TASKTOP

Episode 25: Rene Te-Strote
Episode Transcription

Mik Kersten (00:06):
Hello, and welcome to the Mik + One podcast where I sit down with industry leaders to discuss the project to product movement. I'm Mik Kersten, founder and CEO of Tasktop and bestselling author of Project to Product, How to Survive and Thrive in the Age of Digital Disruption with the Flow Framework.

Mik Kersten (00:28):
Joining me on today's episode is Rene Te-Strote from BMW Group. Rene's responsible for the IT side development of the vehicle simulation at BMW Brilliance Automotive in China, and has been representing BMW as an innovative tech company in an agile world for several years at international events and conferences. Rene is actually the main character featured in Project to Product, so you may recognize the name.

Mik Kersten (00:48):
He has some amazing stories to tell and just an incredible track record in building an infrastructure for innovation at the scale of BMW's IT operations. I'm thrilled to have him finally joined me on the podcast. So, with that, let's get started. Rene, welcome to the Project to Product podcast. It is so great to have you here.

Rene Te-Strote (01:08):
Hello Mik, thank you very much. It's a pleasure to be here.

Mik Kersten (01:10):
And for those who don't know the name Rene Te-Strote, there is one main character in the Project to Product book, in that narrative where we're walking through the plant and I'm learning so many inspirational things, and that character is actually Rene. So I could not be happier to have him on the podcast and just to share some of the learnings that I've had from Rene, not only on that plant trip, but actually over many, many years where he's applied the lessons of cutting edge development of cars - as Rene told me many years ago of these things that were becoming computers on wheels with - ... Rene, how many lines of code does the i8 have currently?

Rene Te-Strote (01:47):
About 100 million.

Mik Kersten (01:49):
Yeah. And then, this is even before we think about all the mobility services and autonomous and everything else. So I've continued to talk regularly with Rene, again, learn more and more with the cutting edges. And I'm just really excited that he's going to share that with us today. So, Rene and I met actually back in... it's been a decade, Rene. It was HP Discover in Vienna in 2011.

Mik Kersten (02:09):
And I'll never forget the meeting because I think the first thing that Rene told me is that he's got this big problem in terms of getting visibility at scale for the entire software supply chain. And then Rene, you said, "Look, budget's not my problem. Compute's not my problem." A decade ago, you were able to get all the VMs that anyone could want with 99 cores, 380 gigabytes of Ram per VM. I'll never forget that, but the problem was actually getting visibility and then integration at scale for the entire software supply chain.

Mik Kersten (02:39):

So Rene, I will get you to tell us about what kind of machines you can procure now. And I know you're working with many, many more, tens of thousands of cores when you're working with simulation. But before we get started on that, tell us how your career began; how you started working actually not in the IT side, but with plants because I think so much of the perspective that you've shared with me that I've learned so much from actually comes from the evolution of your career and how you actually started on the manufacturing side. So just tell us a bit of your story.

Rene Te-Strote (03:09):
Okay. Yeah. Thank you, Mik. I started my career in BMW in 2005 in the brand-new vehicle production plant in Leipzig, and it was the newest BMW plant. And at that time, it was the most modern and sophisticated vehicle plant in the world. In that plant, my job was to run and to develop IT applications and systems for the quality assurance of the vehicle development.

Rene Te-Strote (03:40):
We were always faced with the challenge that we have a huge number of jobs to do with a very low number of people. Everything we did was focused on efficiency and automation; everything we can do to enable the people to focus on their job, on the what and not on the how. And this was a big focus.

Rene Te-Strote (04:03):
And at that time, we started to develop brand new applications for the BMW worldwide quality assurance of the vehicle production itself. So we provided that application as a service for all the plants worldwide. And then after more or less four and a half years in the middle of 2009, I switched to the BMW Central IT in Munich.

Rene Te-Strote (04:31):
And right at that time, at that point, I took over the IT responsibility for the whole application landscape of the so-called ECU development for electric electronic. That was, Mik mentioned before, E/E means everything that works with power. The electricity in the car, so navigation system, brakes, airbags, things like that. Then I took over responsibility for IT Landscape, which was at that time, very much struggling with the size.

Rene Te-Strote (05:10):
So we had huge systems with tens of thousands of users, gigabytes and gigabytes of data in the databases and terabytes of data as attachments and local storages and things like that. And the problem was we had a lot of local workarounds to solve this and this and this problem, and we never had a clear overview over the whole process, and nd what's going on during the whole process.

Rene Te-Strote (05:42):
To get that overview over the quality of the software that meant we had to do a lot of manual work. Let me say today, we would call that no Flow Framework or something like that to automate our velocity and to monitor everything going on. We had no chance to monitor and to ensure the quality from end to end in a very efficient way. We did it, but with a lot of manual work. And my challenge was we have a lot of performance issues, in the future, we will not have that many people in that process and the complexity in the car is growing and data is growing and everything is growing, growing, growing and growing.

Rene Te-Strote (06:26):
Infrastructure wasn't my problem and budget wasn't my problem, problem was I need new sophisticated solutions for the future. And that was the point where I met Mik, but this is the story for after. And then

from time, I was IT project lead active in the so-called BMW ItO, Idea to Offer, that means the vehicle development. So the IT which is responsible for ItO.

Rene Te-Strote (06:57):
After some years when we solved the biggest problems, I gave the job to someone else and I took over different jobs. At the moment I am faced with new challenges in terms of China and simulation, it's a very huge area as well with new challenges. And for that, I need new and more sophisticated solutions to increase everything, what we learned in the past.

Mik Kersten (07:25):
Okay. Rene, I actually do want to get into that, but I think the key thing that... It's so striking to me is that you've been actually solving this problem, and solving it really effectively, over the course of an entire decade, right?

Rene Te-Strote (07:41):
Yeah.

Mik Kersten (07:41):
Many of our listeners probably saw the story in the Wall Street Journal recently about the Volkswagen ID.3 debacle where a $50 billion project to compete with Tesla went off the rails because of software. And actually some of the things that you were coming to me with, again, a decade ago now, are exactly the solutions that are needed to create these highly complex cars with dozens or even more analysis; some cars have over... we're getting between one and 200 ECUs on these cars and even more and more software running and powering the entire driving experience and mobility experience.

Mik Kersten (08:19):
The thing that I've noticed consistently over the years is the way that you've been innovating and pointing the organization in the right direction. I think starting, as you said, with making sure that the plant, this is one of the things that you may not realize is that I think this will be a key theme on this podcast, one key product's the car, another key product's the plant and the entire process of manufacturing, designing, delivering and updating the vehicle itself.

Mik Kersten (08:45):
So you've actually had this from my perspective, these lean principles around having that kind of visibility, let's say of quality in the plant and providing that to every BMW plant. The thing that was so novel to me back then is you actually wanted visibility across the entire supply chain.

Mik Kersten (09:03):
It wasn't okay that some supplier was to blame for some particular problem with the car. You've always had this approach of getting visibility end to end, and always looking at what the constraints to that visibility were, was it a tool constraint? Was it the fact that this is a very complex supply chain?

Mik Kersten (09:19):
And I think that the key thing, because of course, what we're talking about here is helping organizations modernize from where they are today. It's not like you had a greenfield scenario like Tesla, you were actually doing this over an extremely complex and mature organization instead of factories and cars and product lines that were never actually designed around this.

Mik Kersten (09:37):

So can you just tell us some of the principles that you've applied across this journey? Because the bottom line is, I think I see it today, the efforts that you started 10 years ago and eight years ago, and five years ago, and four years ago have actually helped BMW Group end up in a much better spot than so many automotive manufacturers are today.

Rene Te-Strote (09:58):
To your first point, the problem that we can see in the Wall Street Journal today - that is what I saw 10 years ago, the growing complexity. And I say, "Okay, at the moment, we are able to handle that with how do it today." So at that time, I was sure that we will not be able to handle that in the future in the same way. So the complexity is growing, lines of code are growing. The supply chains are growing; there're more and more suppliers and sub-suppliers and sub-sub-suppliers and things like that. And I always have to consider about the end-to-end thing.

Rene Te-Strote (10:32):
And 10 years ago, we wondered how to solve that. And we must act now to have a solution in five years. So for when the next step will come up and things like that. And that's the reason why we try to... In Germany, we have some pictures or pictures and words for that. If you have a lot of sheep’s and the fence is broken and in the morning you want to feed the sheep’s, then you have to go outside and then to catch all the sheep’s into the way you want to feed them and then you can feed them. And the next morning you have to do the same.

Rene Te-Strote (11:04):
And I told them, "Okay. We want to stop to catch the sheep’s every morning. First we fix the broken fence so that they are where they have to be." That was the promise that I gave out to my team and said, "First, we fixed the fence. And then we try to make the fence flexible that we can change the area where the sheeps have to stay." And this is as a picture and we did that 10 years ago, now we can earn the fruits of that, we can harvest the fruits of that.

Rene Te-Strote (11:38):
This is what happens. Let me say what we did there at the time, since then we did that, like you said, in an endless loop again and again and again. So it came up to a template of what we did in the last 10 years. And for that, we changed a lot and the plant Leipzig is a good example for that.

Rene Te-Strote (12:01):
The first time we built a plant completely different to all the plants we had before in the past. So, we had some very historic plants with some buildings on it and assembly lines, and then we need now this. And then another building was built there beside this and this and this. And then it was very distributed and a little bit chaotic and with no real plan behind that.

Rene Te-Strote (12:24):
And in the new plant, the first thing was, "Okay. What is the result we expect from this plant? What's the product we want to generate with that? Then we built the whole plant for that, what needs to be done there including some flexibilities to provide scalability in the plants to increase the production and to build more cars, or then potentially let's say to build digitally bikes or whatever," but we never did, but potentially we could. And that's how we build our plan. It was completely influenced by lean principle and to build as much cars as efficient as possible with as less people as possible and with the highest quality of what is possible.

Mik Kersten (13:16):

Yeah. And to me, as you invite me to this plant where you started your career, the plant Leipzig, I think for me, it really was one of the most transformational experiences of my entire career. And I think some of the things that you hit on, I think are just so profound, which is the plant was thought of as a product and the plants supported an organizational transformation because as you told me, the i3 was actually developed in half the time of previous models and the plant as a product supported this.

Mik Kersten (13:44):
The modularity of the plant, the fact that the plant can be extended to extend manufacturing steps or the i3 line can be reconfigured through software because it's got the software platforms instead of rails; the autonomous... What do you call them again, the autonomous platforms that then move along the line?

Rene Te-Strote (14:00):
The FTS.

Mik Kersten (14:02):
Yeah. So it's just absolutely incredible. A lot of it was obviously described in the book, so I won't cover it again here. But this plant actually achieved that business goal, developing that car in half the time. And again, this is something that I think is in terms of the foundational principles and the first principles by which BMW Group delivered this. I just really want to highlight some of the ones that I think to me made the biggest impact on how I think software and mixed software and hardware meet the scale, this has been your approach.

Mik Kersten (14:29):
So one of them is obviously thinking of the entire manufacturing process as a product and understanding those value streams. And then we already know how to get very good visibility for manufacturing lines, but what you enabled BMW to do is to get end to end visibility and traceability for software. And not just for software of a team working here, not just the inverter team working over in this building over here but actually, I think the fascinating thing is what you enabled is visibility for software across the supply chain.

Mik Kersten (14:59):
And if you look at that, the problems that others are experiencing, like the Volkswagen ID.3 problems, it's exactly these kinds of things where it's the lack of integration, lack of traceability, lack of traceability of course exposes you to more things like diesel gate, less good visibility and the rest. It is fascinating me that actually you solved these things.

Mik Kersten (15:18):
So I think from what you've done and what you've shared, and then some of the presentations you've given that I've seen, organizations that want to do this actually have a blueprint for how to achieve this kind of end to end visibility and traceability.

Mik Kersten (15:30):
So just to shift gears just a little bit, another thing that I know when you first told me this Rene, it must have been five years ago, but with this goal of reducing the development time, accelerating innovation, that was really BMW Group achieved with i Series, you said, "We have another big bottleneck."

Mik Kersten (15:50):
And the big bottleneck, because again, in the kinds of lean in systems thinking that's so natural to you. You told me, "Well, the problem is we have to build physical cars in the car development process." And I

said, "What are you talking about?" And you said, "Well, these cars cost hundreds of thousands of euros to build, and it takes a long time to build them and we need to make it all software."

Mik Kersten (16:11):
So to me, this was a pretty profound thing. And as I actually see the Agile and DevOps communities really now trying to understand how to accelerate the speed of innovation in an industrial context, where you've got these physical devices. It's not Netflix, you've got these cars or ships or planes or IOT devices out there, again, many, many years ago, you actually started the charts to bring BMW to apply these principles of software to the design and manufacturing process itself.

Mik Kersten (16:39):
And I'll never forget the thing that you showed me was actually a fully simulated and actually video rendered drive of a car to test the suspension and so on. And so just tell us a bit, because I think this is actually quite a novel thing to many people, but I think it will be one of the most transformational things that we see in mixed hardware and software development over the coming years. And again, you've already got this up and running.

Mik Kersten (17:02):
So tell us a bit about your journey and how you discovered that simulation was actually going to relieve, because this is back to your fixing the hole in the fence, Rene, and automating things instead of doing things manually. Tell us about your journey with simulation.

Rene Te-Strote (17:17):
My journey with simulation began a little bit funny, let me say, what I mentioned before when I was a responsible of [inaudible 00:17:25] then were faced with a second challenge that in the IT team, in the project team, we had to bring out in very short times a lot of new versions of the single pieces of our software tool chain. So for example, we had interfaces around the quality center and to integrate delivery suppliers then data transformations, ETL Pros, whatever. There was a lot of development work going on.

Rene Te-Strote (17:53):
And then, before I took over the responsibility, all the deployments and integrations were done manually; each part and each component team did it for itself. So there was no central steering option; every team did it how they thought it's the best thing. Then I changed to let me say the central steering of them. And then, we set it up the first time Jenkins servers as built servers and then I integrated the whole deployment.

Rene Te-Strote (18:26):
I ordered the sub teams to integrate it there and to run all the deployments over that Jenkins and to connect the slaves on that. But that was the first time where we said, "Okay, we have step-by-step and overview of what's going on in total, on deployment jobs." And then I integrated the test automation and I'd say, "Okay. I want to have everything test automated and I want nothing to do to be deployed in production without test automation that I can be sure that the base functionality is going right and it's working. We always can find some issues and bugs, but this must be minor bugs not major bugs."

Rene Te-Strote (19:07):
So this was the first change of the mindset of the whole people. It was a bit stressful because a lot of people don't want to do that. "No, we can do that by our own. And we don't need a central steering and central organization of that." And they talk, "Yes, yes, yes. We will do that." "You have to do that."

Rene Te-Strote (19:24):
And then, it was a pretty funny thing. I presented that whole chain, then we had the first versions of end-to-end integrations or someone is putting in the beginning of the line of tool chain new piece of software near it and then automated deployments, test automation and then deployment into the production system. And then, "Okay. We can see it's down here by this, this, this, this is how they can deploy."

Rene Te-Strote (19:49):
And then I presented this in a management meeting and someone asks me, "Does it matter if this is software or something else?" And I asked him, "What do you mean with something else?" "Can it be something else?" I said, "Make an example for that." "Yeah. Let me see, instead of producing a piece of software which is compiled, can we integrate their let me say video rendering or things like that?" "Yes, it's a software which runs job and probably, I guess, yes. Let's test it out."

Rene Te-Strote (20:24):
And then we made some more meetings and then people came to me, the engineers come to me and said, "Yeah, we have here some jobs on a simulation platform, which is simulating driving dynamics. And in that case a simulation of a new car on a rough road. And this is at the moment of manual process." "Okay. Show me, give me more details."

Rene Te-Strote (20:48):
And they told me, "Okay. We have here a list of parameters where we have currently in Excel, and then we upload this in the platform. And these are the functional data to set up the simulation model we have in the platform. And then we start manually a simulation calculation and it takes several time; in smaller models some minutes and big models two days. And then we have to look, is it ready? Is the run fulfilled and just the result formal correct? And then we have to create and run scripts to check the quality of the results."

Rene Te-Strote (21:33):
"Ah, okay. And what do you do then?" "Yeah. And then we put this model into another model to run a bigger model, and then the loop is starting from beginning again." And then I wondered, "Okay. That looks like a normal software development process, but the result is not an application. The result is a simulation. And then there's an option to visualize the simulation. We can generate a video of that. So, to demonstrate that in management meetings or something like that, to make it visible, what's the result?"

Rene Te-Strote (22:07):
And then we started to integrate for that. It was at that time, the simulation tool CarMaker and we integrated in that. And then at the end of the day, we had a completely integrated with a simulation toolchain in there. Integrated in the normal software development chain. First was we can collect data and then the Excel file and the functional data I mentioned before. They stored it in Subversion at that time or today they would do that in Bitbucket, I think, but at that time in Subversion.

Rene Te-Strote (22:42):
And so we checked it out from there, put it into the simulation model in that platform and we would be able to remote control the CarMaker to create the deploys and the compiling of the simulation model. And then they run these proofs and checks and script they had. It was a bit like test automation to check it out if it's right or not. And the end result we generated that video was... We called that so to say the product of rollout. And that was nothing else, it was the same like one we did in the IT, in the software development team, but with other tools and a little bit of different handlings, but the result was the same.

Rene Te-Strote (23:25):
And at that point we used the first time regular IT methodologies to improve the engineering business job. And then we considered, "Okay. What can we do else with that?" And then step by step, it was getting more and more sophisticated. In my job today, what I have, the IT responsible for the simulation buildup in China, we do the same.

Rene Te-Strote (23:51):
On one hand, we have software development teams where we have to produce and to deploy and to roll out software in Germany and in China. And we do the same for providing the simulation data, the functional data, the data models, simulation models, and things like that. We are using exactly the same methodologies. And we don't found that we all knew. We are using that, what we knew and what is very sophisticated and very much proof to the past, which is very good use in the IT industry. This is the same for us there.

Mik Kersten (24:27):
Yes, Rene. And I think when you first started doing this, first took me through it, you had a high-performance computing center in Iceland, and you said it's really convenient to have it in Iceland because you just roll down the windows and the core's get cooled, it's sufficiently cooled, but the way that you've scaled it is just incredible to me now.

Mik Kersten (24:45):
Actually, I want to dissect this journey a bit because I think it's so important, but just tell us quickly where your high-performance computing clusters now in terms... Give people a sense for the amount of simulation that's actually being run. Just give us a sense and especially for the hardware geeks, how many cores, how much Ram have you gotten in there? [crosstalk 00:25:04] you had before.

Rene Te-Strote (25:08):
So we have two big HPC clusters, one on Iceland and one in Northern Sweden. And as you mentioned before, cooling is very easy, I open window and it's cooled. And Iceland has a very good infrastructure for landlines and data cables for providing the leased lines to there. And so of course on Iceland, there is I think one big note of the internet between Europe and Northern America, I think, and we can use this existing infrastructure for that. That's one reason why it's in Iceland.

Rene Te-Strote (25:47):
So in total, in these two clusters, we have at the moment around 150,000 physical CPU cores and around 10 petabyte Ram. And I don't know how much, but a lot of exabyte of storage. And there we run nearly every simulation of the BMW Group, except China. China is a different story and we can dig into that deeper later.

Rene Te-Strote (26:21):
In the past, we had a HPC cluster in Munich. At that time, it was very much smaller than it is today on Iceland. And this needed the same power as a 50,000 person city. And with all the carbon emissions and things like that, and today it's zero emissions.

Mik Kersten (26:43):
That's amazing and great to hear.

Rene Te-Strote (26:45):

Yeah. We knew the terminal energy from Iceland to produce the energy and to cool, just open the window.

Mik Kersten (26:56):
I'm guessing that there's a little bit more liquid involved-

Rene Te-Strote (26:59):
Yeah, but to simplify it.

Mik Kersten (27:03):
But yeah, it seems like a good geographical location. The thing I want to dig into here right now because I think what's so amazing is just the scale at which you are today. And that truly is a mind-blowing scale, if we just imagine the kind of workloads and models, all being simulating, what is being simulated is becoming a key part of car manufacturing at BMW Group.

Mik Kersten (27:25):
But I think what's so fascinating to me about the story and having the privilege of following the story with you and being a part of it is, it's a story of innovation. And I think it is such an amazing story of transformation itself, where you basically took lean principles to a product value stream mindset and then software, and basically it's principles of DevOps.

Mik Kersten (27:47):
You created ITs continuous integration pipeline, like you took Jenkins and then this aha moment that's so incredible saying, "Well, we can apply the principles of software value streams and continuous integrations. And then at the end, what we now call DevOps, not only to our software systems but actually to the entire life cycle of building a car."

Mik Kersten (28:08):
And I think that this is just an amazing thing because it's worked, and it's completely transformed what was a very long and slow business process. The core thing of course, is making these cars that deliver sheer driving pleasure into now a software defined and a software driven process.

Mik Kersten (28:25):
And I think across industries, this is exactly how I think business and technology leaders have to be thinking is how can we apply what we've learned in software over the last decades to transforming how we actually deliver value to customers. And the speed at which you did this, and the scale at which it's running right now is just incredible to me.

Mik Kersten (28:45):
And I actually want to dig into one thing, because when you first showed me that video, Rene, I was like, "Rene, this is just like a game, or this is super cool." It was really neat to actually see the driving. At first I thought it was flippant when you showed it to me and then I kept watching the video and you could actually see the wheels bouncing and the simulation running. And you told me that if we have too much vibration, let's say, in the suspension, we could actually automatically create a defect, saying and go to the right part in our supply chain and say, "Okay. We've got too much vibration. Let's fix this defect."

Mik Kersten (29:19):
And when you took me through, I was like, "Okay, that's completely mindblowing. We're now applying agile and DevOps for digital twin of a physical device. And we have visibility in that connectivity in the

supply chain, because suppliers are providing simulation data. And all of this has now become this flow and feedback loop. That scaling complexity, that's just incredible. And the fact that you thought to make that video to get executives excited about this, probably accelerated that process.

Mik Kersten (29:47):
So I think these patterns that you've taken of, again, using first principles, software concepts, in your case, physical delivery, and then making sure that it was done collaboratively with different parts of the organization. Some of the idea came from what you said, listening to people, but then actually showcasing the result in this really cool video that executives can forward to each other or that you showed in meetings, or however you did this. I just think it's such an amazing success pattern. So it's great to see, and I hope others seek inspiration from it.

Mik Kersten (30:18):
So now what's next? What do you see in terms of what's going to be interesting or difficult in the next 10 years? And I'll have to bring up the quote here from Mr. Diess of Volkswagen, where he stated in this, after all the problems that we were seeing. And again, I'm not trying to pick out the Volkswagen. I'm kind of trying to pick up the entire industry. A lot of organizations and not just the car industry, our economy as a whole, a lot of traditional organizations are just too slow to transform.

Mik Kersten (30:50):
The BMW Group, we've got a great example here of how you actually transform and the amazing amount of investment and thinking that had to go into this kind of connectivity, transparency, visibility, simulation, all of that. So what Mr. Diess said in this article, is that the global transformation of the industry, the car industry, will take roughly 10 years and it'll happen with or without Volkswagen, these things are happening.

Mik Kersten (31:14):
You've really helped define the last 10 years for BMW Group, tell us what you're thinking about the next 10 years looking like, because it doesn't stop, you need to continue innovating, others will continue innovating. Software is just getting more complex. Supply chains are getting more complex. Security is becoming more important, quality.

Mik Kersten (31:32):
Of course, I think a lot of what we've seen is organizations who focus on innovation without an understanding of quality fall behind. Like the ID.3 is an incredibly innovative car, the problem is that shuts off and it has all these defects that affect its consumers and affect trust. So you've actually had this perspective on both striking this balance of quality and innovation and creating an infrastructure. So, I'll stop rambling now, Rene, but tell us how you think about the next 10 years.

Rene Te-Strote (32:00):
Yeah. In the next 10 years, I think, especially in such big companies that we have in automotive industry, it's all about transformation. All the big companies needs to be transformed from former waterfall oriented companies into agile companies. And that means to transform the whole companies, not just the IT or just the development itself, it's everything; transform finance and controlling, transform procurement, transform human resources, transform sales, everything.

Rene Te-Strote (32:35):

Our end product, the car is getting more and more a specific kind of device. Years ago, we were talking about cars as computers on wheels. And in the future, we are talking about devices that the people not necessarily have to own. And it doesn't matter which technology is behind. It doesn't matter if it's an electric car. If it's a plug-in hybrid, if it's a diesel or whatever car, people need to have individual mobility. And in the future, they can choose between different kinds of mobility.

Rene Te-Strote (33:12):
And this must go hand in hand with that what the customers are used to, at home. They have their Spotify account there. They can listen to their favorite podcasts wherever they are. They have their cell phone or smartphone wherever they are going to. And for that, we are faced with the challenge of realizing a lot of huge innovations in the next 10 years or not only in the next 10 years, the next few years.

Rene Te-Strote (33:43):
For that, I'm pretty sure that all the companies, which are not willing or not able to transform and to go in that direction to become more flexible and more innovative. And the companies which are not willing or able to do so, will not exist in a couple of years. What we see at Tesla, it's a revolutional... kind of changing the industry, but it's necessary.

Rene Te-Strote (34:10):
Most of the traditional manufacturers are able to do the same thing, but in the past, they were not willing because there was no pressure on that. And why should they do that? Because no one wants to do that. No one wants to buy that. And the customer is not willing to pay money for that. And now Tesla showed us there are several problems to start such an innovation, but you consult the problems, if you are strong enough, if you are willing enough, if you have enough money for that.

Rene Te-Strote (34:45):
Honestly, what we can see here now some problems away from that. Now the traditional car manufacturers have to go in that direction and doesn't matter if it's a battery electric car or a diesel or whatever, it's a kind of new product with autonomous, with integration, with entertainment. The car is a device in the future, a mobile device. And we all have to focus on that. The innovation and end customer is willing to pay for, and all this in a high quality.

Rene Te-Strote (35:21):
The next 10 years, each company which is not willing or be able to go in that direction and to invest a huge effort and huge mindset change will not exist any longer in the past. And I'm very glad that we started agile transformation of the whole company years ago. And now we are on a very good way. We are not only talking about DevOps. We are living DevOps. DevOps in IT and in business departments, in engineering departments.

