Daniel Newman:	Hey everybody, welcome to the Main Scoop. I'm Daniel Newman, one of your hosts here, Principal Analyst at Futurum Research. Joined by...
Greg Lotko:	I'm Greg Lotko, SVP and General Manager of the Mainframe Software Division at Broadcom.
Daniel Newman:	Well, here we are at the Main Scoop. We've been talking about this for a while. And we came together to basically bring all of the important topics in technology, some of the biggest thinkers, some of the greatest minds, here to join us on the show for perpetuity until we don't do the show anymore, and hopefully that'll be never. Because we think there's a whole lot to talk about, Greg.
Greg Lotko:	Agreed, agreed. It's all about the ecosystem, thinking about how customers view their overall IT environment. They interact with a bunch of different platforms and technologies, vendors, and partners in the ecosystem, and this is an opportunity to have that holistic view and the conversation with the audience. So it's not going to just be you and me the whole time.
Daniel Newman:	No, and thank goodness for everybody out there. But I think we'll have a little bit of fun. I mean, here is the scoop.
Greg Lotko:	I plan on having fun, I'm not just thinking about it. We're going to have fun.
Daniel Newman:	We're going to have some fun. We're going to have some fun.

The scoop here is that there are so many complexities in this IT space right now. We are talking about all the companies' evolutions and expansions and modernization efforts. There's so much ecosystem and partnership, and so often Greg, people are thinking very competitively. They're thinking, "Oh, it's this or that."

But you go into most companies' IT, into their organization, and there are many vendors, many partners, and many experts that come together to really make the enterprise run. And I think that is the opportunity here to bring that all together and put that out there for our audience to learn. |
| Greg Lotko: | For sure. There's many different platforms, there's many different capabilities and technologies, and what we started with is not the be all, end all. We make investments, we provide capabilities, we provide functionality, and then something new or different or additive comes along. |

We don't throw out the other stuff, we build upon it, and that's what really makes it so that you have to interconnect these things. You have to tie them together, leverage the investments you've already made, and tie them into the new to drive greater value.

Daniel Newman: And I think that's going to be exactly what we're going to unpack here. You know, when you first came to me and said, "Hey, let's do a show," part of me says, "Well, it's always hard with one vendor to do a show for a long time." Because as an analyst, I'm trying to really stay objective. But when you said to me, "You know what? We'll bring on our partners, we'll bring on companies that are seen as our competitors-"

Greg Lotko: Absolutely.

Daniel Newman: "We're going to talk to them all, and we're going to really help inform the market, we're going to tell them what's going on. We're going to talk about how things are evolving, how they're changing." And of course, you'll bring your view from the inside at Broadcom, and I'll bring mine from the outside as an analyst at Futurum Research. And heck, we can start that right now, because today we have IBM Fellow Christian Jacobi here to join us. So why don't we bring on our first guest?

Greg Lotko: Let's do it.

Daniel Newman: Well Greg, we're back. We've got our first guest here, Christian Jacobi, Fellow at IBM. Christian, welcome to the show.

Christian Jacobi: Thank you.

Daniel Newman: You know, I got to say, being first is... Well, you and I are car guys, so we like going fast. I feel like there's a Ricky Bobby reference in that. But in all serious, being first is good and it also puts a little bit of pressure on you. So you ready to be here on the Main Scoop with us?

Christian Jacobi: All good for me, thanks.

Greg Lotko: Just be yourself, it's fine.

Christian Jacobi: Thanks for having me.

Daniel Newman: Yeah, keep it natural. But be perfect.

Christian Jacobi: Uh-huh.

Daniel Newman: All right, you ready for that?

Well, let's start off talking about you were instrumental in the development of the telum processor and that's your baby, and you're spending a lot of time over there.

