## Data Center Interview – November 7, 2014 @ 12:57

INT: If we could start out here, if you could just introduce yourself, your first name and tell us your role in your company related to data center management and the number of data centers for which you make purchase and management decisions.

R: Sure. My name is David, and I am responsible for the data center architecture of a large corporation. We [inaudible 02:36] in our architecture that is defining our technical strategy and our goals and targets for efficiency and availability. We have more than 20 fairly large scale data centers around the world.

INT: More than 20. I see on the questionnaire that you sent out, some of the things that I tried to pick off with you I had already sent so I am just going to confirm that it sounds like you have enterprise corporate data centers and also cloud hyper scale computing. Is that correct?

R: Right.

INT: And that you serve the IT and median communications industries. Is that correct?

R: Yes, we serve all sorts of industries but cloud is our primary business.

INT: Okay. So, just to kind of get us into the mode here and hopefully this will be an interesting and easy question for you to answer, can you tell me what are the top three factors you consider when setting up a new data center or doing a major upgrade to an existing data center?

R: I think that it’s hard to pick a top three. We have a lot of criteria that go into it.

INT: Okay.

R: The main focuses are around lifetime total cost of ownership with a focus on you know, operational efficiencies and that total cost ownership includes depreciation of the asset, including the energy usage and other resource usage like water and people costs to run the facilities, maintenance and repair. So the total cost of ownership is a major factor. Availability and the ability to meet our mission as far as the uptime of the data center, how many nines it has or what the time between failures is. I think thirdly would be any customer in back as far as you know, is it in a location where there is a low wait and speed to the end users and we have a good customer experience from that data center.

INT: Okay. I am just taking some notes, too, so that I can remember what you said. So how does energy efficiency fit into these factors? I know that I actually heard you say the word “efficiency.” I didn’t know whether you meant energy efficiency, but how does energy efficiency, but how does energy efficiency fit in? Is it important?

R: All resources efficient. So energy efficiency is extremely important to us. We are a very large energy user and honestly every bit we could save from an energy efficiency standpoint is returned to our bottom line and our entire management chain up to the CFO and CEO of this company have visibility to how the cost of energy effects the bottom line of our business.

INT: Okay. And it sounded like I might have interrupted you and you were saying you also consider all of the other resources that go into that. The water, and are there other resources you also look at?

R: Yeah, we look at water and sewer and our carbon emissions among other things. Those are the main ones.

INT: Okay. And how often do you perform major upgrade at your data centers, whether it’s to refresh a facility or to update IT equipment?

R: IT equipment is updated very frequently, I mean, from the frequency standpoint of I could say from three to six years. It really depends on performance of those assets. The facility size, we for the most part look at return on investment based upgrades. So we are very cognizant of when a deficiency upgrade will pay back. If it pays back in a couple years, it is something that will be understand fairly quickly. If it is going to take five to ten or more years for payback, that’s something that we would put maybe on a ten year cycle to test progress.

INT: Okay. So it sounds like it varies quite a bit depending on the facility. Is that correct?

R: I would say very quiet a bit depending on the technology involved. It’s really about return on investment. If there is a great deal, we are going to do it very quickly.

INT: Alright. So it’s not a set cycle, but it sounds like you are kind of continuously looking at your facilities to see if they do need upgrades.

R: Correct.

INT: Yes, I mean, don’t let me put words in your mouth but that’s what I am picturing.

R: It’s a little bit of both. There are opportunistic upgrades you look at and then when there are large scale refreshes of the IT equipment that is a nice inflection point for also doing facility level upgrades.

INT: Okay. I noticed on your questionnaire, I just wanted to make sure I could read what you wrote. The question was how often do you make major infrastructure upgrades to your data services, when cost advantage was the last word, so that fits in with what you are saying, with what you are just telling me about.

R: Exactly.

