Data Center Interview – November 26, 2014 @11:59

R: We get concerned just because we’re such a unique beast that there may not be enough of a core group of companies with our profile to sufficiently mask our information. That’s our main concern when we do research.

INT: Well, I think that’s a good thing to have on the record here, and I will be sure to convey that to the analysts who will be dealing with this data. And I think to be reassuring, we have dealt with this kind of situation before, so everyone is very concerned about protecting identities and especially in this market. But I will be sure to especially convey that, and I know there are some unique situations, and I think you are rightfully concerned in that sense. So anything else? Any other questions?

R: No.

INT: So just if you would first tell me about yourself. Again, I know your first name is Joyce, and I’d like to know your role in your company with regard to data center management.

R: So I’m in the data center infrastructure group, the group that designs, builds, and runs all the data centers for the company.

INT: Designs, builds, and runs. And the number of data centers for which you make purchase and management decisions, I think that might be on your - - looked like there were more than 2,000, is that right?

R: No. I think it’s at 13.

INT: Oh, 13. Sorry. I’m having - - the questionnaire that was sent to me has some funny little extra characters in it. So I have greater than ten. Is that consistent with the 13?

R: Yes. Yes.

INT: Sorry. And what type of data centers does your company operate, and what industries do you serve?

R: So this was in the survey, and I clicked the box for the large scale. I don’t remember what your words were.

INT: Oh, yeah. Mega or utility scale data centers, is that correct?

R: Correct. Yep.

INT: And I’m looking down here. And you have - - oh, that’s what it was. It was greater than 50,000 servers.

R: Yes.

INT: And primarily cloud and hyperscale computing, is that correct?

R: Correct.

INT: Sorry. There’s little question marks in front of the things that you didn’t check. So instead of being blank, it’s just slightly hard for me to read it. So I just - - so that’s the kind of situation that you’re in. So to get us going here, I’d like to know about the top three factors that you consider when setting up a new data center or doing a major upgrade to an existing data center.

R: Probably the first thing we look at is performance in meeting customer needs. The second would be doing a total cost of ownership or cost analysis.

INT: Is that the second one, total cost of ownership?

R: Yes, of whatever the upgrade or the site was. And then the third would be - - it’s such a different question – are you talking about setting up a new data center or - - I’m sorry. What was the question again?

INT: In setting up a new data center or doing a major upgrade to an existing data center, so I think you can see those as similar. The major upgrade really means significant changes. But I know there are other - - you already obviously have the building and the land and so on. It’s already been sited in the second case. If there’s differences, you can certainly talk to me about it.

R: Well, then the third one would be reliability.

INT: And can you tell me a little bit more about why these are the most important factors? So first you mentioned performance and meeting customer needs.

R: Yes, because that’s what we do. That’s why we’re in business.

INT: That’s what you do.

R: That’s our business is providing compute [space 06:43] -- compute.

INT: And how - - and so how do you determine those customer needs, or is that something that you’re getting feedback on on a regular basis or - -

R: It’s primarily we look at processing feed and latency, and we get feedback from our customers constantly whether things are too slow or seems like they’re going fast. We monitor all that and making sure they’re getting the performance that they need.

INT: And what do you figure into the total cost of ownership?

R: We have a pretty extensive model that we use that figures that is it quite a robust TCO. So it’s all the capital costs, it’s the labor cost to put it in, the operating costs of the different options, and then the end-of-life cost.

INT: And is energy use and other resources figured into that equation?

R: Yes, absolutely. Yes, energy, water. And we actually use - - we have a carbon tax, as well. So if we’re using high carbon energy, then we factor that more into whether we’re using low carbon energy.

INT: And so how important is energy efficiency then among these factors that you consider as part of your cost of ownership?

R: Oh, it’s huge. Typically, the more - - we use a 15-year life for most of our assets in the data centers. And so over those 15 years the equipment uses a lot of energy. So typically that’s more than the capital cost.

INT: Are you hearing a noise on your end by any chance?

R: I am not.

INT: I’m hearing a crunchy noise.

R: Hang on. Maybe that’s my microphone. Is that any better?

INT: Oh, that is better. Thank you so much. I appreciate it.

R: Yep.

INT: And then in terms of reliability, just back to that, could you just tell me a little bit more about what reliability means in your business?

R: Yeah. We have - - I think it’s a five-nine reliability. So we look at system reliability, and we have stats that our failure analysis experts that will look at each of the different components of the system, figure out what the reliability of each component is, and roll it up to a system reliability. And so we have targets that we need to hit, and if something is cheap and great but it’s going to break and damage our reliability, then we won’t go with it.

INT: How often do you perform major upgrades of data centers, whether it’s for a whole facility or the IT equipment inside of it?

R: The IT equipment, we tend to refresh the IT equipment every three to four years, and we would do our sort of infrastructure refresh every five to eight years. But any of the - - that’s for - - on the IT side. The mechanical equipment that’s in the data center, the big stuff, we typically expect that to last, I think, around 15 years.

