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**Greg Lotko:** Hey folks, welcome back to the sixth installment of the Main Scoop where we talk tech, and basically anything anywhere near it. Dan, as I think about what's going on in the world today, I think about our personal investments and how we approach it. I'm curious... I'll share my philosophy... But I'm curious to hear what yours is. How do you approach your personal investments?

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**Daniel Newman:** Yeah, this is the part where I talk about all the funds that I'm an LP in, and my 75 invest strategists. And then I'm like, "Haha, just kidding." I don't have all that. We're in the era of a lot of self-directed strategy. I think everybody hits different stages in their life. I think when you start off. I'm an old millennial, born in the early 80s. And I think when you start out, you don't have much to invest. And then maybe you get a job, and you get a 401k, and that might be your first thing. And if you're more sophisticated or smart, you open a brokerage. And of course, we saw during the pandemic, everybody became a trader. We all opened up eTrades, and TD, and Robinhood accounts, and it became really democratized.

And then everybody lost their rear ends over the last year, when all those same companies got a nice taste of what the market actually does when you pump too much cash into it, and then you take too much out too quickly. And they haven't even taken it all out yet. That's the crazy part. But long story short, Greg, my philosophy is that there are great opportunities to invest. There are a whole bunch of different types of investments that people can make. And that people that tend to do well in life understand that it's not the job that's going to make you wealthy, it's the ability to take that part of your job and put that into different investments. And the rate of which we can do that depends on our discipline. And it depends on how good we do at that work, whatever that work is.

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**Greg Lotko:** Yeah. So, I mean if I listen to what you said, I've got about 15 years on you. For me it's about balance, and where you are at a point in time. So, I mean very early on in your career, I think there's the focus of just making sure you're putting something aside. You're thinking about, "All right, I'm starting to develop those good habits. I'm investing for the future. Putting it aside, it may not be huge growth, but it's something to get started." And then as you grow, as you mature, you think about the balance.

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You start to look at how fast things are growing or not relative to the market. You see that different investments have different returns. And you also go through some of those life events. Where the market goes up, the market goes down, and you develop an ability to think about what your risk tolerance is. What it is that you're really investing in these different classes for. And what you expect to get out of them. So, I think it morphs over time, but there's the tried and the true. I think if we were all left to our own devices, we'd say, "Hey, I want an investment that's growing faster than the market, that has enough risk to give me really big upside. But I don't really want to take those risks that could kind of dash my whole future." And that's that part of balance.

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**Daniel Newman:** Yeah, absolutely. Look, I'm an entrepreneur, and if this show was longer and if we were the stars, I could tell you some real stories about some scars and some calluses. But I'd rather talk to someone that's truly an expert. So, I'm going to introduce Dr. Howard Rubin. Now before that, Greg, on both of our behalf, I do want to just say this show is for information and entertainment purposes. So, we are talking investments here. But we are not giving investment advice. I just want to be really clear about that.

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**Greg Lotko:** Absolutely.

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**Daniel Newman:** A brilliant mind. Someone that's been doing this for a really long time. So, I'm going to shift it from our personal and the fun part of investing. And by the way, whole other conversation, Greg for another day. Talking a little bit about the whole business and IT investing though, Dr. Howard Rubin, he's worked with world-class organizations. And he's got what he refers to as the technology asset classes. Which you referred to too, Greg. So, without further ado, Howard, welcome to the Main Scoop. How are you?

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**Dr. Howard Rubin:** All right, and thanks. This is the first time I've got an introduction that says hearing me talk is not going to be fun. Your starting banter was a absolutely perfect. And I've worked with companies around the world. They've been tracking data for maybe 3000 companies for 30 years, and stuff like that. And watching what's going on, and also advising companies. But it's exactly what you're talking about. Over time the number of technology options, especially in the world of infrastructure, keep expanding. And it's almost like it's all in markets. You go back to stocks were in the 17th... Stocks and bonds and stuff in the 1700s, the early 1900s, and stuff like that. And then derivatives, all these asset classes developed. So, people had to make choices. And if you got to

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make choices of asset classes, it can't work like when I coached Little League soccer, and the entire team was always where the ball was. The goalie, everybody else, would go to one part of the field. Maybe the ball says cloud on it, and everybody goes over there, but it gets really dangerous to win the game.