INT: So starting from this idea where you want to upgrade a data center, how do you go about gathering the information about what new equipment, technologies or facility management strategies are available out there in your upgrade process, or if you are

R: Yeah, we have fairly tight relationships with many of the large scale electrical manufacturers and integrators out there, so the General Electrics, the Siemens, the [inaudible company name 09:32], these are large companies. We have pretty good relationships with them. So we’ve got a strong pipeline relationship with the major organizations and then we also spend a lot of time talking with smaller start up organizations as well for newer technologies like fuel cells and things like smart grid, those types of projects. We’ve got some pretty solid relationships there. We also engage in our own research and development in select areas around energy efficiency and resource efficiency.

INT: Okay, and have you talked to internal people about their knowledge about upcoming things, like the engineers that maintain the system or any other information at all?

R: Yes, absolutely. We have a bidirectional relationship with our operations staff and our engineering staff.

INT: Okay. And how about customers? Do you ever gather information from them in the process of doing these upgrades or building new centers?

R: We do have conversations with them, yes, but typically we are a little bit ahead of what they are doing in their own facilities.

INT: I can imagine, actually. In terms of your relationships with the manufacturers, you said you have a good pipeline, so what is that? Can you just tell me a little bit more about what that means to have a good pipeline? What information you are getting from them?

R: We are brought in early when they have pilot projects or new technologies that they are looking at and they value our feedback and know our users and are often asking us to pilot new projects to support them.

INT: Okay.

R: So, a new type of battery or you know, a transformer with higher efficiency, they are eager to get our feedback.

INT: And are there any other places that you get information that you haven’t told me about so far?

R: Yeah, we stay up to date on conferences, and we have our Twitter feeds and things like that that we watch.

INT: Okay.

R: Just to create awareness.

INT: Okay.

R: We do participate in Energy Star and things like that.

INT: Okay, thank you. Does the decision making process differ between older data centers and newer ones in terms of designing new upgrades or improving the facilities?

R: I must say that the decision making process doesn’t change very much but the outcomes can. We have a robust total cost of ownership model, and so the age of a facility might incent an upgrade or it might disincent an upgrade, depending on the amount of investment necessary and what the expected life of the asset is.

INT: Okay, and does that also come into play if you are considering a new facility, versus upgrading an existing facility?

R: Generally, new facilities are much easier to put new technology into and so for the most part, to a degree, I almost have to constrain the amount of innovation being requested in every new facility. [Laughter] There’s a little bit of [inaudible 13:24] to it.

INT: Right. Everybody gets excited. Okay, so I see from our form that you gave us that you do rent or lease space from others as part of your you know, whole data center supply here. Is that correct?

R: Correct.

INT: And what’s that relationship like when you lease or rent space from others? Do you pay on a space alone basis? How does that relationship work?

R: Typically, the bulk of our you know, we have some small leases where we pay for space. But the bulk of those relationships are paying on a cost per capacity. So cost per kilowatt.

INT: Okay.

R: And that is usually the fee that takes care of the lessor’s depreciation and any profit they have as well as their cost to operate that facility. And then we receive direct pass through on the energy cost.

INT: Okay. And if something needed to be fixed or upgraded in a system that you were leasing space in, would you be giving any direction to them or is that something that the owners of that, would they be making all those decisions?

R: Typically, the owner would not be very interested in providing those upgrades unless there is significant long term benefit as the owner.

INT: Okay, so that’s not a very typical situation that would happen.

R: It’s not a very typical situation. Sometimes, if there is something that we both think is a very good deal, we will collaborate on it and make it happen but for the most part, most lease facilities are run by real estate folks who are very concerned with making their profit. Energy being a passed through cost is the tenant’s responsibility.

INT: So unless there was something, you know, major power or cooling infrastructure system that needed to be fixed, you generally wouldn’t get involved. Is that correct?

R: Yeah. For the most part, they would be responsible for delivering that service and availability to you.

INT: Okay. And occasionally there might be something that you look at collaboratively, it sounds like, from what you said. Correct?

R: From the standpoint of energy efficiency, there is no incentive for the leaseholder to do an upgrade, but there is also no disincentive for them to do an upgrade. Because the energy cost is passed through to the tenant.

INT: Right, and that would be you.