INT: Fifteen years. So that’s more of the heating and cooling equipment, those kinds of things?

R: Yes.

INT: That’s what you mean by that?

R: Yes.

INT: So that - - actually you just anticipated my little follow-up there. That’s great. So let’s start from the idea that you want to set up of upgrade a data center. And I understand that they’re not exactly the same thing. But how do you gather information about what new equipment technologies or new facility management strategies are out there that you might want to consider when you’re undertaking these major upgrades or when you’re building a new data center?

R: Well, because we operate a fleet of data centers already which are very focused on in being efficient, we’ve got kind of our own base of people who are off looking for opportunities constantly. So there’s a very strong feedback loop between our existing data center staff and the data center - - hang on one second. I’m going to go someplace that’s - - now, one moment.

INT: Okay.

R: I just don’t want to bother the people that are around me. So we have our existing sort of the base of our units of our own local experts, guys who - - guys who run our fleet of data centers, who are constantly looking for opportunities. And they’re a pretty forward-looking, thoughtful bunch. The other place we do is we have our kind of at headquarters the design team that are charged with looking for new - - hang on - - looking for new technologies. And so there’s my team that is really focused on technologies that drive resource efficiency, so energy efficiency and water efficiency. And I have specialists who dive into the data coming out of the data centers looking for opportunities.

So if we look at - - we’ll start looking at the numbers that were - - we monitor everything extensively. We look at some of the numbers. And, for example, there’s a piece of equipment that, I think, should be able to be more efficient, I will find that by looking at the data coming out of the data center. I’ll then start doing research on what are the options for that particular piece of equipment. And I’ll do things like go to very specialized trade shows, certainly do Internet searches, talk to other - - I have a couple of professional networks that I belong to where I can put out anonymous questions and put them out there. And then people that I work with or that I’ve worked for or just sort of my own network, I’ll throw stuff at them, as well. That’s what I do.

But then we also have a whole team of electrical engineers, mechanical engineers, doing the same thing.

INT: And do they - - how do manufacturers play in this information resource system? Do you work with them directly or - -

R: Yeah. Yeah. We certainly have a whole portfolio of manufacturers that we work with. And so we will - - if we’ve typically been buying this piece of equipment from Manufacturer A, we will absolutely go to them and say, hey, we’re looking for something more efficient. What do you have? And then let them give up options. But often the stuff that’s more innovative is not coming from the big guys. It’s coming from some of the smaller shops that are really doing things differently.

INT: And you just already have connections with those players, and people are keeping in contact with them to see what’s evolving? Is that how it works?

R: Yeah. Yeah. Well, do you mean with the big guys or the little guys?

INT: Little guys, yeah.

R: Yeah. With the big guys definitely. With the little guys, as we’re out in and about, we’re finding things. Sometimes it can be we find things more serendipitously. I was just at a data center efficiency conference, and one of my colleagues from another company said, hey, Joyce, here’s this technology I think that would be really interesting for your company. And she made the introduction and it turns out actually it’s great. Now, it wasn’t even something I was looking for. It was something that one of my colleagues thought we’d be interested in.

INT: So it sounds like you do conferences and you go to industry shows, as well. Maybe those are the same things. That’s another source of information, and obviously in this case it was a personal connection that connected you with something.

R: Right, right. And we’re pretty selective about which ones - - which shows we go to. But, yeah, we find that to be a good source of new [ideas 16:38].

INT: Is there any particular shows that you could name that you find particularly valuable?

R: The ones that I find valuable, let’s see. So there’s some of the classic data center ones like 7x24. That’s kind of the big data center one. More regionally, the Silicon Valley Leadership Data Center Efficiency Conference is great. And then we also like to look outside of the data center space, so I find a lot of really great ideas from VERGE like GreenBiz. And then I know our - - a lot of the engineers go to more technical conferences targeted at sort of other industries, like oil and gas industry or other industrial manufacturing kinds of trade shows. Because what we’re doing is less like what other data centers are doing and more like a hyperscale industrial facility.

INT: I got you. This is so helpful. Thank you. I just realized, I think I asked you originally about what industries you support, and I also see that on the little questionnaire you filled out that you didn’t indicate that. And I was wondering if I could straighten that out with you. You, of course, don’t have to answer anything.

R: We support all industries.

INT: All industries, okay.

R: Yeah.

INT: Thank you. I’m just going to put that on this. So all the things that were listed there, IT and utilities and a wide variety of customers, it sounds like.

R: Exactly. Exactly. So do you know what company I’m with or no?

INT: No, I do not.

R: You’re not supposed to, is that correct?

INT: I’m not supposed to know that. I, of course, want to know that but I don’t. I’m not supposed to know that. So if you are refurbishing an older data center versus a newer one, are there any differences in your decision-making processes there?