And the game is really getting business value out of the technology. And that's the game. And it will be in time in the future too, with quantum computing, or whatever comes next. So, in advising companies, then observing what's going on... And I have a strange background in computer science and ecology and oceanography... And I work directly with companies, this stuff isn't all by a survey. And the companies I work with if I was... Not to glorify myself like I'm the Darwin of technology economics... I visit different companies like Islands of the Galapagos. I'm trying to figure out who has beaks and who doesn't, and what makes them tick.

And you start learning that companies that are doing well... In the past, in the 1990s, they started saying, "Well, let's have a portfolio approach to systems, and things that run the business, and grow the business and transform the business, and stuff like that." So, they'll start to look at portfolio. But portfolios are made of things. And in the world of infrastructure, the choices are different kinds of infrastructure. And historically it was mainframe, then distributed, and you had client servers... We can go through a whole thing, and you work your way up to cloud and internet and all this other stuff. So, in trying to bring order to the situation... And exactly the parameters you talked about, understanding risk and reward, how things shift over time, and attributes of the asset classes.

I said, "My god, this is pretty straightforward." Because people will understand financial asset classes, like you mentioned. And I don't know if Dan was embarrassed that he didn't do well on the markets, didn't want to talk anymore about it. But some companies are like that too. But they've worked in asset classes. And the different asset classes don't always replace the past asset classes. And we see that in markets. So, I decided to take a better look at this stuff, and I started to call it technology asset class optimization. I liked it because the name is TACO, then we can have Taco Tuesday and have a good time. But beyond the good time of it is that -

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**Greg Lotko:** Well, Dan and I both like food. But let me jump in on that because I want some clarification. And there's some really interesting things that you mentioned there. You talked about being like Darwin. And the companies out there, and how it relates to personal investments. They have an investment in technology. And I think, just like Darwin, he found that there were species that went extinct. There were some that survived. And then there were some that thrived. So, having looked at these, what type of profile do you look for, or see as best in class, when you look at these organizations out there?

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**Dr. Howard Rubin:** Your question is "What does a best-in-class company look like?"

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**Greg Lotko:** Yeah.

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**Dr. Howard Rubin:** Best in class company number one, understands that they've got to optimize the base... Which is the run... And they have to focus on the investments and their business value. But number two, what they've got to do, is best in class companies understand that there is this mix. And they treat them all based on their risk profile. So, you can mention... I mentioned my soccer team... You've seen a lot of companies. And this is not to pick on any technology. But I go to boards and things, and they say, "We need everything on the cloud." I ask, "Why?" And this is having a portfolio with solid blue-chip stocks. Like your mainframe. It's performing well, it has good resiliency and everything else. I take all my blue chips and put it into cryptocurrency. Well, you know what that got Dan.

But anyway... But no. But that that's the spread of stuff. So, you have different characteristics, and there's asset classes. Best in class companies is dealing with the asset classes. And the interesting profile that I see coming about. And so, what does "best" mean is another question. Some people will, in consultancy, will define best as means, "It costs you less." But best to me means, your best has the yield that you want. And the yield is the return on investment, and public companies that has to do with operating margin, return on equity, and earnings per share, and shareholder value, and a whole bunch of other things. And those guys have a balance. The interesting thing about the balance... And I've been tracking this kind of stuff over time since cloud was born in terminology around 2005 at Google... And you watch as people have rejiggered their portfolio, and it'll always change over time. When quantum comes out, something else is, it's going to keep moving.