R: That would be me. And if there is a win-win solution, you know, if we had an idea and said, “Hey, if you do this to your facility, it will save us some money right now, and in the long run, if you are going to rent this to someone else, it will save them money and it will be more attractive for them,” then they might see that as an opportunity.

INT: Okay, and that as you said, only happens – has it ever happened?

R: It definitely has happened. But it’s not a regular.

INT: And when you also lease space out to others, is that correct? The data center space or not?

R: No, I may have gotten confused in that element. We do not lease our space to others.

INT: Okay so let me just check on here. So the question was, “Do you lease or outsource any of the following elements of your data center,” Oh, not space. You said sometimes you lease space and sometimes facility management and sometimes maintenance, but you are saying no to all of them?

R: I misread that question maybe. What I was trying to say was we are tenants of leased space, sometimes. We are not the lease holder in any case.

INT: Okay. I am just going to change. I can see how you could have read that that way.

R: I think the word, “outsource,” made me think that I was consuming rather than providing.

INT: Right. So you are not leasing out any space to others, or any equipment or anything. Okay. Are your data centers run as a single organization within one budget with one team and one boss, or do they have separate different teams and bosses?

R: It all rolls out to one boss.

INT: Is that you?

R: No. He’s my boss.

INT: Not quite you.

R: Not quite me. I don’t like to manage people.

INT: Okay, so it’s all under one umbrella. And you are paying the electric bills, it sounds obviously you are. Is IT responsible for electricity costs? Does that come out of your budget?

R: The electricity costs come out of our budget, the data center budget, and we provide a consumption based charge back model to our product groups or product units internally.

INT: Okay, and I am assuming that all of your upgrades and so on, they also come out of your budget. Is that correct?

R: Yes they do.

INT: Okay. Do you buy or sell equipment on the secondary market at all?

R: We sell equipment at the end of life on the secondary market, yeah.

INT: Okay. Sorry. Sometimes I have to see whether these things apply to you or not. Does selling on the secondary market have an effect? How does that affect your business? Is that a very big part of it?

R: It’s not a very big part of it, but for every server we buy, at some point we need to get rid of it. We went from being just a recycler, of just recycling our assets to receiving a little bit higher return for selling them off. We fell into a third party intermediary who resells them.

INT: And so the reason you decided to stop recycling was what?

R: It’s not that. We are still recycling, we are just being paid more for it.

INT: I see.

R: We were wrapping our servers before, and now we are actually recycling them to people who would use them as servers.

INT: Okay. So these servers will get used and they are buying them from you basically, and they are going to use them and someone makes that arrangement.

R: We presume that they are going to use them. I am sure some quantity of them end up being recycled.

INT: Okay, alright. So this next part, we want to know a little bit more about how energy efficiency fits into your purchase decisions, and specifically if there are barriers to certain kinds of energy saving investments and how you weigh energy efficiency against other factors, such as performance or reliability. So you did mention in the beginning that energy efficiency was an important factor in your data center management because you have big bills for one thing, it sounded like. Is there anything else that motivates energy efficiency to be an important factor by the way, aside from the cost of it?

R: I mean we have corporate sustainability goals, we have corporate carbon goals, and we want to be good citizens and it looks good for our brand.

INT: Have you made recent improvements that improved facility energy efficiency? This is in your facility. Then I’ll ask you about your server utilization.

R: I guess you could say yes, because we are growing fairly rapidly so we are creating new designs and new facilities that have much higher efficiency than two years ago or three years ago.

INT: Can you give me a couple of examples of what you are doing?

R: We use elevated supply temperatures in our data centers as well as outside air cooling. Many of our facilities have no mechanical chillers.

INT: Okay. And were there specific reasons you chose those technologies, or what made those technologies so appealing to you?

R: They were low cost, high return as far as the amount of efficiency we got, and the also lent themselves to more integrated designs. By that I mean, rather than being a stand-alone technology, they were concepts that we could expand upon by making investments in our server platform, or in our software control systems to get even more bang for the buck out of it.

INT: Okay. Were there other factors that you considered when deciding to choose these particular technologies?

R: We factored in availability. So it would be how reliable would the system be in our platform. We considered how much water they would consume as well as the energy. We considered overall performance and ease of operation.