R: Surely refurbishing - - so we’re refurbishing one that’s really old versus one that’s newer?

INT: Yes. I’m trying to get at, yeah, if you make different decisions if you’re going to upgrade and old data center versus a newer data center. And then I have a second question whether there’s - - and this is what you were alluding to earlier, if the design of - - when you’re designing a new facility versus an upgrade to an existing data center if there’s different considerations for those two choices, as well. I think this is probably all about the life of the center and how you view what’s worth doing.

R: Right.

INT: Does that make sense?

R: Yeah. Well, so we look at data centers as there’s the shell, which is the building. There’s all the mechanical and electrical gear, and then there are the servers and the racks and the IT infrastructure. And those three things have different life cycles.

INT: Right. I think you mentioned those.

R: Yeah.

INT: Go ahead.

R: And so we will - - we do evaluate the - - we use TCOs a lot, so the TCO of the upgrade. So if it - - five years in if it - - the numbers pencil out that it makes - - that we will save more money on energy savings and performance and labor and O&M, operations and maintenance, by putting the dollars in today, then we’ll do it regardless of - - but that’s typically where our three to five years for the servers - - three to four years for the servers and five to eight years for the infrastructure rule of thumb pencil out.

INT: So in all of these cases then, you’re using this total cost of ownership?

R: Yeah.

INT: And you’re going to tailor it to the various facilities that you’re dealing with, is that accurate?

R: Right, right. Yep.

INT: And so for - -

R: And it’s going to vary in the facility because our cost of electricity depends on where our data center is.

INT: Right. And the design of a new facility then versus an upgrade to an existing data center would also take into account things that are unique to a new facility, for instance?

R: Absolutely. Absolutely.

INT: I think that’s clear. So this is another one. I’m sorry. I wish it were clearer on my - - what I’m looking at. But how many of - - do you lease data center equipment from other companies?

R: We do but I don’t have any view into that.

INT: The little X came between yes and no on the questionnaire, so I couldn’t tell where it belonged.

R: Yeah, we do. It’s not very - - it’s a small percent of our total data center computes. The bulk of our data center compute is what we own and operate.

INT: And do you - - it looks like you do lease data center equipment or space to other companies, is that correct?

R: No.

INT: Oh, no. I’m sorry.

R: No. We use it all ourselves.

INT: Thank you. Is your data center run as a single organization with one budget, one team, and one boss, or is it - -

R: Yes.

INT: - - broken up - - yes, it is?

R: Yes. Yeah. It all rolls up to one person.

INT: And do you buy or sell equipment on the secondary market at all?

R: We’ll sell - -

INT: And that would mean - - beg your pardon?

R: No. Go ahead.

INT: I just wondered if you bought or sold equipment on the secondary market, like used equipment.

R: We sell equipment on the secondary market. So when we decommission servers, things that we can - - if we - - we completely erase the hard drives that we don’t need any more if they’re not big enough or we need to replace them, we can sort of triple erase them. And if we can guarantee that everything is off of them, we’ll sell those to resellers to resell. So whatever we can, we resell. What we can’t resell, we recycle.

INT: And just back to the things rolling up to one person and all being under one budget, does that mean also that you’re responsible for all your own utility bills, your electric bill and so on?

R: Yes. Yep, we pay all that under the same person who runs the data center. And that actually is kind of the secret to why we can run really efficient, well-run data centers, where we can do these holistic TCOs because we own all of it.

INT: And you have the most interest in making sure they’re efficient then, right?

R: Absolutely. Absolutely. And in a lot of organizations that’s not true.

INT: So at the very beginning you mentioned energy efficiency as being - - energy costs as being huge and energy efficiency being as a very important aspect of what you consider in data center management. And I want to probe into that a little bit more since that’s a big focus - - really the focus of this interview. How have you - - have you made recent investments that improve facility energy efficiency? And if you have, tell me about them.

R: Well, we constantly do. So we have - - do you know about the metric PUE?

INT: Yes, I do.

R: So we have a real time PUE monitor for each of our data center sites that everyone can go to at any moment and find out what the PUE of their data center is. And the site techs are constantly looking at that to try and figure out how they can be more efficient, and they’re very competitive. So they want to be competitive with each other, even though we keep telling them it’s about - - what we really measure them is how they did the same quarter the prior year.

So we’re trying to do an apples-to-apples improvement within your own facility. So they’re looking at all sorts of things. We have - - we’re doing a big project at one of our sites to use all the heat from the servers to do all the heating required in the facility, and we’ve just turned off all natural gas heating that facility as an effort to cut our energy use. There’s another site where we have developed an algorithm that munches through all of the data coming out of the data center and also maps it to weather data that’s coming up, and then track that to historical performance, and then sort of automatically tells the operators what the set point should be for all the different components in the data center that would optimize the energy use.