Christian Jacobi:	It is.
Daniel Newman:	I want to talk a little bit, I'm thinking we can talk some AI, we can talk some cybersecurity, we can talk some hybrid cloud. Let's start with AI, because that was a big enhancement in this newest generation z box for IBM. Talk a little bit about, what's the story behind the AI and its part in the new telum processor?
Christian Jacobi:	It's a really interesting story, because it really goes into how we decide what we put into every generation. We've worked very closely with a number of our clients, understood what their businesses need in terms of the new capabilities of the next generation. And we did learn about AI being a really growing and important part of the IT landscape. And we were wondering, how does IBM z systems play in that?
	And what we learn through all these client interactions is, where we make a difference is in low latency, real time inferencing. Not just training or generic inferencing, but focused specifically on the low latency, so that clients can embed AI capabilities directly into their transaction workloads, which typically have very low latency service level agreements and things like that. So-
Greg Lotko:	And the really, I think, cool thing about that is, you took what has been a hallmark of this platform and the technology, and you combined it to address a challenge, right? Low latency, high throughput, high transaction speeds has always been the strong point of the mainframe, but as we looked at modern workloads and artificial intelligence and inferencing, there were people that were doing warehousing or marts off platform, that were doing calls off to do fraud detection. And combining the best of both worlds was to say, "Hey, let's make it so that you don't have to call out, so that you don't have to move out, but you can do it on the platform while preserving that speed." Right?
Christian Jacobi:	That's exactly it. We knew from those client conversations, some clients are doing fraud detection on a different platform, wasting critical latency on network hops and scheduling decisions, et cetera. Now they can integrate it directly into their mainframe workload, running it directly on the processor, super tightly connected into the cash hierarchy. And so that's what gives that low latency and the real time capabilities.
Greg Lotko:	And do we think this is going to drive different patterns, right? Because it wasn't just about the speed. It was data moving off the platform, a proliferation of copies of data. Do you believe this is going to drive more the data centricity of keeping it on the platform, or are you doing things to speed up the connectivity for those pieces of information that you got to bring that may not be resident on the mainframe?
Christian Jacobi:	I think it's a little bit of both. The whole concept is that clients can train their models anywhere. Many clients have invested in data lake strategies

or train on GPU clusters in the cloud. So they are already comfortable with moving the data for the purpose of training.

And then doing the inference with the low latency real time capabilities on the processor brings that work to the mainframe, keeps it on the mainframe. But sometimes also, additional data is necessary in the inferencing. So there's some gravity that we're also creating for new types of data coming into whatever, a MongoDB or something like that, that can support the inference work as part of the transaction.

Greg Lotko: One could listen to that and think that the motion was about keeping data on the platform, but that really wasn't the driver, the design point. It was about the speed of operation, the speed of inferencing, the speed of fraud detection. And the result is to do it on platform. Even if you're drawing from data that's off platform with the model, as you say, but then embedding it in the transaction.

Christian Jacobi: Absolutely, yes.

Greg Lotko: Very cool. Very cool.

Daniel Newman: Yeah, it's super interesting to me. One of the things IBM's been pretty outspoken about is this whole concept of co-creation. So when you guys go generation to generation, one of the things I also thought about is, this was a fairly big difference. And again, there's always differences from generation 14 to 15. But this investment in AI, how much of this was driven by the demand coming in and you guys taking it and listening, versus you guys knowing the importance of innovating, meeting the customer where they are?

Christian Jacobi: We had a feeling that AI would be important for this generation, but we didn't have it right. We went to clients and talked about training and talked about generic inferencing, and through those conversations we learned, "No, we really got to be laser focused on low latency, real time inferencing." So the client conversations definitely helped us shape exactly what we need to build. And then based on that, of course, it's all the hardware design and all the enablement through the software stack that came from that.

Greg Lotko: And I don't actually think that was what was so unique about the 14. Sorry, the 16. I'm backing up, you started with the 14.

The reality is, in every generation, IBM has involved customers in the development of what they're doing with the platform. But again, thinking about the ecosystem, it expands beyond that. One of the reasons I've really valued my interactions in the mainframe space is if you look at the technologists across the variety of vendors that are working around this technology and on this technology, but not only them, the customers, the technologists that are using the capabilities, they're invested. They care

about what's going on in their environment. They care about the capabilities that they're delivering to their end customers. So you see folks wanting to get together, wanting to collaborate, and figuring out how across all the capabilities being provided, how they can drive that greater value.

Daniel Newman: Well, I think we largely agree in principle. I think some of the bigger leaps from generation to generation are met by secular trends and demand. I think identifying your niche is super important, and I think you've made that clear.

Another thing that came out very clear in your recent announcements were some of the focuses and enhancements in cybersecurity. The pandemic drew a ton of attention to the amount of threats. Mainframe has always been known for incredible security capabilities. I think that has no chance of changing anytime soon. But talk a little bit about some of those enhancements and really what drove them in z16.

Christian Jacobi: Like you say, mainframe computers and the whole stack running on them and the applications have that history of being the data vault for many of those large enterprises. We take that serious, and we can't rest on our laurels here. We always have to innovate and do the next step forward.

So one thing that we've looked at is, what are future risks? And one of the risks that's out there are quantum computers. Now, quantum computers will be incredibly capable machines. They will be helpful in many complex problems that can't be solved today. And so there's huge upside with quantum computing, but there's also downsides.

Quantum computers will eventually be able to crack today's cryptographic codes. So that's of course a huge concern, because nation state actors, for example, can already steal and store data, waiting for condom heaters to be available and crack that data. So.