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But the balance is pretty interesting. Because the balance over time... And this is not like an investment formula everyone can take to the bank, as you say... But you find that mainframe is very strong for transaction systems, has a long history, has a good resiliency, has wonderful tools. It's not a mainframe advertisement. This thing, there's an asset class that has these characteristics. And in that asset class, you have performance that's tuned to certain attributes. And then there's an interesting... Between the asset class of the servers and private and public cloud... Because when you watch what companies are doing, it's easy to peel back the things that are on distributed servers and transport them over to cloud. And maybe you get some leverage and elasticity and stuff. But the mainframe is performing well. So actually, the thing that I see when I look across 20 different sectors and samples of over 2000 companies are, there's no single best in class patterned.

But you're seeing that companies that can scale well on the mainframe, have good mainframe and that's growing. Distributed is getting moved to cloud as appropriate for the workload, whether it's private or public cloud. And you see a dip in the middle. So, when you ask what this balance looks like today, to me, it looks like companies that have learned to leverage the mainframe. And mainframe covers like 90% of the world's transactions. Credit cards and everything else. Mainframe grows. There's no reason they're disposing of it. Distributed and on-prem is decreasing. Private cloud and public cloud are both growing. So, if you look at this stuff, you see mainframe up, you see distributed down. And you see on the other side of it the cloudy stuff over there.

But I say one thing, the issue with the cloud thing... Cause I've been analyzing companies that have in cloud... Some of them get stuck on the technical beauty of, "I'm getting onto cloud." And they forget what the business value is of doing that. I hate to say it, but the risk on that side is I've said to one CIO that, "What do you think, is that he or she who has the most stuff on the cloud wins?" No.

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**Daniel Newman:** Now something you said that was really interesting to me is, we are really actually in early innings for the public cloud. We're only about 20 or 25% of the way there. And then enterprise workloads, we're at sub 10% right now. The economics, though, for the markets and investing is pretty phenomenal. And in "phenomenal" I don't just mean good. I mean almost wow. ServiceNow trades at 500 times it's forward earnings as a SaaS company. And a company like HPE, as an infrastructure company trades at five. And yet you need both software

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as a service and you need more infrastructure, and you need all these things to get there.

But somehow the future value of one is being there's a hundred times more valuable. Which also goes to show that we can do a lot of assessing... Guys like you and me, when I'm not crying over my losses in Bitcoin... And sometimes what the market ends up telling us ends up being confusing. Because it's not always black and white. Because the mainframe, like you said, is still so important. But the way the market values that business probably isn't as high as it should be.

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**Dr. Howard Rubin:** Well yeah, I sign on the mainframe because there's always something... This what they always say, "There's another new shiny object." If you really look at the cloud provider data, I mean this is forgetting, take SaaS out of the picture. And you look at the combined revenue of Amazon, there's Azure, Google cloud. It's about 200 billion if you add that up. The worldwide technology economy, depending on if you include labor or not, is between 4 trillion and 8 trillion. So, the total technology expense in those areas accounts for five, maybe, to 15% of worldwide technology spent.

So, cloud ain't as pervasive as everyone wants you to think it to be, when you go back to the numbers. So why are they getting the evaluations? The evaluations are in a hope and a prayer. But you're starting to see right now... Today as we're doing this, we're starting to see... Yeah, the cloud stuff is growing. There's nothing negative about cloud. But it ain't growing the way it used to be growing. And there was a recent survey, I forget, I think Deloitte or KPMG, they said 67% of people aren't using cloud. 60% of a thousand CIOs said it's costing them more and not getting the value. So again, it's an important shiny new object. And it has its particular uses. But some of the risk is people aren't using it as expected. And there's a lot of behavioral economics around it.

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**Greg Lotko:** I think, just like investments, you don't know what you don't know unless you ask, or you look into it. So, you've said that a lot of these studies are starting to show that cloud is costing more than folks thought. So, what are you seeing in terms of costs per unit, for the different unit of compute across these different asset classes?