There’s another one that we’re using outside air to cool, and we found some new - - some air filters that significantly reduce the energy use, but yet provide the same amount of filtration that can happen. And all of the sites are empowered to sort of find these things and make them happen, and then we bounce those back up to our central group, which is my team, and then we share them out to all the other sites to really try and create this opportunity for learning.

INT: I have to say, it sounds very exciting.

R: Yeah, it’s very cool.

INT: So - - I’m sorry. I’m looking at my question and - - because you’re really telling me some very interesting holistic approaches that you’re using and also some specifics obviously about technologies. Are there anything in particular about what you’ve told me that particularly makes these technologies or approaches so appealing to you and your company?

R: It saves money. [Laughter] Is there anything else?

INT: Anything else?

R: It’s cost savings and, frankly, the simpler the system, the more reliable it is. So if we can streamline, simplify, and make more efficient, there’s less sort of - - less opportunity for error.

INT: Any other reasons that things are set up this way?

R: Also, it really empowers the employees and gets them excited about what they’re doing. They’re not just having to turn the crank. They get to think about how they can sort of enact change and make a difference and be impact.

INT: And anything else? This is very important. This motivation thing is a very important part of what we’re trying to get at.

R: No, that’s probably it.

INT: And do you try out things in a few facilities first, and then roll it out wider or - -

R: Yeah. Yeah. We’ll pilot it at probably one facility, monitor it, test it, check the results, compare reliability, cost, all that. And then if that pans out, then we’ll spread it to other sites.

INT: And now I just want to focus in on server utilization a bit. And have you made any major investments that improved server utilization?

R: We have. Yes, we have.

INT: And can you tell me about those?

R: I can’t. I can’t.

INT: You can’t?

R: No.

INT: But you have?

R: Yes. Yes. It’s something that we look at and we think is important.

INT: I’m sorry. Could you repeat what you just said?

R: It is something that we look at and we think is really important.

INT: So I just want to make sure there’s nothing else you can tell me about equipment utilization that you’re comfortable telling me about, but that you are - - you do consider it, is that correct?

R: Yeah. And we consider it important because if you can increase your utilizations, that means you just need fewer servers. So you’re buying fewer servers, you’re building fewer data centers, it’s a huge reduction in capital and a more efficient use of your facility.

INT: And I’m assuming you do measure equipment utilization even though you can’t tell me anything more than that?

R: Yes. We monitor it real time.

INT: Are there any energy or utilization efficiency technologies that you’ve chosen not to pursue?

R: I don’t think so. No. We’ll do - - we do all the - - all the stuff that everyone else is doing, we’ve already done. So that means sort of look at what else is there to do.

INT: So you haven’t gotten rid of anything that you thought didn’t work or - - I mean, I understand you will be shifting things, but there aren’t any things that you haven’t pursued as far as you’re concerned?

R: No. There are things that we’ve piloted that haven’t worked. But that’s a little more sort of the leading-edge stuff. All the basic blocking and tackling, air flow management, energy-efficient equipment, all that stuff, we’ve all put that in, and it seems to be working just fine.

INT: Can you tell me anything that has failed in piloting about any specific technologies, efficiency technologies?

R: Energy efficiency?

INT: Uh-huh.

R: You know what? Actually, energy efficiency I’ll say no. I can’t think of what we - - definitely on some water-efficiency things we’ve tried to use haven’t worked. But the energy one, I can’t think of anything that hasn’t.

INT: Can you tell me which water-efficiency things haven’t worked out for you?

R: Well, we tried a - - I hate to call out vendors but we tried - - unless you want me to. I just as well --

INT: You can talk -- it’s not going anywhere, so it’s not going to - -

R: So these are not the - - water is really hard because water chemistry is very different depending on where you are. And some technologies work with certain water chemistries, and others don’t. And so I think we’ve tried to use some water technologies where the water chemistry wasn’t right for that technology, and so it didn’t work.

INT: I see. We’ve been talking about major investments to reduce energy use. And do you also use maintenance or training for your staff to reduce energy use?

R: Oh, yeah.

INT: Is that something that’s built into - -

R: Yeah. We have a - -

INT: And can you tell me - -

R: We have a training program that everyone who goes to work in the data centers takes it. We run within the data centers, and it highlights, you know, these are the things that are important to us. One of them is energy efficiency and finding opportunities for energy efficiency, and here’s how to - - if you need resources or help, here’s where to look.

INT: So is that quite a focus of the training that they receive?

R: Yeah. Yes.

INT: I have a list of factors here that you might consider when choosing technologies or strategies to reduce energy use, and I just want to ask you about them. And then some of them we may have touched on before, but I just want to make sure I touch on them all if you factor these into your decisions. And the first one is performance and things like uptime reliability, peak capacity, and data security under performance. How do those factors come into play?

R: Very important.

INT: And all three, uptime reliability, peak capacity, and data security, all very important?

R: Yep, all very important.

