Dallas Data Center Focus Group Two – December 9, 2014 @ 2:00 PM

INT: Let’s just go around the table, give your first name. Tell me what type of data centers you operate or make use of, what industries you serve and your role in the company with regard to data center choice or management and the number of data centers from which you make purchase and management decisions, if any. I hope that all makes sense. So again, first name, type of data center, your role in your company and number of data centers. Jose, you want to start off? I always start to the left because I am left handed.

R1: Sure. My name is Jose.

INT: Sorry. You are so right. [Laughter].

R1: We are a wholesale data center provider. We have data centers in the size of ten thousand square feet, thirteen thousand square feet and sixteen thousand square feet and I have the ability to operate those as well. Our positions is unique because we give the end user a lot of control so they can operate their data center or we can do it on behalf of them. What was that third question?

INT: So it was your role in all of this.

R1: So if somebody…director of engineering for the company that I am currently working.

INT: Great. Okay. David F?

R2: Yeah. So my name is David. I work for a company that provides web surfaces and web utilities for average consumers and B to B application. We have four data centers. We currently operate them and we currently operate them within multi-tenant co-location campuses. Each of our facilities is roughly ten to twenty thousand square feet. My personal responsibility is that I am in charge of designing the outfitting of those spaces as well as ensuring that our hardware selections that go into those spaces will be compliant with the environment that we choose.

INT: Great. Next along. I won’t give your names so you can say it yourself.

R3: My name is Mark and my company is corporate, data centers just for us and we are in the insurance industry. My - - that’s - - I am the operations manager of them. We have forty thousand square feet of space now expandable to one hundred and sixty thousand square feet that would go into computer floor space. We have another data center in another state, which is about probably sixty thousand square feet and then we have several data closets and other controllers and things like that in one of our office buildings.

INT: Great. Thank you.

R4: Thomas with a company in the food and beverage industry and we operate right around eighty data centers based on this definition around the U.S. About seventy-five of those are located at production facilities that operate the equipment to do all of the production control PLCs, automation, as well as the local file/print service and the local services for the end users. And then we operate five…today five more enterprise type data centers where we run our primary applications. My accountability…I have got accountability for the delivery of service from all of those data centers.

INT: Great. Next?

R5: I’m Tarif. I work for global information and communications technology company and I am responsible for the uptime of the U.S. based data centers. Our data centers are used for colocation by customers and they are also used for web posting where we own servers and deploy customers’ applications on them so they are hybrid.

INT: Great. And last but not least.

R6: I am Dave. I am responsible for the technology and strategy that we run one of the world’s largest companies on. We currently have six data centers dedicated to running the company, a total consumption of approximately sixteen megawatts worth of power between those six data centers.

INT: Great. And I am going to start with you this time around for the second question. Just to get us started and let’s try to please be brief on this so we can move through this quickly. Top three factors you consider when either doing a major upgrade to an existing data center or building a facility. And I know some of you may know more or less about this, but that’s fine. What about you, top three factors that come into play?

R6: So number one of the three factors is availability. I am in the job of providing continuous availability to our internal customers. It must work. It must work continually. After that the next two are two different ways of looking at the finances. One is what is the upfront Capex of the solution. More important than Capex however, is what is the total cost of ownership over the life of the solution and that’s –

INT: Can you tell me what Capex is? Sorry. Haven’t heard that before.

R6: Sure. Capital expense. So it is the upfront amount of money I am going to pay to implement the solution. Buying a car, it’s the cost of the car. The OpEx being the gas maintenance, insurance and all of that. So I care both about what the upfront cost of the car…I also care what’s the total cost of ownership of owning and operating the car.

INT: Over the life of that.

R6: And I am actually more concerned about the latter.

INT: And third thing?

R6: Those are the two, Capex, TCO: total customer ownership and availability.

INT: Okay so upfront costs and the total cost of ownership.

R6: And availability.

INT: And availability. Okay. Tarif?

R5: Uptime, availability is…

R6: The equivalent.

R5: Yep.

INT: That’s the same as availability?

R6: Yep.

INT: Okay thank you. That helps me.

R5: Return on investment. We are not a non-profit organization. And energy efficiency and greenness.

INT: And do a lot of factors get put into that ROI calculation? Is it beyond even just basic costs? Some people put a lot more qualitative things into that or?

R5: Yep.

INT: So what other things besides cost and payback and various things go into that calculation?

R5: It’s like in a casino, the casino operator knows that they are going to lose on some days on some games and they accept that because they know that big picture wise they are going to come out ahead. Analogy. Analogies.