INT: That is a good list. Thank you. Did you try out some of these things first in a few facilities before you did them other places? Or how do you do that? How do you?

R: Yeah, we definitely pilot new technologies and improve them before we put them into more extreme situations.

INT: Okay. Are there things that generally tip the scale toward making a wider spread investment in these technologies or are they the things that you are talking about that they live up to all of those criteria that you have been mentioning?

R: Yeah, and if they live up to the criteria, then they are proven.

INT: Okay. Have you had any troubles with anything?

R: Absolutely.

INT: Not proving – and does that mean that they are broken or they haven’t performed the way you expected or what?

R: We learn a lot of lessons along the way and there is no technology for efficiency that is completely silver bullet. All of them take a little bit of massaging and learning to get to the peak efficiency while delivering against all the other criteria.

INT: And yet it sounds like you are willing to take the risk, or do you perceive it as a risk?

R: The rewards are significant.

INT: Okay, the rewards in terms of savings?

R: Correct.

INT: Yeah, okay.

R: Do some of these technologies turn out to have other benefits besides the savings?

INT: Yeah. A lot of them, I’d say, some of them are much more simple to operate, which means if it is simpler to operate, we have fewer human errors, which means we have better availability and reliability.

R: Okay, and I was just thinking what you said about, if there is less mechanical equipment going on, is that a simpler kind of approach?

INT: Exactly. Fewer parts, fewer broken pieces.

R: Right. Fewer things to pay attention to and to fix.

INT: Well that’s pretty – sorry, I am very interested in what you are saying even though I don’t know very much about it. So have you recently made any investments that improved server utilization?

R: Yes. We are often making those investments.

INT: And can you give me some examples of the kinds of things that you have done?

R: I think the simple ones are incenting more of our business units to virtualize their products, and virtualize their server applications. We have done that through internal charge back models. We have done that through you know, demonstrating the cost efficacy of the decision, primarily.

INT: Do you measure equipment utilization? I think you said you did, actually.

R: Oh, facility equipment utilization? Or server.

INT: Server. I think this is supposed to be service. It should have said server.

R: Yeah, we do track that, yeah.

INT: I notice you didn’t have an answer, possibly because you didn’t have an answer to put in there, but what is the average utilization server rate of your data centers?  
  
R: Yeah, and that’s probably one of the things that would serve as a competitive secret. Can’t answer that one.

INT: Okay, alright. That’s a perfectly good answer, even though this information isn’t going anywhere.

R: Understood

INT: Do you currently use all of the energy efficiency technologies that are built into your servers, or have you disabled any of them for any reasons?

R: We use them and there are certain technologies that we enable or disable, but we are actively looking to enable some of them. I think one of the greatest examples is power capping the server. We use it in select places. We are learning a lot about it, but it still can be a little bit dangerous, versus things maybe we can do in other parts of the software to achieve the same goal.

INT: When you say “dangerous,” what does that mean?

R: In a large scale data center environment, if the servers decided to put themselves into a reduced power state, performance could go significantly where we do not want it to. So the lesson to us here, would be we buy extremely power efficient power supplies. We do a tremendous amount of work on our server fans and ensure that they are the most efficient they can be and we do enable throttling or under clocking in certain situations.

INT: So it sounds like you are very actively involved in maximizing how all of these different elements work together to have an efficient result. Is that correct?

R: That’s a great way to put it. IT’s a system level optimization that takes into account the data center, the servers, the network and the applications that run on top of them.

INT: That sounds challenging, I have to say.

R: I love my job.

INT: By pretty fun too at the same time. So do you think about facility efficiency and inefficiency and IT utilization efficiency together, or is that a separate thing?

R: Yeah, we like to roll up, you know, if I look at an uber set of metrics for our business it is around performance per dollar per kilowatt hour.

INT: And so that includes both the facility and the IT equipment, is that right? And how it is operated?

R: Facilities, IT equipment, the network and to some degree the applications. Writing better software can affect that as well.

INT: Okay and does any one thing dominate any other or is it all those factors thrown into sort of equal calculations?