INT: How about climate, and are there location specific factors that - -

R: Oh, critical. Very important.

INT: And financing, do you use financing?

R: No.

INT: Beg your pardon?

R: No.

INT: How about energy policy? Do you have any built-in energy-efficiency or energy- use policies in your company?

R: You mean - - so not government policies, but our own personal corporate policies?

INT: Right. Well, actually I’m interested in both, companywide energy-efficiency policies that are approaches, and also how state and federal or any local energy- efficiency policies might affect you.

R: Well, let me think. So internal policies we call those more - - we have metrics which each of the data centers, they have energy-efficiency goals that they’re working toward. And if that’s what you consider a policy, then, yeah, we do. And then corporate policy, oh, no, we don’t - - in terms of are there local or government regulatory efficiency policies that impact us, really not. We do the energy efficiency because it just makes good business sense. And so to run a smart business, it’s something you look at and we don’t think it’s needed.

There have been - - I think some good use of policies have been things like the advancements in lighting that are lighting-efficiency guidelines, which then trickle down to the data centers. But what it does is it pushes the manufacturers to invest in technologies that then we use, because they save us a ton of money.

INT: Got you.

R: But trying to push sort of a regulatory thing on the data centers, we don’t have the ability to innovate on lighting, so it wouldn’t make any sense. But if we can get access to these technologies, we’re happy to do them. So I think the same thing is happening with transformers. There’s a policy that, I guess as of next year, all transformers manufactured have to have a certain level of efficiency, which is great. But then we’ll choose efficient transformers because they’re available and because they’ll save us money in the long run.

INT: So let me see if I’m interpreting you correctly here. It sounds like what you think works is that various components are - - there’s regulations or code or whatever to ensure a certain level of efficiency for those components, and then that is something that you can take advantage of?

R: Right, right.

INT: Is that correct?

R: Yes.

INT: Rather than say some kind of policy that regulates efficiency overall in a data center?

R: Right.

INT: Something like that?

R: Right. Yes.

INT: That wouldn’t be something you’d - - doesn’t sound like you’d be interested in that?

R: No. And chances are we’re well below that anyway, so it wouldn’t really impact us. But we got to make sure that if there’s a policy, the people who that policy is set to have the ability to have an impact to make a difference in it. It’s like saying if your home has to be so energy efficient, but yet there are no products that you can use to make it energy efficient, you’re kind of stuck.

INT: Indeed. The cart before the horse, I guess.

R: Right.

INT: That’s for sure. How about reliability issues? How important are those, and how do they factor into your decisions?

R: They’re very important. Yes.

INT: How about things like - - here’s the three things I have listed under reliability: Ease of installation, maintenance and repair, and warranty issues. Are those - - how do they - - how do you look at those?

R: Well, it all boils down to cost. So I would say ease of installation, maybe that’s the least important of all because that’s a one-time thing, assuming it doesn’t cost you $12 million to install it. The O&M is - - depending on the life of the product or of the component is really important, because that impacts your TCO cost.

INT: Right.

R: And then what was the last one? The warranty?

INT: Warranty.

R: Warranty is actually quite important, but more so when we’re - - well, if it’s bigger equipment of new technology, warranty is important. But warranty is important.

INT: This I don’t think - - split incentives doesn’t really apply to you, since you don’t do very much in terms of leasing out your equipment or - - and you don’t lease any equipment from anybody, right? So that doesn’t really apply to you.

R: Right. Yes.

INT: And I know you mentioned this to begin with, but the customers and their satisfaction that, you said, was the very first thing that you mentioned as important, right?

R: Yeah. Yes, very important.

INT: And how about electricity rates?

R: That’s huge.

INT: And so that’s part of the - - that’s what one of those factors are in your TCO, I assume?

R: That’s a really important factor in our TCO, yes. Yeah.

INT: And resale price, is that something that you consider very much or not?

R: Resale of what?

INT: I’m sorry. Resale of equipment?

R: Marginal. We throw - - we put in a standard factor and assume we can get rid of it, but a lot of the stuff we just write off, or we’ll donate it someplace.

INT: It sounded like before if it works out, then you’re happy to refurbish and sell, but otherwise you recycle from what you said before?

R: Yeah. Or if it works and we don’t know who can use it, we’ve donated things. We had some extra water tanks we donated to the local municipality. We really just want it to get used in the most productive way possible versus trying to get as much money as we can out of it.

INT: So now even going a little deeper into estimating how you consider energy savings in your decision-making, is that something - - you mentioned that you’re always looking around and gathering information for new technologies. Do those new technologies tell you about energy use? Do they talk about how efficient they are, help you - -

R: Some do. Some don’t. In the circles I revolve in, they do just because that specific focus of mine. But I know when my engineers come up with, here’s this cool new thing, and I ask them, well, how does that impact energy use, they’re like, oh, we’ll have to go look at that. So it’s not always. And sometimes it negatively affects your energy use, and I have to make sure that we factor that into our decision on whether to go forward or not.