Greg Lotko: Yeah, you think about that. You don't have to be technologically savvy or smart about how you go to try to crack something if you have the horsepower and the brute force to do it. And quantum computing is going to bring that. So if you think about it in the old ways, it'll just be crushed.

Christian Jacobi: Exactly. And whether that happens in five, 10 or 15 years, there's a lot of uncertainty, but there's data being generated and stored today that we don't want to be out in the open 15 years from now, right? So that's where we started saying, "Okay, we got to start thinking about a roadmap to ensure that this data that runs on the mainframes is secured against those kinds of risk factors."

We started out with a quantum safe self-boot engine as the root of trust in the system, creating the first quantum safe server. And we have quantum safe algorithms in our crypto accelerator, so that clients can

start using these advanced algorithms that are immune against the attacks from quantum computers.

And then I will say one of the coolest things is also, we have a dashboard that can create a report on which crypto algorithms are used where in the application stacks, so that clients... Obviously these application landscapes are very complicated. So that clients get a sense for which algorithms are used where, "Where are my most sensitive data?" and where do they need to do their investments first to get ready for a post quantum world?

Greg Lotko: But let's make another point to our audience here. You said it yourself about how secure the mainframe platform is, and it can be easy for the customers out there, the people using the devices, the hardware, the mainframe, the software, and say, "Oh, most secure platform on the planet." You actually have to implement the capabilities.

So we're car guys, right? You can have the highest horsepower car, but if you don't ever press that accelerator down, you don't get the advantage of it, right? If you have locks on your house, but you never actually lock them, but you carry the key around, it doesn't provide that capability.

There's encryption everywhere, there's ways to protect IDs, there's the security in being quantum safe. You want to enable those things and apply the latest capabilities, the features and functions, and implement them in your environment, and doing that is what makes it so secure.

Christian Jacobi: Absolutely.

Greg Lotko: Just having it but not using it does nothing.

Daniel Newman: No, I think that's a great point. And by the way, I think most of the research that security analysts do actually identifies that we create a lot of our own vulnerabilities.

Greg Lotko: Things that could have been avoided.

Daniel Newman: "I had a sticker." I think they did some DOD study once, and it was stickers left on laptops…

Greg Lotko: With the ID and the password?

Daniel Newman: ... with the ID and the password. So yes, there are those raspberry pies being installed in the most secure data centers in the world, but those are TV stories. The real stories are, a lot of times we create our own vulnerabilities. And to your point, you got to put your foot on that accelerator.

	And that's, by the way, something companies have to be thinking about all the time. You're always on defense nowadays in cybersecurity. I do want to ask one quick question, because I know I want to get to hybrid cloud, I know we want to talk about that. But with quantum, how much does IBM in your quantum business and your mainframe business... Did you collaborate on that? Was that a collaboration?
Christian Jacobi:	Yeah, there's good collaboration going on. There's collaboration in both the crypto algorithms that are actually immune to quantum computers. The IBM research group is very active in that regard, and we implemented some of those algorithms in z16. We're also looking into, how in the future will we be able to combine quantum computers and mainframes, and use the quantum computer as an accelerator to solve interesting business problems? Now that's a little down the road, but-
Greg Lotko:	There was a zIIP and a zAAP. Is there going to be a quAAP?
Christian Jacobi:	We'll find the right name for it.
Greg Lotko:	All right.
Christian Jacobi:	Quantum computers are a few years down the road, but yeah, we're talking about things like that.
Daniel Newman:	We all know there's a symbiotic relationship between classical and quantum computing, and those two things are going to work together. Both do certain things very well, and...
Greg Lotko:	As there actually has been with every technology, right?
Christian Jacobi:	Absolutely.
Greg Lotko:	You had mainframes, you had desktops, right? You had distributed servers. We have cloud. It's not each of them in isolation, it's them together.
Daniel Newman:	Let's segue, because I did that on accident, but I think you did that on purpose. So-
Greg Lotko:	Every once in a while, okay.
Daniel Newman:	Okay, you got one. Greg one, Dan zero. This could be a score keeping thing, you know what I'm saying?
Greg Lotko:	Don't play a drinking game.
Daniel Newman:	We'll be more fun.

Hybrid. That's kind of on the tip of everyone's tongue right now, hybrid architectures, hybrid cloud, hybrid IA and AI. I think it's something your CEO certainly talking a lot about right now.

Christian Jacobi: Yep.

Daniel Newman: It's common knowledge. But in the mainframe world, sometimes the idea of connecting to the cloud was pooh-poohed and no-noed, but that's changing.

Christian Jacobi: Yeah.

Daniel Newman: Absolutely. I'm setting him up, I'm setting him up. Hold on, let me do my job. Talk a little bit about how in the next generation with z16 and beyond, how you guys are thinking about hybrid. As we know, that's what's on every enterprise's mind.

Christian Jacobi: Yeah. It's clear that a lot of enterprises are running their key mission critical data and their transactions on IBM z systems. And this data and these transactions need to connect into applications that are running in a hybrid world. And that could be on-prem hybrid, it could be multi-cloud hybrid, be that AWS or IBM Cloud or Google. Whatever it is, the mainframe needs to play with that and connect with that. Right?

And so that's why we invest in things like OpenShift technology to be available natively on the mainframe. That's why even at the hardware level, we're doing investments to be efficient at running containerized workloads, where we have capabilities like secure execution and confidential computing to run containerized workloads in a secure way that no other system can run. It's both capabilities on the mainframe itself and then capabilities to connect the data and the transactions to other applications outside.

Greg Lotko: Well, and the reality is, it's a hybrid world. No workload runs in isolation. It's why you see all the focus on open. It's not about necessarily just open source technologies, it's about connectivity, it's opening up APIs so across different platforms, different vendors, different technologies, you can tie these things together, use the best of all worlds tying them together for greater value.

Daniel Newman: Yeah, but it's also the weight of the future, Greg, and it's really the only way that we're going to get there. I really can tell you from being out there, talking to hundreds of vendors, customers in front of many audiences and investors, that everyone shares the idea that hybrid is the future. Now multi-cloud versus hybrid cloud to one.

Greg Lotko: It's just the future, it's the reality today. There's no workload runs in isolation. It's the idea that the rhetoric and the discussion has changed from, "Oh, here's the next great technology that's going to take over

everything," to looking back at the past and realizing, "Come on, that hasn't happened in the last 40 or 50 years." There have been some capabilities or technologies that went away.

But it's those things that are great and have additive value that get added to the mix, that get connected, and that's a hybrid reality today. The hybrid reality of tomorrow will include connecting all the best capabilities from everything that we know of today, but all the things that have yet to be invented.

Christian Jacobi: The new thing is the attempt to create a orchestration layer that straddles that variety of platforms and tries to really bring together a management scheme to keep those things holding together. And I think there's some great progress in that sense.

Daniel Newman: And let me win this argument, because I feel like he's pushing back on me and you know we don't like that here on the Main Scoop. I'm the one that's right and you're the other person on the show. No, kidding.

You made a great point-

Greg Lotko: You've got two scoops. And the guest people that'll come in.

Daniel Newman: The banana split.

Greg Lotko: It's always going to be more than us.

Daniel Newman: Two scoops.

No, but what I was really trying to point to is, people have made this assertion that we are already there as it comes to cloud. And the data's pretty evident, we are actually very early innings. You're at 25 to about 33 percent of workloads have been deployed to any public cloud.

Greg Lotko: And that's all workloads. If you narrow that down to enterprise workloads, it gets-

Daniel Newman: It's less.

Greg Lotko: Yeah.

Daniel Newman: And so my point is, when I use the word "future," and I just feel like in the first episode I can't get shut down that hard-

Greg Lotko: Well, you don't want to call your company Pastum. You called it Futurum.

Daniel Newman: Pastem Research? When I use the word future though, it is an evolutionary state. What I mean is, I think we're in the point right now

where we as thought leaders, pundits, industry players, developers, engineers, we are really cognizant of what the future looks like. But when you're an enterprise and you're out there and you're listening here, you're going, "Well, we still have most of our workload, most of our data is still on-prem, or we're just starting to look at multiple clouds." So I think we agree in principle on most things.

Greg Lotko: Fair, fair. We do.

Daniel Newman: But I think there is an evolution of what's actually happening. And then there is the, of course, agreed upon state that we as people that are analyzing the industry are saying, because we understand it.

Greg Lotko: And the evolution is going to be continual.

Daniel Newman: It's a lot of fun.

Greg Lotko: Because we don't know what's next.

Daniel Newman: But what we do know is that Christian here made a really, really great guest here on our first episode.

Greg Lotko: Absolutely.

Christian Jacobi: Thank you.

Greg Lotko: Pleasure having you.

Christian Jacobi: Thank you.

Greg Lotko: Yes. Christian, thank you so much. Love to have you back for episode 50 or something like that. We'll do a retrospective.

Christian Jacobi: Yeah, we'll do that.

Greg Lotko: When z18, 19 or 20 comes out.

Christian Jacobi: We'll see. I'm working on it.

Greg Lotko: Sounds good. Thanks for joining us.

Christian Jacobi: Thank you.