R: The servers tend to dominate that because that is where the performance increases are coming from every year. So as servers get more performance for the amount of money and the amount of energy that they use, that tips the scale more than anything.

INT: Okay, are there any efficiency technologies that you have chosen not to pursue and if so, can you tell me what they are, or give me one example?

R: That’s a great question. I’ll have to think about that. I am trying to think of what people try to ask me or sell me all the time.

INT: Right.

R: You know, I think rotary and flywheel UPS’s are a technology that we haven’t put a lot of effort into. They are fairly efficient, mostly because there is a barrier to entry. It doesn’t pan out on the total cost of ownership.

INT: Okay.

R: Similarly, some of the early entries into the fuel cell market kind of had the same problem. They were very drained, they were fairly efficient to institute, the grid efficiency, but it just wasn’t panning out financially.

INT: So, by panning out financially, you mean the return on investment wasn’t there?

R: Yeah.

INT: Okay. We have been talking about major investments to reduce energy use. Do you also use maintenance or training of staff to reduce energy use?

R: Definitely. Our data center managers, a portion of their performance and incentive system is tied to the TUE or the energy efficiency of their data centers.

INT: Okay, well that’s pretty direct. I mean, that’s really interesting. Anything else that you provide them training or ongoing training?

R: Yeah, we provide ongoing training. We stay close to industry conferences to be able to learn best practices from other users. We have a number of working groups or what we call committees or forums that work with specific technology upgrades. For example, we kind of finished one up on retrofits for LED lighting in the data centers, and thoroughly understood what that threshold would need to be, what the return on investment would look like for that to be successful. Those are kind of grass roots community efforts we really encourage.

INT: Okay. You sound like poster children, I have to say, for energy efficiency.

R: The funny thing is that you know, in the business I happen to be in, it comes out of the bottom line and it actually feels really good to be able to be doing the right thing and actually be able to be improving our profits at the same time. It actually works.

INT: Well, that’s the way I feel about my own work. It is nice to do something that is both good and enjoyable and earns you money at the same time.

R: Exactly.

INT: So that’s great. I have a list of factors here, and I think we have talked about some of them before, in terms of the ones that you used when you choose technology. So you obviously look at performance. I think we’ve talked about that. Reliability. How about as part of the performance, peak capacity or data security, do you look at those two things?

R: Oh yes, absolutely. Peak capacity, wondering when it will tip things over and from a security standpoint, that’s a great example for like the startups in the newer product out on the market, you know they may not have as robust security measures as some of the more established players.

INT: Okay. Do you consider climate and other location specific factors in your decisions?

R: Absolutely.

INT: How does climate affect cooling choices, for instance?

R: Well, as I mentioned at the beginning, since we are using outside air cooling without chillers, we can do that in a lot of locations around the world, but if I had a choice, I’d want to do the outside air solution and so when we are doing our site selection, factors such as you know, the cost of power, any other tax incentives, staffing, network, all those come into play. We also look at the climate to determine if we can use our preferred means of high efficiency cooling there. Sometimes, the total cost of ownership shifts to the point that we need to put chillers in because the location is great otherwise, but for the most part, we have managed to stay out of chillers for a little while now.

INT: So your preference is to be able to do that but sometimes other factors may make it not possible.

R: Sometimes there might be a location where the business climate and the energy cost and things like that drive us to a higher humidity, higher temperature location that requires less energy efficient cooling.

INT: How about financing? Does that factor into your decisions related to your energy usage?

R: No. I will say we do a net present value calculations on all of our efficiency upgrades. So our cost of capital is factored into those decisions.

INT: And energy policy within the company or state or federal efficiency policies? Do they affect your decisions related to energy use?

R: We are actively engaged with federal and local energy regulators.

INT: Okay. And you also said that you have a sustainability policy. Is that correct?

R: That’s correct.

INT: I know you mentioned reliability issues so does that include ease of installation and maintenance and repair?

R: Yeah. Those are definitely factors that go into our total costs of ownership.

INT: Okay, and warranties? Is that part of what gets considered? Or not?

