbox, the various APIs, so that they can get a jumpstart even before talking to us about any sort of commercial agreement to leverage that. So, it's our way of working an appetite of those entrepreneurs or innovators and developers, to go and innovate.

James Crawshaw: Got you, perfect. Okay, We've got some questions now from the audience, and, one of them, we can try to answer. But you might need to come back with a follow up to elaborate a little bit. I'm not quite sure what the question is, but it's something to do with IoT and edge communications and compute, and it's something to do with factories and logistics. I guess, maybe the question is, "Do you see an opportunity here? Any use cases, any applications for Network APIs that could perhaps, solve problems for industry using some sort of IoT or edge capability? Is that something that you've come across?" Stephanie, Joe, Vikram?

Stephanie Ormston: I can take that one. Yes. Again, you know, when we talk about these Network APIs, component level can be bundled, can be added on to things. And so,

for the IoT space, what gets really fun and interesting is how can we layer these network APIs on top of other offerings or how can we bundle these other APIs with things like compute that might be provided by another provider. But, we go to market together in a way that is, with the customer problem and with the customer intent in mind, logistics, manufacturing, supply chain, all of these, again, you think about the opportunities you have connected devices, you have backhaul, you have compute, you have SIMs, you have all sorts of things that AT&T and, our ecosystem of partners are very well-positioned to put together offerings on. And so, to really this conversation and, to the commercials and to the go-to-market, in some cases, the customer might not even see the Network APIs.

They might not know that they're there and they might not have to. They might get a dashboard that just has everything there for them. And, they might just get alerts to a mobile device that says, "Hey, one of your, you know, one of your devices is acting weird out in the field and you need to go attend to it." All of those would be powered by the Network APIs, But, the customer doesn't know that and they don't need to know that. If that's not, you know how deep they want to go into the solution. and so, it's all about the ecosystem. Then, the things that, you know, Vikram talked about as well, that piece together, the right model for the end customer.

James Crawshaw: Got you, perfect. Thank you. And, by all means, follow up. The person asked that question, if we haven't addressed your point. Okay. The next question is, well, we talked earlier about these APIs that you mentioned being pre-commercial. So, when do you expect to actually launch these? Stephanie, Joe. If that's not giving away too much.

Stephanie Ormston: I can't give you any specific answers on that, but I would say, you'll see some motion happening over the next, next couple months into 2025.

James Crawshaw: Okay. That's precise enough. Thank you. Okay. Next question, from a developer, and they're working in the financial services sector, and they're interested here, what would be sort of the key capabilities or Network APIs that would be useful to them, that they don't already have access to? And, anything that sort of springs to mind, any new use cases or capabilities that could be of interest in the financial services space?

Joseph Torres: Yeah. James, I'll take a crack at that one. So, I think you covered it in some of the use cases you talked about, right? I think it's, specifically around security. I think, there's not a month that goes by that we don't hear about some sort of security incident. Just this week, I have a neighbor that was attempting to get phished by a fraudster, and was, you know, really concerned about that. So, I think, as a neo-telco or a telco or a neo-bank, or a fin company, the importance of security is, certainly, in play there. Knowing the customer, and giving them a level of assurance of that. I think, there's also some location-based advertising that could be in play there, as a customer is getting

close to a financial institution. So, I think there's multiple opportunities for that developer to say, to think, the art of the possible relative to, okay, I have this embedded app that I've created. How can I put some of these network capabilities into that?

James Crawshaw: Very good. Thank you, Joe. Okay, next question here. This should be an easy one. Again, from a developer who's looking to figure out where is the best place to get started working, learn, experiment with these sorts of APIs. What's a good place to learn?

Joseph Torres: So, I think in one of your questions, you kind of hit on it. We have the MVNX developer portal I know, beyond that there is a broader enterprise level of the AT&T Developer Experience that allows developers to just go out there and see what connectivity APIs are available. So, I think that would be the first step for a developer, to just explore some of the capabilities. and then, when you start to go through some of those use cases, I'm sure they're going to be able to innovate on how they embed that into their technology stack.

James Crawshaw: Thank you. Joe.