INT: So it’s not necessarily just there in everything?

R: Right.

INT: But you’re there to police it, it sounds like?

R: Right, as much as I can.

INT: You are always looking at that?

R: Yes. Yes.

INT: Are there estimates that you don’t believe sometimes, or do you think it’s pretty - - when you do hear about what energy use is or energy savings, do you tend to find them reliable?

R: We will ask for a third-party verification, an unaffiliated third-party verification, so we don’t believe the vendors. We kind of believe the unaffiliated third-party verification, and we’ll still pilot it to verify what all that says is true anyway. So it’s in but not necessarily guaranteed.

INT: So - - and I think I know the answer to this, but I have to ask you my questions. So thinking about all the factors you have mentioned so far that affect your investment decisions, do you weigh them against the up-front cost - -

R: Oh, yeah.

INT: - - and incorporate any of them?

R: Yes.

INT: So into a - - so you weigh them against that. And then do you incorporate them into a ROI or a payback calculation?

R: That’s what the TCO is.

INT: That is exactly what the TCO is. So --

R: The TCO is a more robust - - it’s a more robust payback calculation.

INT: So there’s a standardized set of business metrics, correct?

R: Yes. Yes.

INT: That are figured into that, and then you can map and benchmark your costs and benefits onto that?

R: Correct.

INT: And can you tell me anything more about - -

R: Can you hang on for one sec?

INT: Yeah, sure. Of course.

R: Just a minute.

[Phone ringing]

INT: Oh, dear.

R: Hello?

INT: Oh, hi. There you are.

R: Did it disconnect us?

INT: I don’t know.

R: I’m sorry.

INT: I heard a phone ringing and I got a little concerned, but then you said, hello, so that’s good. Did you get disconnected and have to call back in?

R: Well, I just picked up, so I had another line coming in that I had to pick up because my car is in the shop. So I figured it would just put you on hold and send me there, and I’d come back and you’d be there, but you were gone.

INT: I was here, but I don’t know exactly what happened in hyperspace.

R: Well, we’re back.

INT: We’re back. So I know you’ve told me a lot about the metrics that you’ve put into that equation, and I’m just wondering if there’s - - because I know we’ve talked about maintenance costs and efficiency and reliability and customer satisfaction, all those things. Are there any other key metrics that we haven’t discussed that go into that TCO?

R: I don’t think so. I don’t think so. Those are the main ones. So - - but into the TCO are the standard TCO things like discount rates and cost escalations and life cycle and residual costs, all that stuff. But - -

INT: All the sort of financial and - -

R: Yeah. Yeah.

INT: Great. So the next part of this discussion, you might remember at the end of your questionnaire, there was a long list of technologies - -

R: Yes.

INT: - - that we asked if you’d used them. And it looks like that you have used, I think, every one of these except for the data center infrastructure management software.

R: Yes.

INT: Is that - -

R: Yes. And I said no on that one because I don’t exactly know what that is. There is really no definition for what DCIM is. If it’s a tool for measuring how your performance is doing, we have our own internal system that monitors absolutely everything in the data center and throws in a big database, and then we look at the data and make recommendations. So I don’t know if that would mean that the answer is yes on that one or not.

INT: So if that - - and I don’t know the definition either, but if that definition fits what that is, you do use that, as well?

R: Yeah. We have our own system for that.

INT: So since you have used all these things, and I think for every single thing that you have used, you said you would use it again that’s on this list. I wonder if we could just - - and you probably don’t have that list in front of you, so I’m trying to figure out how to help you here. But I’d like to hear maybe if you have a few favorite things that you have used, just hear more about those technologies and why they have worked so well for you.

R: Is this Question 22?

INT: Yes.

R: Yeah, I have it in front of me. So everything on this list, so on the facility management side that’s what I call the basic blocking and tackling. Everything in here, every single data center should be doing. To us it’s a no-brainer. So I guess maybe the only thing that’s even a little - - the only thing that is not is predicted modeling of future IT deployment. I would take that off of the basic blocking and tackling.

INT: That’s right near the bottom of that first part of the list, right?

R: Yeah. It’s kind of like someone decided to throw that in at the last minute. It really doesn’t fit in with the other stuff in there. So we do --

INT: But, otherwise, everything that’s - - why don’t you tell me a little bit more why that doesn’t fit in there? So since someone did think it fit in there, why do you think that it doesn’t?

R: Oh, well, because everything else above that is basic stuff that for a very low price you can put into a data center. And if you don’t, it’s - - the payback on this stuff is less than a year. It’s really physical infrastructure. This predicted modeling is - - actually goes down to the coming up with hypotheses on how you should design the data center, which is more theoretical and would involve either hiring a consultant to run that for you, because most people don’t have the infrastructure themselves to do it. But your architect or your data center designer should be looking at this kind of stuff.