R: Yeah, sometimes. It’s generally not a big factor but it plays into our maintenance and repair budgets and or total cost of ownership.

INT: Okay. I think we’ve talked about the split incentive situation where you are leasing space. It doesn’t sound like that. That’s not mostly what you are concerned with from what you have been telling me. I mean, whether that doesn’t relate to your energy because it’s really the owner of the space passing through the cost to you. Is that correct?

R: Yeah. We pay attention. We try to influence. Sometimes we are successful and sometimes we are not.

INT: Okay, I got you. Please don’t ever let me put any words in your mouth. I am just trying to understand and make sure we get through this in a timely way.

R: Yeah.

INT: Do you look at electricity rates as part of your analysis?

R: Absolutely.

INT: Okay, and do you ever renegotiate your rates?

R: Yes. We work closely with the local utilities to negotiate our rates and also to work on how rate structures are classified for data center operators.

INT: Back to this idea of reselling your equipment. Do people pay premium prices for the more efficient use equipment?

R: Yeah, I mean slightly.

INT: Okay.

R: For the most part, we are lucky if we see two digit returns on some of these efforts.

INT: I’d like to ask you how you estimate and consider energy savings a little bit more in your decision making. You already mentioned where you go to get information. It sounds like you have great pipelines actually. Do you feel like these sources provide reliable estimates for energy use?

R: No.

INT: No? Okay.

R: No.

INT: And why do you say that?

R: Well I think that, and I’ll try to give a couple of examples, but one, so if I look at the startup community and the newer stuff that’s coming out and the really exciting stuff for energy efficiency, a lot of it is being driven out of California. California has terrible power rates and they also have a great incentive program. So when someone comes to sell me a new technology, their total cost of ownership calculations and their value proposition are based on ten to eleven cents a kilowatt hour and also receiving a significant incentive from a local utility, like hundreds of thousands of dollars. I have a global program, so none of those things apply and we end up running every technology through our own operating model to better understand it. I think that there is a real opportunity for the energy efficiency community, or Energy Star, or someone to look at creating a total cost of ownership index that went to multiple markets and multiple situations.

INT: Sounds like a great idea to me. Most of the developers who use these technologies are in California, so that is where a lot of the new developments are coming from.

R: Yeah, and they are a little bit out of touch for the major market, what needs to happen there. So, you and I have been talking and we have fairly advanced analytic capabilities and so we are looking for a little bit more in our decision than what is in a white paper by a manufacturer.

INT: Okay. Thinking about all of the factors that you have mentioned so far that affect your decisions, investment decisions, do you weigh them against he up front cost and incorporate that into your investments or pay back calculations?

R: Definitely. I mean, the upfront cost definitely plays in. The amount of time it would take to put the upgrade in place play in but we use our weighing cost of capital and we have an idea of what a reasonable amount of return time is. It generally is not a – first costs are not an exclusionary thing. If somebody says it’s going to cost a million dollars, it doesn’t make it a nonstarter.

INT: Okay. So it sounds like though you do have a very standardized set of metrics that go into this decision. You sound like the envy of many, I would say.

R: We are lucky. We understand what drives our business and what makes our money and what we need to do.

INT: Okay, so the last major part of my questions here and I think we have maybe about ten minutes or fifteen minutes left, I hope you have that much time, given we got started a little late.

R: Yeah we got going a little late. Let me just double check here. I’m pretty sure, yeah, I’m fine.

INT: Okay, great. Some of these things we have already covered. You might recall you filled out that long, it shouldn’t be pejorative there but the last question on your questionnaire was about which technologies have you used and would you use them again. Remember that list?

R: Yep.

INT: So here are my instructions here. So help me figure out what to do. We want to hear some more about some specific technologies. In particular, you’ve got a few here that you say you’ve never used and you wouldn’t consider and a one I think that you say you have used and you wouldn’t use again. We can talk about those, but let’s start with maybe a couple that you have used and you would use again and why those are you know, compelling technologies to you. I can refresh your memory as to what the list is.

R: I’m glad that you’ve got that. I’ve got the list.