Rene Te-Strote (35:57):
And that makes my job so fun to me and I love my job. Every morning, I'm happy to start my work for this day again, because I know that's what I want to do. I'm in the right place. And I think we are on the next step of the combination of engineering and IT work.

Rene Te-Strote (36:21):
And this is what we are doing as I mentioned before, with the simulation buildup in China, where we start a real cross company and cross country distributed simulation work, it's not only to integrate an external supplier. It's really a distribution and physical distribution of work and to scale our capabilities and our skills and our performance over the world.

Rene Te-Strote (36:50):
And this is the next step because you cannot find all the specialists for simulation engineering, whatever you need in your business in one country, you have to look over the road where they are, and then you have to distribute your work there and to integrate it and always it's necessary to have integrated chain for whatever you are doing, supply chain, tool chain, whatever, but to have to transparency of what's going on and to control the quality and what you are doing there.

Rene Te-Strote (37:21):
And this is important for the next years, to run a transformation and to integrate everything, what needs to be integrated and to have control over your flows over your velocities, everything. And this is the future in my mind, in my opinion.

Mik Kersten (37:41):
Yeah. Rene, I think that is such a great, and again, I think an inspirational summing is that this journey that you've navigated from just improving, automating, increasing the flow of software for IT to that actually becoming that next phase of the combination of production and engineering and IT and software.

Mik Kersten (38:03):
I think the key thing that you're saying is that without maturity on those two things, that next step which is a transformation of the business itself, the organization becoming more agile, more waterfall and adapting its business to the way things are consumed today, which is through these digital experiences combined with devices, including large... I hadn't thought of them, but it is a mobile device, a very large mobile, that is the future.

Mik Kersten (38:26):
And I think the key thing is you can't build that without investing into the foundation, without investing for that infrastructure for innovation that you've helped create without that visible integration, you just can't get there. You can't get to that next step and you can't skip those steps. And I mean, these devices can hurt people; software bugs send people to jail. We know these things now.

Mik Kersten (38:48):
So I think again, that perspective that you have on how to create the kind of right foundation for this, I think is so critical because organizations can't shortcut that long journey that you've been on. Maybe they can get there faster. You've, I think, been one of the main innovators behind it, but in the end, they have to follow the steps that you took.

Rene Te-Strote (39:08):
Yeah, that's right. And as you can see an example of Tesla, develop the software and all the features that such a car needs to have is one thing, but to produce it so that you have a car every 30 seconds is a different thing, but it works together. And this is an experience you have to collect over decades, but don't stay on a specific point if you think, "Okay, now we are on a good point and now we can chill down. And where we are, we are in the front." But if you stop getting better, then you stop being good.

Mik Kersten (39:50):
That is a beautiful point to end it on, Rene. Thank you so much, just incredible insight from you. And I hope others enjoyed as well. I will be paying close attention to what you're thinking of next. So we'll have to have you share those thoughts again in the coming months. So thank you so much, Rene.

Rene Te-Strote (40:10):
Yeah. You're welcome. I hope we can start our next discussions in the second half of this year physically from face-to-face with a glass of wine.

Mik Kersten (40:20):
Yes, exactly. Fingers crossed for that.

Rene Te-Strote (40:23):
Yeah.

Mik Kersten (40:24):
Okay. And thank you everyone for tuning in.

Rene Te-Strote (40:27):
Yeah. You're welcome.

Mik Kersten (40:32):
A huge thank you to Rene for joining me on this episode. For more follow me on my journey on LinkedIn, Twitter, or using the hashtag Mik + One Project to Product. You can reach out to Rene on LinkedIn or on his Twitter @Rene_TeStrote. I have a new episode every two weeks so hit subscribe to join us again. You can also search for Projects to Products, to get the book and remember all other proceeds go to supporting women and minorities in technology. Thanks, stay safe, and until next time.