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**Dr. Howard Rubin:** Yeah, that's a very interesting question. Because a lot of mythology. And I'm first taking apart the fact of it. So, mainframe has a great history. And as mainframe scale unit cost drops off fast. So, if you have a shop that's running at 10,000, 15,000 MIPS, or even less, you might find they have unit costs. And this comes out of published Gartner stuff of \$1,300 bucks per MIPS. You go to the high altitudes and they're above 50,000 MIPS. Now it's about \$335 bucks per MIPS. So, you see this great curve because the software is leveraged, a whole bunch of stuff is leveraged. That's not to pick on cloud for the moment. But the attractiveness of cloud, by the way, is the cost per unit of compute, the cost for VCPU. So, you start looking at published things from Amazon. Or you look at published things from Azure. And it says one VCPU can handle 52 MIPS. Sort of interesting. And it's 65 cents a VCPU hour, looks like it's costing just pennies an hour.

But then you load on the transport cost. And it turns out that, above a certain break point, that transporting mainframe stuff to cloud could be two to five times more expensive than running at mainframe native. So again, that's not a hard fact, it's first being investigated. But the numbers say, "Here's an environment. You move it to this environment, going to be cheaper." Suddenly there's a whole bunch of other costs on this. The network cost, the security costs, and things that are inherent in a mainframe. So, this is not meant to be a mainframe advertisement or an anti-cloud statement. It means that you've got to do this stuff just like you're doing investments. And understanding, "What's the cost of you even shifting? What's the yield?" And the other interesting thing about cloud is, the cloud contracts that I see most companies have, have floors in the contract. That means you have guaranteeing of certain amount of consumption. Suddenly they're paying for excess usage.

So, companies are first learning that it's not just the technology, it's how to contract for the technology. That's starting to make a difference. So, there are a whole bunch of variables yet to be explored. But you can't always make an assumption that platform A is cheaper than platform B... No matter what that platform is... Without having how the numbers work, how the contracts work, and understanding the suitability for a workload. Understanding doesn't have the attributes for the workload you have. And what are the risk factors it's bringing along? And another risk factor, by the way, is talent.

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**Greg Lotko:** So, there's a revival here, I got to tell you, with the investment bunch of us are making in the ecosystem. You would be surprised how many young folks are coming into the ecosystem. But again, it's kind of like what you talked about before, of what the hype is, and what people know. So, people are still looking directly to a university, and if they don't see it on the curriculum they're thinking, "Oh, nobody can know the mainframe." But the reality is, just like back in the 60s and the 70s, folks can learn the mainframe as they go into their companies. And there is a revival happening. I mean, even just at recent SHARE and iDUB conferences, it caused quite the stir, the amount of young folks, or earlier career folks that people saw around. As well as those transitioning mid-career into the space.

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**Daniel Newman:** I was going to say... Because I want to make sure we get you back on your day, Howard, because we could talk for a long time here... I think what you're pointing to though, Greg, is that we've seen with cloud the idea that everything could go to the cloud. And I'm not even getting to the mainframe. But a lot of workloads remained on-prem. And I think we've sort of landed that hybrid is the way. And even the public cloud companies have moved towards hybrid cloud. The hybrids have moved to public... And you're seeing this sort of convergence. It's the same thing with mainframe, the idea that everything could be moved off the mainframe to public. And now everybody's seeing. And so, it's creating sort of its own economy for people that are like, "Hey, part of this modernization is inclusive of mainframe." And so, there's an opportunity if I can be gaining talent in this space.

So, I guess talk about that, Howard, about the evolution of these classes. Because like I said, A16Z, Andrews and Horowitz, came out with this whole cloud consumption study not too long ago that was like "Holy cow, there is a tipping point where cloud is just no bueno for companies. They're going to way overspend." And these born on cloud companies end up spending way too much. And that's pushed us in this direction. How do these asset classes kind of evolve as tech changes and we start to settle on what the world's going to really look like?

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**Dr. Howard Rubin:** One of the things that always interests me is, always thinking about what comes after what comes next. And that's what you brought up. Again, going back to the financial asset class categories. There are always new financial classes of assets being developed. You saw that in derivatives, you see that in funneling mortgages. You see that in everything else. So, it can't predict what's going to be next. What you

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can predict is that the best-in-class companies... going back to Greg's point... need a view to be able to assess each of these things and look at the attributes that are a key to them. And the attributes run everything from risk, to yield to security. And resiliency, even to sustainability. Suppose you have something that just eats up power... It's like crypto, eating up power in the environment and everything else.