INT: So other than that, you’re saying - - when you say blocking and tackling, you see these as sort of no-brainer, low cost, what everyone should be doing if they’re going to - -

R: Yeah.

INT: - - make it energy efficient?

R: Yeah. We’ve been doing all this stuff for ten years. There’s nothing new. And it should be there and the payback is there and - - some older data centers may not have it, but they’re easy retrofits.

INT: Are there any things under facility management that you would add there then that you think are more cutting edge?

R: I will add one caveat on this facility management is all that is caveated by where the site is. There are sites, for example, where it does not make sense to use an air side economizer because of climate reasons or air quality reasons. There may be sites where a water side economizer doesn’t work because of climate reasons, as well. So anything that has to do with the interaction with the outdoor environment needs to be mapped, needs to be offset with what’s the climate for where that data center is. The rest of this stuff, it all - - the rest of that should be fairly straightforward.

INT: And are there things that aren’t on this list that you think should be on this list, not in terms of the basic stuff?

R: Yeah. I would put in high-efficiency transformers. I would put in - - what do they call them? It’s the UPS’s should be high-efficiency UPS. There’s a - -

INT: I know it’s hard to look at a long list and come up with additional ones, but this is great. Can you think of anything else?

R: You should really have a monitoring -- let me see if they put it under service, no. So this DCIM software is a loaded term in that no one has actually really defined it. If what that is supposed to mean is a management and control system, I would add that in there as something they should do. I’m sorry. Monitoring and control system. That’s probably the best tool that you can put in the data center, because if you can’t see what’s going on, you’re not going to do anything about it. But if you can monitor it, that really motivates people to do energy efficiency.

INT: And that’s what you were talking about earlier when you said people have this access to looking at PUE? Is that the same kind of thing you were talking about?

R: Yes. Yes, so we - -

INT: So they can see exactly what’s - -

[Beeping noise]

R: Sorry. I’m walking down the street. Yeah, so they can see exactly what’s going on with their PUE, and then they can dive into it and say, hah, our PUE is way off. What’s going on? They can dive in and go, oh, my gosh, we forgot to turn all the pumps off, for example. So a tool that lets them do that.

INT: So however that’s accomplished, you think, it sounds like that’s a key to being more and more efficient over time?

R: Yes. Yeah. I think that’s actually a really important piece in just monitoring. I mean, because it has to be controlled. So monitoring system, a robust monitoring system, so they can actually see what’s going on. And then the other place that we started to find a lot of savings is in pumps, variable-speed pumps drive, variable-speed pumps.

INT: And is that water pumps that you’re talking about?

R: Yes, water pumps.

INT: So variable speed water pumps?

R: Yes.

INT: And so that’s - - but they’re highly efficient is what you’re talking about?

R: Yes. You can call high-efficiency pumps or variable-speed pumps but, yeah.

INT: And we haven’t talked about the server - - well, is there anything else you want me to add to this list under the facility management part?

R: Sorry, yeah, I’m looking. No. That’s probably okay.

INT: And how about the servers? The same kind of question in terms of you’re using all of these things. How do you consider them? Why do you use them? And is there anything missing?

R: I would add high-efficiency networking gear. You’ve got your servers pretty well covered. Power supplies could even be pulled out by itself. [*Interviewee reading to* *herself* 58:09]. Data storage. So the other technology that’s starting to evolve is systems that connect the server usage to the cooling control. So it monitors how server usage goes up and down. And as the server usage varies, the cooling system varies. So I think you would that Integrated Server Utilization Cooling Facility Cooling System. It’s a control scheme that’s pretty new, but I think it has great promise.

INT: In terms of the ones that are listed there, do you consider those in the same way you were considering the facility management? Are they mostly pretty basic, or are there some that are less basic?

R: The only one that I haven’t run into before is under clocking. I don’t know what they mean by that. I’m kind of surprised because I typically know all about server stuff. And it may be that we just have a --

INT: You certainly do.

R: -- it may just be that we have a different word for it, which could be variable power use based on - - variable power based on usage. That might be under clocking, but it’s just a term I don’t know.

INT: How about the other things? Energy-efficient server hardware, is that a pretty - -

R: Yes.

INT: - - standard as far as you’re concerned?

R: Yes. Yeah, there’s lots of options for that, lots of options for virtualization, decommissioning, consolidating, improving storage, a lot of interesting stuff going on there right now, and then IT power management. Yes.

INT: You said there was interesting things going on with data storage efficiency? Do you have any - -

R: Yes.

INT: What kinds of things?

R: Well, moving old or infrequently accessed data to non-spinning resources. What the heck do you call it? Anywhere you can use a non-spinning storage is helpful, because it reduces your energy usage significantly. So a lot of companies are moving sort of archived data onto non-spinning disks of some sort, and then they’re using high, fast access data to - - why is it totally off my head? No, it’s not flash. It’s a high-speed, non-spinning storage which is - - used to be super expensive but it’s dropping in price a lot. So I think they call it having tiers of storage and managing tiered - - it’s tiered storage, and you manage the different tiers in different ways and treats the different tiers in different ways.