Stephanie Ormston: developer.att.com That's what I would say.

James Crawshaw: There you go, in go the URL. Next question, from one of our audience. Do you consider the concept of a network operator like AT&T connecting into multiple aggregator platforms as well as your own platform marketplace portal in order to reach more developers? I guess, the answer is yes, you are. You are going to use all the routes to market. I think, we discussed that right, Stephanie? It's not just, it's not just the MVNX that Joe has been talking about. You'll be working with partners, trying to expose these capabilities through whatever means necessary, to get to as wide an audience as possible. That's right. Yeah?

Stephanie Ormston: That's the way that I would think about it. Yeah. All options are on the table at this point. Like I said, with our Network API Accelerator Program, we're learning. and so, we're learning what developers are looking for and through that and through those conversations, that'll help guide us as to the right routes to market and as to maybe even where we start. and then, where we can expand from once we gain the right amount of traction.

James Crawshaw: Very good. Okay. I got a question here. This one's kind of high-level and strategic again. Do you see all of this leading to a source of convergence of connectivity offers service and experience where every company can become an embedded wireless company?

Joseph Torres: Yeah, absolutely right. I think, if that wasn't a softball question, James, I don't know what was, but, you know. Absolutely, right? Connectivity is not just about this anymore, just connecting this, it's about the embedded connectivity of the app, in that in this device or the computer that I'm looking at, or the platform that I'm leveraging, or the IoT device that's connected somewhere. So, absolutely.

James Crawshaw: Fantastic.

Vikram Srivats: Yeah. The only thing I'll add to that, is, there's a parallel, James, in the financial services world. When this thing, about banking as a service started about 3 or 4 years ago, and then, obviously, that was from a standpoint of financial services being offered via APIs. So, it was not just banks you do financial services transactions with, but you do it with any company. And, the other face of banking-as-a-service is embedded finance. Basically, that finance sits in the experience that you have and that world is, exactly, shaped out in ways that, you know, you could go, an Uber driver could, access his or her savings account via Uber. Why would they go to their bank? So, we see those kinds of converged experiences, at the intersection of brands, corporations, service providers, what have you and I have talked about ISVs as well. So, all of that is just waiting to happen once we simplify, once we abstract, and we offer this sort of capability to developers. And again, like Stephanie said, there's no one definition of developers, but that's why you need to have a sort of a, you know, sort of a very, very, open approach to like, you know, creating this, abstraction and layers of abstraction.

Sometimes, you may just build a complete application that one set of developers just want to customize and take it to market. Somebody else would like to access a component library and compose their applications very quickly. Some developers would say, just, I don't need all of that, just give me the APIs, I know how to work with them. They might want to do that as well. So, you need to have different layers of that so-called, you know, enchilada. Right? To be able to, offer that to the market.

James Crawshaw: Very good. The enchilada! It's a fitting end to the discussion, Vikram Well, that's pretty much all we have time for today. If there are any follow up questions, then we'll try to get back to you via email. We will also have the slides that will be available for download. It just remains for me to thank our speakers today, Stephanie Ormston, AVP Digital Services Integration with AT&T. Joseph Torres, Director of 5G Service Design and Lifecycle Operations with AT&T. Vikram Srivats, Chief Commercial Officer and GM Americas with WaveMaker. I've been James Crawshaw, your moderator and Industry Analyst with Omdia. Thank you everyone for taking part, and thank you to our audience for the great questions.

Stephanie Ormston: Thanks for the time today.

Joseph Torres: Thank you.

Vikram Srivats: Thank you.

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WaveMaker, Inc. is a privately-held enterprise software provider that offers an open standards low code, modern platform for professional developers building high-stakes custom applications and platforms with composable experiences. As the only top-tier Java-tech stack, low code platform that generates real code, has zero lock-in and uses a developer seat licensing model, customers love WaveMaker for its flexibility, low risk and low TCO. Headquartered in the Dallas-Fort Worth metro area and with customers in 17 countries, WaveMaker powers large enterprises and ISVs who are building API-driven, consumer-scale, enterprise-grade web and mobile applications and software platforms.

Write to us at **info@wavemaker.com**