



TomTom Azure Maps

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List of MAIN speakers	Company	Job title
Chris Pendleton	TomTom	Head of Azure Maps – Microsoft

IMAGE

Chris Pendleton
Head of Azure Maps – Microsoft

Thank you. I want to thank TomTom for inviting me to stage. This has been a very lucrative partnership for Microsoft.

Azure Maps Slide #2

I've been in the map space for 20 years now, varying degrees of impact across the company. I've been at Microsoft for 17 years and three years at the company prior to that and so I can fully appreciate Alain's presentation. The ability to make maps is hard in it of itself, but the ability to make them fast and keep them fresh – It's exorbitant in terms of resources, cost and the amount of data required to actually keep them up to date. And so, just to give a little bit of history, a few years back, I ran the Bing Maps data ingestion team. So, I was responsible for keeping Bing Maps data up to date and we would take quarterly drops from our provider and it would take us anywhere from six to nine months to get that data out.

And so, if you do the maths, you get a drop every three months and then it takes six to nine months to get it out, so we miss one or two drops in the process. It didn't work for us. And so, the product of Azure maps was created effectively for two reasons.

What is Azure Maps? Slide #3

The first of which was to bring location natively to the Azure cloud. And so, in our conversations at Microsoft in terms of competition, we talk about the three clouds that are currently in competition with one another.

Azure Maps is natively integrated as a first party product of the Azure cloud. And so, when we talk about Azure, and all of the Azure wins, we are talking about location through Azure Maps. And so, as you start to see these wins announcements coming through Azure that include location and effectively Azure Maps, we are effectively talking about TomTom.

As Andrew's mentioned, we struck this lucrative partnership that brings TomTom's APIs to the Azure cloud, and we wrapped those up and made them a part of our platform. And so, this is the definition that I wrote for documentation. It's super nerdy, but basically Azure Maps is a collection of location technologies for Azure customers.

As Azure grows, our location capabilities need to grow and keep up with our customer needs. And we want to make that simple for our Azure customers to use. And the way that Azure works is you actually subscribe to a pre-committed amount of Azure and then you start spending against that commitment.

And when companies start to look around over the one, two, three, five-year commitments and they see Maps there, it's a pretty easy decision because they've already pre-committed for amounts that they need to spend and so they just go to our portal and they start using Azure Maps. In fact, somebody on my team is dedicated to every morning looking up and seeing who our new customers are, because every day we actually don't know until we look up the report and there's no negotiating for us.

We don't get pinned against Google Maps anymore. It's an Azure discussion. It's higher level. And so, Azure Maps is the native location platform for Azure and the Azure ecosystem. We actually sit inside of Azure IoT organizationally and within Azure IoT there's a group called Azure IoT Mobility. Azure IoT Mobility is made up of the Microsoft connected vehicle platform and Azure Maps.

MCVP: Digital Chassis for the modern ecosystem Slide #4

So that gets me to the second part of why Azure Maps was created and that was to power a direct vertical integration into the automotive space for the Microsoft connected vehicle platform.

And, last week, two weeks ago, ten days ago... We announced that TomTom's native integration with their navigation kit would be part of the Microsoft connected vehicle platform. This is a significant move. The connected vehicle platform brings edge computing into the vehicle.

Edge computing means it runs in the car. It can actually run AI in the vehicle. It can make decisions in the car and it's trained by cloud computing. You get data, you put it in the cloud, you train it, you install modules in the car, and now things are happening in the car. We call it the automotive edge.

And Azure Maps sits quite nicely right in that ecosystem as well, but it is an ecosystem play. We are inviting other partners to participate in the Microsoft connected vehicle platform, TomTom being one of those prominent. And so, Azure Maps is a horizontal set of location APIs or services for Azure customers and a vertical integration for our connected vehicle platform inside of Azure IoT.

The Rise of the Location of Things Slide #5

I decided to include the customer presentation deck that we give executive briefings. We have an executive briefing centre at Microsoft. Everyday dozens of executive fly from around the world to Microsoft and we treat them to a day of the products they want to hear about and so this is a significant portion of that deck.