INT: Wow. That is so interesting. Sorry. My mind is trying to get around this. I just have a couple more questions, and then we’ll be done. Some companies in other industries have told us that the payback barrier they need to justify investing in an energy-saving technology feature is less than the amount of time before they perform a major upgrade. So, for instance, some technologies might pay back in one to three years, but the equipment lasts ten years. Is that true in your approach to decision-making?

R: No. We map the TCO to the life of the equipment. So we do take a longer view on payback than some companies might.

INT: That’s so interesting. Can you tell me a little bit more about why you’ve decided to do that, why it works for you? Because really this is a common problem, so what’s your philosophy there?

R: It might be that because we - - I think it may be an organizational issue. Because we have the same organization that’s buying and running the equipment, we can see that whole picture. Whereas, if you have it split, so the guy who’s buying - - just the guy who’s buying it or just the guy who’s running it, they don’t have the luxury of being able to look at the whole picture. They’ve got to create some arbitrary cut point.

I know some companies will say, it’s got to be less than two years or we won’t do it, which I guess is fine if you’re an operating guy or you’re - - but if you own the whole thing, then it just makes sense to look at, okay, we’re going to have this equipment for ten years. If I can cut my operating costs and after year eight I’m in the green again or in the black, it just makes sense. So maybe for the folks that don’t pay all the bills, like the data centers that just do the capital costs, they have to create some arbitrary cutoff point. And historically, for some reason, that’s been two to three years.

INT: Because it’s almost in my experience sort of like a knee-jerk reaction that there are those payback periods. So I think you’re the very first person I’ve ever talked to that didn’t have that, so it’s very interesting. And not for data centers per se, but I’m talking about energy efficiency in general.

R: Yes. Yeah. No. I’ve definitely seen that in a lot of places.

INT: Do you have any recommendations for how you could get around that in trying to talk with people about payback?

R: We don’t use payback. We use TCO, which is a more robust number.

INT: Right.

R: So maybe that’s telling the bigger story.

INT: So we’re right at the end here. You have been a fountain of information, and I really appreciate the detail that you’ve gone into for me today and for the folks who will be looking at this later. We’ve discussed a variety of factors in your invest decisions about energy efficiency, and correct me if I’m wrong, but the cost of energy certainly and operations over time and making sure you meet these other requirements of performance and reliability and satisfying your customers, is that a reasonable summary?

R: Yes. Yes. Yeah, I think - -

INT: I’m amazed. Good. So is there anything else that you want to add before we finish or anything that we haven’t discussed that you think would be important for my sponsors to know about?

R: I think the only thing is that if this is a group that’s looking at imposing regulations, just be aware that there are different kinds of data centers, and there are - - there’s not a - - I’m all for trying to improve the efficiency of data centers in this country. There are different kinds of data centers, and Gartner and IDC spell those out well in terms of server closets and small data centers and large data centers and industrial utility-scale data centers. Each of them has a different set of constraints and opportunities, and it’s really hard and probably destructive to try and come out with sort of one rule for all of them. So be conscious of that.

And there was some crazy - - California decided that every data center in California had to have air economization. Well, there are reasons why that doesn’t work in a lot of situations. And prescriptive mandates like that are typically more damaging than helpful. I guess that would be more for setting efficiency guidelines than determining prescriptive solutions that must be used. But even I think most helpful would be target the equipment manufacturers, and it’s unacceptable that you would even be able to sell a UPS device that isn’t 98% efficient. It’s just stupid. So stop that.

INT: Well, that’s a very interesting note.

R: And the challenge is that in most organizations the person who’s buying the equipment has a different budget from the person who’s going to be running it. And so data center - - a lot of people who build data centers are being judged on the lowest first cost. And so they’re going to go for the cheapest equipment that they can put in there because that’s how they’re evaluated, because someone else is paying the electrical bill. And so if you give them the option of a lo-efficiency item that’s cheap but uses a bunch of energy, they’re going to go with it because that meets their personal goal.

We’ve gotten around that in our organization because we have the same person who does - - who builds it and operates it, so we look at that whole big number. And that cheap energy-efficient gear is a total waste of money after a few years because you paid so much more in energy. So that’s it from my perspective as well as - - that’s really where the opportunities or the challenges are in this equation is getting those two sides connected, build and operate.

INT: That’s a good note to end on unless you have anything else to add.

R: Nope. Nope.

INT: Well, you’ve been very helpful and I learned a lot, and I know the people who will look at your responses will find them most interesting. So thanks so much, Joyce. I really appreciate your help. Have a good Thanksgiving.

R: Thank you. You, too. And good luck.

INT: Bye-bye.

[End of Interview]