INT: Analogies are good. Okay, Thomas.

R4: The first thing we look at is the ease of transition, how quickly once we procure the new [importable assets 19:39] what is it going to take to get to bring it over. The next one is entry cost of Capex to make that position. And then looking at the ROI over the expected life of the asset.

INT: You are doing great. Mark.

R3: So reliability, uptime and expansion capacity capability.

INT: So I hear reliability and availability. Is that…and what there was a third one, uptime. Are those the same or different? I am sorry. I am just…uptime and…sounds like uptime and availability are the same from what I have heard.

R3: Yeah.

INT: And what about…is that the same as reliability or is that something?

R3: I would say so.

INT: And did you give me three? I am sorry.

R3: The third one was expansion for capacity.

INT: Capacity. Yeah. Got you. Okay David.

R2: So you will hear this continuous trend. Uptime is predominant. Second thing is speed to deployment and the third thing is lead time to acquisition.

INT: Lead time to acquisition meaning?

R2: Meaning we…for example, we need twenty thousand square feet tomorrow. We need twenty thousand square feet tomorrow. We’ve pre-qualified or we know that there are…that there is x inventory on the market that we can walk into tomorrow.

INT: Okay. I understand. Something wouldn’t fit that bill obviously.

R2: Right. There is a list of things that qualify. There’s a list of things that don’t qualify and then there’s pieces that sit in the middle ground and you have to make a judgment call.

INT: Jose? Top three.

R1: For me it is a little bit different because we have an end user that is the one that uses the data center. And the whole scenario data center space, things that we look at is actually core things. We look at benefits. We look at time to execute that given thing. We look at cost and we look at risks. So we validate those four elements and that will lead us into a decision whether it is buying a piece of equipment or selecting what our strategy is. So we call those business lenses and that is what we use as a metric to make decisions. Overlying that, we also look at the scalability of a working product.

INT: So I am just going to show you my hand here, but I am wondering where energy efficiency fits in with your decision making and how important it is.

R6: This is Dave. Energy efficiency -

INT: Oh thanks.

R6: -- is an extremely important element. We care about it a lot. We want to be green. We want to be efficient, but it has to be cost effective. And one of our beliefs is that if we push our vendors to provide energy efficient solutions, they can make the same product for the same or less cost and sell it to us and it will cost us less to own and operate over time. And I will succeed in both having a lower total cost of ownership ROI, at the same time being greener.

INT: Other comments on energy efficiency?

R4: From the data center perspective the only time that ever comes into configuration is when we are almost out of power in the data center. The power we use in our data center is a tiny drop in the bucket compared to what we use in our production facilities and it is just not something we…on the production side they are very concerned and they…they monitor and measure and track everything, drive it down trying to be green. On the data center side it is no different than a small corporate office [inaudible due to low volume 24:05].

INT: Other comments on energy efficiency?

R5: So…

R6: No, go ahead.

R5: My previous response I put at number three, so it comes ahead of…

INT: I knew that you mentioned it. Yeah.

R5: Comes ahead a slew of other considerations, but if it doesn’t give us a return on the investment, a good return on the investment it is unlikely we will do it. And if it in any way compromises uptime it is a non-starter.

INT: Other people views on efficiency, energy efficiency?

R: I think green has two definitions. Green…you can talk about green from an efficiency standpoint but you can also talk about green from a dollar perspective. So if you are able to quantify and model a given technology over the course of time and get to that ROI or the TCO and at the same time are able to quantify the actual energy efficiency throughout that time span then you have good data to make good decisions. You don’t do that and you don’t have either available then you are just guessing, hoping that –

INT: So it comes into your calculation.

R: From a data center provider perspective, it’s important to a lot of our customers. A lot of these enterprises have green strategies and so forth and we do a couple of those elements like using condensation techniques or even going through a USGBC lead certification process for buildings. The difficult piece is that we are talking about data centers so sometimes green can be very, very difficult and not cost effective.

INT: Got you. David?

R2: Yeah. [Long pause]. So when we are choosing…when we are choosing a space that we are going to occupy…again, I am echoing what everyone else says. It has to meet business criteria first before you can qualify as a perspective option so that’s first and foremost. More…

INT: Sorry.