INT: You’ve got that? That’s great. So maybe if you picked a couple of your favorites. Because we don’t have to go through the whole list, but we want to hear about a few things.

R: Yeah, I’ll try to. I might lump them all together into one thing, but you know, I would say that the number one improvement for us from an energy efficiency standpoint, has been moving to air side economizers.

INT: Okay.

R: We’ll call that the gateway drug as far as there is a bunch of other things that happened afterwards. By moving to the air side economizer, we realized we could make that very efficient if we put in place hot aisle containment, so that you are isolating hot and cold aisles. So that made us not bring hot air from the back of the servers back around to the front anymore. When we did that, we realized that we could then raise the temperature set point in the cold aisle and it would be consistent throughout the space. And so those three things together have driven our energy efficiency up by thirty to forty percent.

INT: So that’s the air side economizer as the gateway drug that led to what’s that the isolating hot and cold aisles, that’s the second? And the third one is which one?

R: Raising temperature set points.

INT: Oh, raising temperature set points. You are so analytical, I really, this is great. Thank you. Well, I know these things are all related together and you can piece it apart for me in this kind of causal way. It’s great. So anything else about those three things that technologies or approaches that you just mentioned that you want to say about air side economizers or isolating hot and cold aisles?

R: Some of them are well [barrier to entry]. I think many businesses can isolate hot and cold aisles and get a measure of efficiency product. Air side economizer takes a little bit different risk profile and I don’t think everyone can do it. We are a little bit more tolerant to risk. We are a little bit more experimental. But I think it is fairly well proven to work, but it doesn’t do some things that some days our operators like to do. We have a thing called island mode, where can you run your data center basically disconnected from the outside world, and the air side economizer is not great for that. You kind of have to have air. But we have done a water side economizer in situations where we need to behave like that, which works great, too.

INT: Water? Did you say water side economizers?

R: Yeah.

INT: Okay. I love that, “island mode.” I thought about that for me personally, I mean how could I have island mode?

R: I am actually thinking about that for the holidays. Maui.

INT: That sounds great. Especially if they don’t have any Internet, right?

R: Exactly.

INT: Detachment from the outside world. Okay, anything else about these three then? You’ve talked more about the air side economizer, you’ve found a low barrier entry for isolating hot and cold. Anything else about -- ?

R: There’s one other thing that wasn’t really on this list and I really didn’t mention it, but in addition to the raising temperature set points, another important thing has been raising Delta T, which is an industry term. If the temperature comes into the server at 80 degrees Fahrenheit, what temperature does it leave at? Typical servers, it is going to leave at about 100 degrees. It’s going to be a 20 degree Delta T. There are very large efficiencies to be gained by having that temperature leave at 120 degrees, or a 40 degree Delta T or somewhere in between. That is not seen in typical data center PUE calculations. Because it’s making the fans inside the server more efficient, that very, very few people track.

INT: Okay. But you have used this and it’s worked?

R: Yeah. It requires an integrated system design, but it works.

INT: Let’s look at the couple of things that you said you’ve never used. You have one, you said space based pricing you’d never used and you would not consider.

R: Yeah, and I’ve read this as how we lease. Is that the right way to read that?

INT: I would trust your judgment more than my own. Because it does say “multitenant.” It does say multitenant.

R: Yeah, to my assumption, this was a lease and I would go back to that lease holder incentive model we talked about earlier. A long time ago, lease providers priced everything on a cost per square foot and that was space based pricing, and that included the energy bill. And it’s a terrible deal for everybody. Because the lease holder had no control over how much energy you use or didn’t use, they charged you for as much as you could use.

INT: Okay. Worst case scenario.

R: Worst case scenario and it just didn’t work. So for the most part, the industry stopped doing that. You know, if you want to buy one server rack, you might get charged that way. But for the most part, people don’t do that. The next thing they moved to was the Next Line, where they charged you for the space, the amount of square foot that you have and they were explicit with how much energy they charged you for but they charged you for all of it. And the same thing, we wouldn’t use it again because we end up paying for a lot of energy consumption and that lease provider is not incented to make their system more efficient. Because they are making profit off it. There is one provider who makes profit off of power you don’t use times two.