It's really long and technical but I decided to focus on some of the more important facets. I mentioned we're an Azure IoT team. I've been speaking about this Location of Things concept for the last year, and it's effectively IoT plus location. So, IoT has this proliferation of devices and when we talk about IoT inside of Azure, we talk about these three stages where you've got device sensors, the actual devices that are sensing things, and that data comes up into the cloud and with that data you can generate insights.

So, you've got present sensors in room so you can know that certain rooms have people in them. You've got thermostat systems and houses. You've got thermometers out in fields. There's a slew of Azure IoT scenarios that generate a number of data insights, and what we do with those data insights, what our customers are doing with those data insights, are then making data-driven decisions.

And if we do this fast enough, there's a fourth stage and that is predictive. So, once we have enough data and we've generated enough AI, we can start to predict what's going to happen based on machine learning. And so, the Location of Things gives you that important piece of information as to where is it happening.

I can tell you that there's a field out in the Eastern California that is too dry based on the thermostat and the weather patterns and the sprinkler system needs to turn on. But that's just one piece. Where is that sprinkler? Which one is it? What field does it cover? And that's where the geospatial facets come in. And when we talk about mobility, we talk about fleet management.

Managing where trucks are at any given time. These are IoT mobility scenarios and how they come to life.

The Location of Things Slide #6

And this is an actuation. So, I think this is as technical as I'm going to get for you. But the idea here is that if you take telemetry from a vehicle, of course that means the vehicle is connected to the Internet and the Internet can publish that data to the cloud, you publish those messages up through IoT Hub. IoT Hub is one of the core products for Azure IoT. It basically can receive messages from devices. From IoT hub we have a listener and event grid for changes.

And in this particular scenario, what we're looking at is a geo-fence. Geo-fence is an invisible fence around a particular area, and we've just fenced off this particular area so that when the truck leaves the fence, we get a notification. It sounds simple, but it's actually built-in geography. Its built-in mathematics.

And so, we need to know where the truck is at any given time. We need a pulse for where it's going, where it is. When it's there, we get a pulse reading and then as soon as it is no longer inside that polygon, an alert kicks down through an Azure function, kicks off alerts through event grid. These alerts could be text messages or a sequence of events after that in programming languages that can then do other things: notify the driver that he's off route, whatever other things you want to cascade after this.

And Azure Maps brings the canvas, which is powered by TomTom, and it brings the geo-fence which is the geo-spatial representation of that invisible area. And then the data gets dropped in blob storage. Blob storage basically means I'm going to use that later, probably for training purposes. I want to train some machine learning later, create some AI.

A platform of geospatial APIs for the enterprise Slide #7

So, I have an iconic slide just like Andrew's did. He mentioned we've done some things as well. So, when I present this slide, we've got a robust offering for Azure Maps and Azure customers. We've got maps and satellite imagery. The Maps are powered by TomTom. Every map TomTom has, I have coming through Azure Maps.

The SDKs. Our SDKs. We actually built these on open source. So, we took web SDKs and rolled them and we're pulling in TomTom services through the web SDKs so as Azure customers are taking Azure Maps SDKs, they're pulling through TomTom services. Routing, Anders covered this, didn't do it justice. There's so much complexity in the routing API that TomTom provides.

Shortest and fastest is the simple ones but also route optimisation. So, give me a bunch of points. Tell me the order in which I should go through them. The isochrones which is how far can I get in one minute from here, in five minutes from here, in all directions. It ends up creating a polygon. Electrical vehicle routing, all of the turn restrictions are included. There's a multitude of scenarios. In fact, I have a huge slide that has all of the routing capabilities: taxis, HOV lanes, vans, bike routing.

All of this is included in the routing API powered by TomTom. The search API is everything that TomTom has in their data corpus, I could search for it. Every address, every point of interest, business listing, every landmark available to Azure customers.

The spatial operations is a unique thing to Microsoft. We actually built this, and it includes our geofencing service. So, we're routing out the portfolio of offerings from TomTom with some additional capabilities. This gives us spatial analytics so that we can plug in different data sets and do analytics based on spatial information.

Anytime geography comes into play, we use TomTom. The traffic data, best in breed across the board, powered by TomTom. We get this as flow and incident data. We also get some measurements. So, if you're approaching the back of the line for any part of congestion, it will give you a measurement distance and time from where you are to the back of the line. Once you're in the line, we can actually calculate once you're going to get out of the line as well.

So, it's great insight for time management. Time zone API. This was actually a pretty popular API for Microsoft. We built this for the Windows team who wanted to get off of their own time zones but if you give us a point in the world, we'll tell you what time zone you're in, the offset to GMT, as well as the actual time there. The wall clock time. We just introduced sunset and sunrise times, so you can automate IoT scenarios as a part of that too.

We have a geo-location API. It takes an IP address from a computer. That could be a phone, that could be a PC, and we'll tell you what country that locations coming from. Mobility is actually an additional partnership we did with a company called Moovit out of Israel. So now you can see there's a partner ecosystem at play. We are very partner led in Azure Maps when it comes to this rich deep content and intelligence within the industry.

And so, while TomTom brings these rich data and services, the freshest maps, Moovit does the same thing for transit mobility and so in fact our partnership has extended beyond and now the three of us are talking. And so, we actually announced earlier this year the first multi modal system that crossed both transit and road graphs. And so, a unique offering coming through Azure Maps.

And then data storage, if you wanted to store your data in the Azure Cloud and use it with Azure Maps, you can use it with the Azure Maps data storage.

Applications of Location Intelligence Slide #8

And so, there's a myriad of applications. You can imagine, Microsoft has access to quite a developer ecosystem and so this developer ecosystem is building a multitude of applications, ranging anywhere from mobility, fleet and logistics to IoT scenarios, inclusive of indoor maps, facility management, cloud, mobile edge computing.

All this is happening through the power of Azure Maps and location and then spatial analytics and AI. This is also part of what we're seeing as the developers who are building on Azure and using location,

are building our super-rich cutting-edge type applications and technology. As we go along this journey, TomTom is just coming with us.

IMAGE Slide #9

And so, these are just some of the headlines have come. I want to always confirm and re-institute the fact that we decided to not make Maps. It was really hard. I've been at Microsoft 17 years and I was in charge of MapPoint web service, I was in charge of MapPoint the DVDs. I was actually responsible for killing those.

I'm sorry. A lot of people love those, but we had to change our business model. DVDs were going away and we needed to keep up. I was with the Virtual Earth team when we built 3D and had weekly reviews with Bill Gates. I was part of what became Bing Maps and to this day, the Bing team is still licensing data, ingesting data, and now they're working on how we ingest TomTom data to make Bing's search rich, to make Cortana smarter.

So, we're actually using both products: the uncompiled maps for Bing, because they have to ingest it and train rankers inside of the Bing search engine, and we're using APIs directly for Azure Maps.

Azure Maps Built for the Enterprise Slide #10

And we're also very enterprise ready. This is an important facet in 2019 and it will get even more critical moving forward. We talk about enterprise ready. We talk about enterprise scale. As our customers grow, we grow. Elastic scale is not a real thing. It's just a concept, but with our partnership with TomTom, we've been able to scale. I said we wake up every morning and see who our customers are. Our customers could unload on us 1,000 QPS, 2,000 QPS overnight and we need to be ready for it.

And that's the enterprise scale we're talking about and so the infrastructure that TomTom has built on Azure is actually scalable too. They have to scale with us. We treat them as a backend engineering team. Globally available. So, this is accessible to all the customers that Microsoft has around the world. We talk about trusted security services.

When I joined Azure Maps and I launched the product, I had to go through a plethora of trials by fire, if you will. 375 different tasks for compliance, security, accessibility, usability, privacy. We are fully supportive and check down all the boxes for compliance in Azure.

And then the pricing itself is super competitive. I mentioned we can lean on enterprise agreements. So, as customers are signing up for Azure, they have a menu of options that they can go choose. And Azure Maps is right there waiting for them. They can select it and start using it immediately. They don't have to talk to me. Much like Andrew's, you don't have to talk to me, but you can if you want you can just start using the service.

And so, it's been a big win inside of Microsoft. Our growth is significant. It's a 200% month over month in terms of customers for Azure Maps specifically and we only made it generally available at May of last year, and so the uptake has been significant. We're going to continue to grow. We're going to continue to innovate and I will continue to push requirements on TomTom to keep their engineering team on their toes as well.