R2: More often than not we don’t have decisions. So we are going to be coming into a space after the fact that has already been built existing stock so the discussion doesn’t happen at a blank page for the actual infrastructure itself. So the likelihood that will affect implement choices is nearly nonexistent at this time. What I would say is that what is within our control is the IT hardware selection so we do pay attention to things like 80 plus so we are taking into account power supply efficiencies on the backup server. So we are benchmarking those against normal utilization and peak utilization and doing that across a variety of manufacturers that we might use and we make those choices in balance. So we will project their total cost and essentially run an ROI on the actual hardware platform itself to understand that. And so that is a battle between how many ions can we supply ratio to how many bits can we produce and so that is the ratio.

INT: I almost understand what you are saying. Thank you. I am sure someone does. Probably everyone in this room does better than I do. That’s great. And Mark, to finish up this part of the conversation?

R3: I would say it’s very important for our company. We have two large data centers. One is twenty years old. The other one is five – it was lead certified for construction and all of our equipment we buy is as energy efficient as we can get, but it’s not the first choice compared to those…the overtime aspect of it.

INT: Right. Thank you. Got slightly distracted here.

R6: I would like to follow up on one comment that I heard earlier, which was the…it is a tiny fraction. My energy bill is less than one percent of what I spent on IT every year. However, that is still an astounding amount of money and it still has an astounding amount of pollution associated with it and so it still remains extremely important for our company to focus on that one percent and get it down. It is just I am not going to do…focus on one percent at the expense of something else.

INT: That is a good analysis of what you do. Thank you. Do you refresh or upgrade your facilities, whether it’s IT refreshment or the facility infrastructure improvements? How often do you do that just quickly? And maybe it is different for…I heard in the last group it was different. The IT assessment is quite different from the facility infrastructure assessment. So let’s just talk about IT really quickly. How often do you refresh your equipment on the IT side?

R1: I don’t.

INT: You don’t.

R1: I don’t. This is Jose. Just because of the nature of our business; we are just a wholesale provider. Our end user will do that.

INT: So they control when things get refreshed on the IT side and you control when the facility gets changed out?

R1: We do but we are a fairly new company so all of our facilities are brand new. And that said, we do an analysis to understand the lifecycle of all the chosen equipment that makes up the data center system, but we are ten, fifteen years out.

INT: Who else would like to answer this question about how often you upgrade your data centers?

R6: So on the IT side…this is Dave…we –

INT: Guys you are so helpful. Thank you.

R6: We vary our IT based on the return on investment on it so it could vary between three and eight years. But let’s say an average of about five. Low cost commodity servers…it’s often cheaper to buy a newer one and get rid of even a perfectly good one and switch over to it. Some of the bigger enterprise type apps it makes more sense to run the older equipment longer. On the facilities side generally it is a fifteen to twenty year lifecycle. We don’t see the energy improvements generally making a cost effective to retrofit anything before then. The assets are generally depreciated on a fifteen to twenty year cycle and for those reasons it just doesn’t make any sense.

INT: Tarif, how about your situation?

R5: It depends. Generally speaking, I agree but there are certain elements within the infrastructure that don’t have that expensive of a lifecycle. So UPS batteries for example, a big expense. Every five years if they are a particular type that we try for every ten, twelve, thirteen years. If they are [Wexell] batteries again, the focus being uptime and make sure that we get in there and replace before they become a threat. When you asked the question initially you were talking about refresh. Refresh in our industry generally applies to IT assets, not –

INT: One is replacement on the facilities side right?

R5: When we talk refresh…I associate refresh with changing out service and that the industry talked about three to five years. Three years being for some people gospel, others extending it more.

INT: Thomas, how about you?

R4: From the IT infrastructure perspective we are three and five years, depending on what it is. Some stuff will run a little bit longer, depending on how critical it is verses other things where we will switch our sooner. From the facilities, very much the same as well. It depends upon the component. UPS batteries it is going to be a lot quicker than a generator. A generator we are going to run as long as we possibly can and avoid at all costs replacing that.

INT: Great. How about you Mark?

R3: IT side part, I’m a part of that, but it varies from what I understand. On the facilities side, we are still too new in that one data center and the other one, we’re starting to change out some equipment, but the good news is they can when they do replace.

INT: Dave?

R2: We are too young, [we haven’t contemplated any yet 33:40].

INT: I like that some of you are too young to have faced this already. How do you gather information about new equipment technologies and facility management strategies? Where do you get your information about what to do when you are ready to do something or even if you are not ready? What is a major place you go to or a couple of places? Anybody. Just start a couple of places that are important to you.

R: The first thing we do when we are looking at acquiring new hardware, new assets, we will start with the vendor, the provider.