INT: Okay.

R: I should have done that ten years ago when I figured that out.

INT: Right.

R: And then the third one is space and actual power price, which is metered energy, which is very good and that’s kind of where the industry should be at. As we talked a little bit, there, I probably should have ticked the other box here and said, “power capacity pricing and actual power use,” which is what we typically do now.

INT: Okay, so that would go in the other spot. So you added there. But otherwise, you’ve figured out a way to use a lot of these things and have been quite satisfied with them. It looks like you ran through there.

R: Yeah, there is nothing on this list that I don’t actively do on a regular basis, aside from these last guys about leasing.

INT: Okay. Well that’s great. I have almost to the last question. Some companies in other industries have told us about pay back periods that they need to justify investing in energy saving technologies, and that payback needs to be less than the amount of time for the actual payback for the equipment, if that makes sense to you. So that you might, for instance, have a technology that lasts ten years, but pays us back in one to three years. Is that true for you that you need to have a shorter payback in comparison to the actual life of the equipment?

R: Yeah, definitely. It’s not a hard and fast rule, you know, the cost of capital involved in the decision weighs into it and the total costs of ownership weigh into it. But for the most part, I am usually looking for a two to three year payback on something. I remember that we were involved in a government deal, no, it wasn’t a government deal but a building review with a government agency and they asked us why we didn’t use a particular energy efficiency technology and when they modeled it out it had nineteen year payback, and the depreciation of our entire facility was fifteen years. And so sometimes the payback periods are short in government view, but in business view, they are extremely long. I could have used my money better on other things.

INT: So that’s what you are always considering, is what the best way to use your capital is?

R: Yeah. What’s the best way to use my capital and my cash today?

INT: Your cash. But you said it’s two to three years normally but that there might be some situations where it would stretch out longer than that.

R: There might be times when we could let it stretch out longer than that but if it is an upgrade of an existing facility, it would have to be fairly short to compensate for the risk of making changes.

INT: Okay. So part of it is how soon are changes going to be made and as you say in the new facility, then you might have a longer lifetime for that facility.

R: Yeah, it’s easier to adopt.

INT: Yeah, and can you tell me anything more about why you need to have the investments pay back sooner? As you can tell, I think, there are different points of view here. There is the government point of view and the business point of view. Any other helpful ideas there you could relay?

R: I’m lucky to work for a company that has significant amounts of cash, and so we are not typically borrowing to build these types of things. And in that case, we have a responsibility to our shareholders to get the most return for the amount of money that we have and I am accountable to the CFO to ensure that we are spending that money wisely. That’s kind of what it comes down to. If project costs a million dollars and it took ten years to pay that back, I took that million dollars and I bought a startup company and I invested in something completely different like a new business, what would my return on that be? It probably would be significantly higher than buying a widget that got me a little bit of energy efficiency for ten years.

INT: Okay, thank you. That’s very helpful. This is my wrap up question and you are free to enjoy the rest of your day. We talked about a lot of different investment decisions and actually you just summarized a lot of the things we have been about your investment process, you know, what you consider and the reliability and payback and the many factors that you consider. I say you have been really clear and very helpful. Before we finish, I just want to check in to see if there is anything else that we haven’t discussed here that would influence the technology or strategies that you choose for your facilities?

R: Not too much. We are in the unique position where we control a lot of our software as well, so we make a lot of energy decisions in software that don’t result in a hardware purchase and are not directly noticeable to the outside world, that stuff is government so it’s hard to understand.

INT: Okay. Well thank you. So anything else? This is your final word of advice or insight?

R: No, this is easy and you are really good at what you do.

INT: Oh thank you so much. I want to take this chance to thank you so much and it’s really valuable. I’ve done a lot of interviews in my life and you have provided some very specific ideas that I think our clients will find really useful. So thank you very much, David.

R: Thanks a lot. Have a great day and a great weekend.

INT: Okay you too, bye-bye. I hope you get to Bali.

R: Thanks, take care.

INT: Bye-bye.

R: Bye.

[END OF INTERVIEW]