This may sound like a big non-esoteric answer. But there's a wonderful statement by Darwin. It says it's not the strongest species that survives, nor it's the smartest. It's the one that's able to adapt to change. And it's really about harnessing the future and taking advantage of it. So, when a new asset class comes out... Or technology asset classes, I'm calling it... You need to have a basis of looking at its characters to the attributes you know, understand if it's introducing new attributes, and then understand what's suitable. And going back to your hybrid example... And this may be really controversial... But if you take a look at Capital One in 2011, versus Capital One in 2022. And they talk about their journey of moving 2200 apps to the cloud. And then you take a look at JP Morgan in 2011, and JP Morgan in 2022 with a hybrid strategy? Their operational performance has gone up. More income per employee. Their margin has gone up. And their net promoter score has gone up, and everything else.

So, here's hybrid... And actually, if you look at the numbers for Capital One, you'll see that I have a market basket of companies that I compare over here against. And against 34 companies, they were ahead of 71 companies. With their cloud strategy now they're only 71% of the companies. Now they're only ahead of 46% of the companies... I'm not picking on them in particular, because there are a lot of variables and all this in different markets. But there's no guarantee that, move everything to this class, that class you're going to win. And you know that financially. So, best in class companies understand that there's no single technology they can bet their future on. It's different if you were born cloud native, by the way. It's different that you were born in a time where electric vehicles and other things are being phased out.

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**Greg Lotko:** So, let's bring this home, Dan. Let's summarize and wrap this up. What do you gotten out of today?

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**Daniel Newman:** Oh my gosh, a ton. First of all, when it comes down to the way we think about investing, there is some underpinnings that sometimes get missed, in the fact that we just tend to look at what's new and cool, and these huge valuations. And then what's considered old and traditional in tech. And I actually have an op-ed in Market Watch. I just wrote about this. And as we're evaluating these classes, you've got to realize that these things are not independent of one another. These things are heavily interdependent. And I feel like Dr. Rubin really brought that together. There's a timeline and a criticality that these different technologies participate in, in the enterprise life cycle. But I can't totally... I guess I can't totally audit here. And I'd love to get to it, and maybe in a long other conversation, when these things are so interdependent, why are certain asset classes always hyper valued? Hyper. And other asset classes that are just as critical fade, even though there's no real sign that they're going to lose meaningful importance in the markets in any time in the near future.

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**Greg Lotko:** Yeah, but it's the parallel -

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**Dr. Howard Rubin:** Yeah, I was going to say. If I can answer that, sorry to interrupt.

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**Greg Lotko:** Sure.

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**Dr. Howard Rubin:** If I could go back to school again, I would study behavioral economics. Because you're getting back to behavioral economics and all the wild things that go on in markets. So, science ends at a point, then behavioral economics. I'm sorry for interrupting, Greg.

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**Greg Lotko:** That's good.

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**Dr. Howard Rubin:** Yeah.

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**Greg Lotko:** We're on the same thought. I think it's the psychology of markets, and it's this psychology of technology. It's all about people being involved. Those who approach it and are thinking about balance and thinking about use and really evaluating what they have in front of them, are probably destined to make better decisions... Or at least longer enduring systems. Those that get distracted by the bright shiny object, or the overwhelming consensus at the time, they go in a different direction. And hey, look, if it ends up being right on that hot tip and they know when to get out, or they know when to stick or reinvest across balance, they end up better. So, it's about balance, it's about balancing your investment. But also balancing your operation and your organization. So, it's been a great conversation. Fabulous having you

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here, Dr. Rubin. And Dan, as always, a pleasure. Hope folks join us for the next time. We had a great time. This has been the Main Scoop.

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**Daniel Newman:** See y'all later. Hit that subscribe button.

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