INT: You have a certain vendor you regularly deal with?

R: Yeah so we have our strategic provider for all the different categories and so we will start with them. Every couple of acquisition cycles we will do a step back and will engage a customer to just give you a review of the providers, where they are going to, their roadmap and then we will either reselect or we will go…

INT: Who else wants to answer this question?

R: Can you repeat the question?

INT: It is where do you get information if you are ready to switch out something? Where do you go to get information about what your options are?

R: The Internet.

INT: How about you David?

R2: I go on Thomas’ sentiment. We rely heavily on vendor data for our IT selection. In terms of when we go out to make choices about datacenter locations what we do is we will interview the broker community and we will interview the broker community and then we will interview the vendor community. I know. Bad. Really bad. So we will interview…anytime any type…we have services that can be rendered what we will do is we will interview that community. And then in terms of maybe if this customer is trying to dig deep into where is - - what’s genesis for all this stuff a lot of it comes down to person to person interaction. I have got to tell you I have probably had a lot of conversations with that guy over there about stuff that we are randomly doing and something comes out of it. Or I will have conversations, we used to ride together so we talk about random stuff that comes out. And he has had experiences that I don’t have. So a lot it is tribal.

INT: And does that happen at conferences or does it happen…is that one place it happens, these kinds of conferences?

R: It definitely does. Conferences is…like I said earlier, this is a very small industry so when you go to a conference you pretty much are guaranteed you are going to see everybody in the industry.

INT: So that is one.

R: There’s industry conferences. There’s also for lack of a better term, trade organizations. And many of us are the leadership in our company who are responsible for figuring some of this out so we can often reach out to our peers to understand and that helps get additional data into the discussion in addition to what we are getting from our vendor and our consultants, the people who are essentially trying to sell us a product or service. We reach out to our peers and get much more of an independent view.

INT: Now how about you Mark? Where do you go?

R3: We use our original design team that still does a lot of work on a lot of our buildings and then also our current vendors for equipment and so they are competitors.

INT: Do you ever talk to manufacturers about products?

R: Yeah. When I say vendor I mean manufacturer.

INT: That’s the same kind of thing. And that’s true because there are of course all different sizes of companies that make all the equipment.

R: To lend some credence to your question, there are a lot of bars that exist in our space between the manufacturer and the end user and so I would say that in the infrastructure space, if you guys wanted to learn about this new wet mister for a fire alarm system, the likelihood is you probably would be introduced to that by the actual manufacturer themselves doing a luncheon or you would be the bar that you - - or the rep that comes around that you get occasionally. So I think that exists in our space, but I am going to - - I hate to disparage [on this all 38:22], but they don’t necessarily represent a lot of credence because they a middleman.

INT: How many of you lease data center equipment or facility space from other companies? So several of you do. Three of you do. That would be…oh Tarif and Thomas and…

R2: David.

INT: David do. And do you pay for that space based…what’s the arrangement like in terms of payment? What do you negotiate in terms of paying for that space? Is it just square footage or are there other factors?

R2: Used to be but it is has morphed into kilowatt.

INT: So there is a power…

R: Capacity and power. That’s…in data centers the…the real estate is cheap compared to the infrastructure that supports the load.

INT: Is that true for the others of you?

R: Yeah. What we do is we lease the floor space and we subscribe to so much power and then based on band of consumption is what we pay.

INT: And how about you Dave?

R2: Well what we do is we understand what…so let’s…echoing Tarif’s sentiment is people used to pay for space. Now it is negligible so it’s…what we do is we pay for a kilowatt band but we also do is we build in subscription tiers as Thomas said, into our - - understanding that we are going to grow at a certain rate what we do is we build in future subscription bands with the understanding that if we ever exceed a band ahead of schedule that we can get bumped into that new band from a cost rate.

INT: Great. On the flip side, how many of you lease data center equipment or space to other companies? I know that you do and you do Mark. So how do you structure that relationship given this previous conversation with people who are the buyers and now you are the sellers right?

R: So far it’s all in the family. They are subsidiaries of our companies. It is different companies but we work together still. But we’ve looked at some outside companies but so far we haven’t leased any space. But we have a lot of surplus space we could do - - we could lease out and just haven’t –

INT: You haven’t done that yet.

R: Yeah.

INT: And how about you Jose?

R1: What was the question again?

INT: The question was you lease out data center equipment or space to other companies correct? And so how is that relationship structured in terms of payment and who determines when things are needed to be done and not done? