Welcome to the Event Tech Podcast, where we explore the ever evolving world of event technology every week. This show is brought to you by Endless Events, the event AV company that doesn't suck. Now let's talk tech.

Brandt Krueger:
Hello everybody and welcome to another edition of the Event Tech Podcast. That gentleman right over there, he is the damp Will Curran.

Will Curran:
And that over there is the swanky Brandt Krueger.

Brandt Krueger:
Yeah, and I'm so glad to be here. I'm from Event Technology Consulting. He's from Endless Events, and we are excited to be talking to you today about some relatively recent news. As part of this show, we've been trying to look at the broader technology landscape and try and envision what we think it's going to do for our events, as we move into the future. And so, Google announced that they have achieved quantum supremacy.

Will Curran:
Quantum supremacy.

Brandt Krueger:
And it's one of those things, it's like man, engineers need to learn how real people talk because when you come out saying you've achieved quantum supremacy, you better be prepared for some blow back. So let's talk a little bit about what that means, what that is, and then we'll talk about what the ramifications are for our fans. So first and foremost, let's get it out of the way, because a lot of the articles... and by the way, this leaked like weeks ahead of time, NASA accidentally put out a thing saying, "Oh yeah, by the way, Google achieved quantum supremacy." And then like, "Oops, no, I mean, no, um, em, um, uh."

Will Curran:
"Uh, just kidding."

Brandt Krueger:
Right. So it's officially been published now into the Scientific Journal of Nature Magazine, or Nature of the Scientific Journal. And so when we talk about quantum supremacy, it's not like an advertising branding thing. It's not something that Google just made up. It's a legitimate engineering term.

Will Curran:
Scientific term.

Brandt Krueger:

Yeah. It's a scientific term.

Will Curran:
Like they achieved the scientific method kind of... that'd be like a similar-

Brandt Krueger:
Right, yeah. Or it's a label.

Will Curran:
Achieved light speed or something like that.

Brandt Krueger:
Yeah, exactly. It's a quantifiable thing that is backed up by engineering. And so it's a silly term, but it's a quantifiable, actual term used to describe in quantum computing. So we should probably take a quick step back and talk about what quantum computing is.

Will Curran:
Yeah, so the idea behind quantum computing, the big term that you want to understand is this idea of the qubit, Q-U-B-I-T, right?

Brandt Krueger:
Yeah.

Will Curran:
And the idea behind a qubit is... a traditional bit is zero or one, and that's where it kind of that binary one or zero. It can be one of those two states, right? On or off. Well, a qubit can be both simultaneously, a one and a zero. So it is like on and off at the same time. It's almost like Schrodinger's cat.

Brandt Krueger:
Right. And that's why it's quantum physics, right? And so quantum physics, things get really weird when you get down to the subatomic level, when you get down to the quantum level. And without getting too technical on it, states of matter get a little fuzzy, whether or not things are positive or negative, get a little fuzzy. And so these computers involve enormous amounts of coolant, cooling things down, they run at a gajillion bazillion degrees below zero, where things get weird.

Brandt Krueger:
So bits, like you said, on or off, that goes all the way back to literally transistors, tubes, things like that, being able to store data as a one and a zero and so that's zero and one. And then if you want a two, it would be zero, one and then if we wanted three, it'd be one, one.

Will Curran:

Yeah, I don't speak binary. So you've lost me there.

Brandt Krueger:
Yeah well, you should. But anyway, either way, all of the things, all of the technology that we have; laptops, cell phones, satellites, all the way up to the most powerful super computers in the world are based on this zero and one technology. And so they're limited by this zero and one technology. In the end, when you break it all down through all the programming languages and you get it all the way down to the bare bones, it's zeros and ones, zeros and ones.

Brandt Krueger:
So this idea of these qubits is, it's more than double because of the way this works. So instead of being a zero or a one, it can be a zero and a one, right? That's two states of matter. Then if you add a second one, you've got four states.

Will Curran:
It just gets more and more-

Brandt Krueger:
And if you add a third one, it's eight states, I think, if I'm remembering right, whereas instead of-

Will Curran:
No, 16 I think.

Brandt Krueger:
16.

Will Curran:
I don't know.

Brandt Krueger:
And so it's logarithmic, where it gets more, and more, and more, and more, and more, and more, the more of these you add. And it's infinitely more than these traditional bits of on and off. And so the supercomputer that they made, that Google have made, is a 54 qubit Sycamore processor. So it's got 54 of these qubits.

Will Curran:
Well, Sycamore isn't the name, that is the branding that they decided to call it.

Brandt Krueger:
Yeah, they decided to call it the Sycamore processor, right. And so, let's cut to the chase. So it's a gazillion, gagillion, bazillion calculations being able to be performed in a very short amount of time. And so, what they were able to do was to perform a calculation in 200 seconds that would have taken the world's most powerful super computer 10,000 years. And that's essentially for

our practical purposes, it's impossible, right. And so it's not just a little bit faster, it's not just significantly faster.

Will Curran:
It's a quantum.

Brandt Krueger:
Yeah, it's a quantum leap, as it were, in technology.

Will Curran:
Oh man, the quantum quans are coming out.

Brandt Krueger:
Okay. So that's kind of the techie, nerdy background. So what you need to know is that it's not just a little bit faster, it's exponentially faster. That's the word I was saying, logarithmic, I meant to exponential. It's exponentially faster than the fastest computer that we have now. Now, this is technology that is absolutely in its infancy. I mean, the thing takes up... it's the size of a room. It takes a... it's-

Will Curran:
Takes like cryo to simple it.

Brandt Krueger:
Exactly, yeah. It's cryogenically cooled and it didn't work quite right the first couple of times that they turned it on. To the point where they actually surpassed this quantum supremacy level, which again is a very specific thing. So they reached this level and weren't really sure that they had reached the level. There's actually some good video on the verge.com that you can check out.

Will Curran:
Well, this is like the official Google video.

Brandt Krueger:
Yeah, sorry. Yeah, they've just embedded it. So yeah, Google's official video that they released is kind of funny because they're like, "Yeah, we didn't really know that we'd done it." And so it's kind of like, "Yay."

Will Curran:
It's like if you time traveled, you wouldn't know that it happened until someone affected something maybe in the past. It's kind of like one of those... It's a funny moment because you'd only see the movies.

Brandt Krueger:

Well, if you were going to space and you weren't quite sure you were in space.

Will Curran:
Exactly. You're like-

Brandt Krueger:
"I think, I think we're, I think we're in space. Maybe it's getting a little weightless here."

Will Curran:
Because no one's ever getting there, so we don't actually know.

Brandt Krueger:
Right, exactly, exactly. So it's a fascinating idea. So okay now let's... And it's also funny because now IBM is like, "No you didn't."

Will Curran:
Yeah, yeah. We'll talk about that in just a second. But one thing that we'll do too for sure for everyone who's listening and you don't know what we're talking about when it comes to this video is that we'll link it into the resources. So make sure to head over Event Tech podcast.com and check out the video. It's really, really good. They also do a really good job, giving a lot of praise to the team who put this on as well, which is really, really cool. But yeah, let's talk about the IBM thing.

Will Curran:
So obviously, this got announced and when it officially got published, then shortly obviously the fastest supercomputer in the world is run by IBM. So of course, they said, like you said, "No you didn't." So what did they say?

Brandt Krueger:
Well, I've seen a couple of different. So I saw an initial report that was basically implying that it was just a branding term, which is kind of why we wanted to start there. But it's not. It's an actual legit, quantifiable thing. They didn't just pull that term.

Will Curran:
Yeah. It's a scientific achievement more than a technological or... It's not like, "Oh hey, Google announced they had the new folding phone." It's like, no. They scientifically did this. It's more scientific than anything.

Brandt Krueger:
Yeah, it's more of a... Yeah, it's a level. It's something that they pass. But the more specific claim that they're saying now is, "Well, if you had a lot more storage capability, so basically if you had really big disc drives, you'd be able to achieve this same thing without using a quantum

computer." Okay. That doesn't, however, discount the fact that they did it with a quantum computer.

Will Curran:
Yeah, in this moment.

Brandt Krueger:
Right. And so IBM's kind of claim is a little... it seems like, "No," if it seems whatever the scientific equivalent to, "No."

Will Curran:
Well, obviously, it must be way closer to the 200 seconds to how fast did they say the supercomputer could get done in.

Brandt Krueger:
Well, so IBM's is claiming that a classic normal system could do it in two and a half days.

Will Curran:
That's a lot. Does that compared-

Brandt Krueger:
If it had basic...

Will Curran:
That seems like a lot longer than 200 seconds.

Brandt Krueger:
Right, right, right. All right, well-

Will Curran:
We're still going to make this Hot Pockets. It's going to take me 200 seconds to cook Hot Pockets. Oh well, my Hot Pockets can be cooked in two and a half days.

Brandt Krueger:
Yeah, we're real proud of you for being able to cook that Hot Pockets in two and a half seconds. But we could do it with a normal microwave and two and a half days. That's great. So yeah, it seems a little petty. And it even mentions in this article that it was basically preemptively published. So they were like they knew this was coming out, so they posted about a blog article saying, "Yeah."

Will Curran:
Yeah, they're just protecting their share value, basically.

Brandt Krueger:
Yeah, yeah, exactly. And then I think that's fair. So and then I've seen more than a few people again saying this idea is that, "Quantum supremacy, geez. Ego much Google." But so. All right. What does this have to do with the events industry?

Will Curran:
Well, I think the exciting thing about this is that they're calling this like the Hello World moment for computing, and that this idea that this is a big breakthrough for computing. So I'm going to get this out of the way by saying this first, that we're probably never going to get to actually see one of these computers for a long period time. Similar to the discussions we had about 5G and maybe the future of virtual reality, and augmented reality, this is a little bit further off. But that's why we created this podcast is that we wanted to look at things even if they're very, very far off.

Will Curran:
So while this breakthrough is happening, it's not like tomorrow we're going to be able to go at Best Buy and pick up a quantum computer and say like, "Oh, I'd love to run my registration system off this quantum computer and whatever it may be." But instead, we're looking at, "Hey, this is going to be a big step move forward." It's kind of like now we have to rethink how computers are done I think altogether.

Brandt Krueger:
So I mean, yeah, as we're recording this, it's 2019, it was 1903, this is one of the better analogies that I've heard. 1903 was the Wright brothers. So basically a 100 years, we've gone from the the paper mache plane, basically, that they put. The wooden bailing wire, bicycle shop plane that they made to rockets and sending rovers to Mars and daily, hourly flights from New York to Shanghai. So this is where we're at now with quantum computing. So 100 years from now it's going to be off the chain.

Will Curran:
Yeah, we don't even know what it's going to look like. But I bet the Wright brothers weren't like, "Yeah, in some day-"

Brandt Krueger:
"Give it 100 years."

Will Curran:
"We're going to go to the planet Mars."

Brandt Krueger:
And it wasn't even 100. I mean, just even think of 50 years out of that. I mean, so some 1903 to the 1950s World War II, the Korean War, Vietnam. I mean, all of where we're at into the Heyday, as some people say, it's the Heyday of airplane travel in the 1960s. So imagine just what these capables are.

Will Curran:
So how does it relate to the...

Brandt Krueger:
Exactly. Bringing it around. Bring it around. Promise to stick with us, stick with us. We're bringing it around. So here's the long and the short of it is that just like computers today had to start with being giant rooms full of coiled wire, and it took a massive amounts of power, that was only in the 1940s and '50s, the original computers, to then going from that to being able to have computers capable of guiding us to the moon and really only about 25 years.

Brandt Krueger:
So as we start to look at this, being able to perform ridiculously fast computations initially is going to do with things like cryptography, right? So having things protected by secure cryptography. So our bank being able to connect to our banks, being able to connect to these things.

Will Curran:
Wait, wait is Brandt about to talk about cybersecurity?

Brandt Krueger:
A little bit because a lot of our current cryptography is based on, it will take a ridiculously long time to guess.

Will Curran:
That's why they say like your password should be 20 characters including exclamation points, capitals, because they will take 10,000 for years.

Brandt Krueger:
Right. So even if you figure alphanumerics plus kind of the exclamation points and punctuation and things like that. I want to say it's under 100 characters in standard English. And so if you took a computer and you tried to guess okay, let's guess every single possibility of the first character and it's only a one-digit password basically, and then you do the same thing with every permutation of the second digit and every permutation of the third digit.

Brandt Krueger:
If you get out to a 16 digit alphanumeric password with some things written in a traditional computer, even as a supercomputer would take thousands of years to crack that, to crack that cryptography. If quantum computing gets involved and you've got to know that governments are going to be working on this as well, all of those are going to go out the window. So you would be able to, instead of having a password that was 16 digits long, being able to be hacked in 10,000 years, it'll be cracked in a matter of seconds.

Brandt Krueger:
And so not to get too tinfoil Hattie, but the intelligence community of the US government built a giant data farm that's just hoovering up basically every single possible scrap of data that it can off the internet, whether or not it's encrypted and retroactively would be able to go back and decrypt those files, eventually. So not going to be a huge deal in the near term. But anything that's using some of these older encryption patterns would be able to be cracked in just a second.

Will Curran:
I think it's crazy to think about, yeah, what the future of like passwords are going to look like. So while you were talking about that, I pulled up a... and I'm going to have to share a link to this, is the betterbuys.com estimating password cracking times and they're just using not even the fastest computers. They're talking about probably three or four years ago, top of the line processor you buy from Best Buy.

Will Curran:
And I typed in of pretty secure password that was 1, 2, 3, 4, 5, 6, 7 ,8 ,9, 10, 11, 12 characters long, pretty secure password. And got symbols, upper case, lower case. That's a pretty secured password, right? It's saying that it'll take 11,000 millennia to do it. I bet you if you plug that in with the top of the line supercomputer, that would drop significantly, which is 100 years or something like that. But now we're saying this can do it in two minutes.

Brandt Krueger:
Yeah. Exactly.

Will Curran:
I'm scared. That's terrifying.

Brandt Krueger:
So the good news is that newer versions of cryptography people were already starting to go, "Holy crap. We're getting closer to actually achieving quantum supremacy." So newer levels of cryptography are starting to take this into account and people are actively working on ways of getting us away from passwords. "What can we do?"

Will Curran:
Multifactor authentication.

Brandt Krueger:
Yeah, looking at Biometrics multifactor, there's some really interesting stuff out there that it's just going to take adoption, right. People to say, "Yep, we're going to start using this technology over that technology."

Will Curran:

So I'll spin it if you're cool with me spinning it off as cybersecurity. I think then it also brings up this idea that we've always talked about the idea of machine learning and it takes a certain amount time for computers to learn things by testing things and things like that. And I think that this also proves that used to be that you'd have to sit here and try, what was it? Facebook had the AIs talking to themselves, it was like a week or so when they taught themselves a new language or whatever it was. Well, now that's going to happen instantaneously and I think that's a really exciting-

Brandt Krueger:
Yeah, with the ridiculously, yeah. I mean, when we're talking about cryptography and things like that, and even the tests that they're using for quantum supremacy, it's basically math. It's not doing anything fancy, but that's the first step.

Will Curran:
It's not like we're rendering the Corvette in three dimensions.

Brandt Krueger:
Right. But that will come. And so just like we know that's the way the original computers started as we used them for math and calculating things. And so it's increased processing power. And so as this starts to filter down, as this technology starts to filter down to universities, to corporations being able to do things like machine learning and AI with that tremendously increased speed it'll be able to chew through a dataset in nothing like a ridiculously complicated dataset like weather patterns and all of that kind of stuff where you have to take in so many different factors. So again, kind of bringing it back to what does this mean for us, is that down the way, as we go, one we're going to have to find new ways to secure our data.

Will Curran:
Yeah, let's definitely do that.

Brandt Krueger:
Two, just generalized increased processing power. So everything will be bigger, better, faster, you know what I mean.

Will Curran:
Totally. Phones, tablets, computers that run the rendering graphics for your presentation.

Brandt Krueger:
Exactly, that's something you know Hollywood's going to start investing in this cause right now folks or anybody that doesn't know kind of how CGI and things like that, you need stacks and stacks and racks of computers just chewing to create one frame of the Hulks but. I mean, it's just one of those things and it just chews and chews and chews and the processing power and memory that are used to create current, modern, big budget CGI effects is ridiculous. And so as

that starts to filter down as well, that will get cheaper and easier and faster as well. And so what they will be capable of doing will be ridiculously detailed, ridiculously accurate 3D models.

Will Curran:
I think that's going to make for an exciting time too for rendering that, for example, one of the biggest cost for projection mapping right now is the content because you have to 3D render content and if you could do this faster and do it quicker, it means that, hey, you need less powerful computer, cheaper to get. I mean, Oh man.

Brandt Krueger:
It's all going to slowly filter down over, over time. And same virtual reality, augmented reality, all of these things are going to become ridiculously realistic as these environments are being able to be created in fully rendered 3D space.

Will Curran:
And I mean, it's weird to think about too, and I'm sure that, I'm just going to love to listen to this podcast when I turned 100 years old, you know what I mean?

Brandt Krueger:
Of course. Yeah, it's early days.

Will Curran:
It's going to be funny to listen to this.

Brandt Krueger:
"I was there when Google..." "Daddy, what's a Google? Grandpa? Papa?"

Will Curran:
The G company.

Brandt Krueger:
"Papa, what's a Google? What's a Google?" "You know, our corporate overlords."

Will Curran:
Well, I'm thinking about like there's things that we can't even begin to think about as well. When the computers first came out, people were like, "Wow, wouldn't it be great if you could communicate across to another country using these tools?" And now we have video chat in high definition on our phones, that fit in our pockets. Some of the stuff we even don't know where this is going to go.

Brandt Krueger:
First 50 years to now of computing is one chapter, and it doesn't feel like it, but we've just started the second giant chapter of computing in human technology

Will Curran:
Absolutely. Absolutely. And yeah, I mean, definitely congratulations to Google. I mean, the people that do it are the ones that are experimenting the craziest. And so it takes things like this. And what's crazy is, I mean, you listen to a ton of tech podcast way more than I do. I didn't even know this was coming. In fact, I remember when I stumbled upon this I was just doing like late night after gig YouTube videos and I was like Google announces quantum supremacy. And I was like, what the heck is that? Clicked on it and I watch it and I was like, "Oh, cool." And I just closed it cause I didn't understand that it was like this big deal. I just watched that video and I was just like, "Oh, okay cool, they did this thing. This isn't a big deal." And I assumed that everyone was doing this.

Brandt Krueger:
Right. So the takeaway out there folks is this is actually a big deal. It's not something you're going to have to deal with anytime soon, but it's going to affect your lives for the next 50 years. So as this stuff begins to filter its way into the world.

Will Curran:
Maybe less than 50 years, maybe like a quantum of that.

Brandt Krueger:
Over the course. Over the course.

Will Curran:
Over the course.

Brandt Krueger:
Over the course of the next 50 years. And we were talking before the show, is it 10 years, 20? I think over the course of 50 years, you'll just see continued slow improvements in the technology, just like you did with airplanes and computers.

Will Curran:
Yeah, I'm going to make a crazy prediction.

Brandt Krueger:
Okay. So when we listened to this in 50 years.

Will Curran:
Yes. Two predictions. A, I think there's definitely going to be in obviously our normal computers and things like that. They're going to figure out a way to shrink this down into like the size of our processes are now, but I was talking, actually, I think this is fitting to start talking about this theory I have that eventually, I think we're going to get the point where computer processing doesn't happen in the device, but instead on like a server farm similar to the Stadia stuff that's

going on where you can, instead of playing video games on a crazy PlayStation, it's played on a server room made by Google and it streams to your device. But I think with quantum computers initially, that's going to be the thing, is that we will use quantum computers, but remotely.

Brandt Krueger:
It's funny. Yeah, we'll be going back to the ages of the early computing where you would have a remote terminal and the remote terminal would connect to the mainframe and all the calculations and stuff would happen on the mainframe and we're going to go back to that. Yeah. Where like these initial steps is, as long as you've got connectivity fast enough to send the information, which all of the major platforms are playing with this. Google is not the only one. Sony's there, Microsoft is there, they're all playing with it, so it's going to be one of those things that it's going to absolutely get there and, yeah. All right.

Will Curran:
That's my Amy Webb futuristic prediction for the week.

Brandt Krueger:
Remember it's not a line, it's a cone. Go back and listen to our interview with Amy Webb to find out what we're talking about. Their futurists, how to think like a futurist in Event Tech. All right. I think that's good enough for now. I don't think we want to go too deep into this because we'll revisit it as we hear more about this or we hear something that's going to affect us a little more directly. For now, just know we live in amazing times and you will able to be able to tell your grandkids. I was there when our corporate overlord or when big G achieved quantum supremacy.

Brandt Krueger:
All right, man. Well, thanks so much for helping me out with this. I'm glad that we were able to bring this to folks. If this is the kind of thing you'd like to learn more about, obviously we'll throw information into onto the webpage at eventtechpodcast.com. We'll put all the show notes, all the links there. Don't forget, that's where you can also hit the links to subscribe in your favorite podcast apps, whether that's Google Play, Pocket Casts, Google podcasts. Now they've separated the podcasts app on max. So wherever your fine podcasts be found, that way you can find us there. So thank you all so much for joining us.

Brandt Krueger:
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Brandt Krueger:
Event Tech.

Will Curran:
Event. Event. Event 54 times.

Brandt Krueger:
Oh, 54 cubits worth of-

Will Curran:
54 cubits worth of Event Tech.

Brandt Krueger:
Out. Out.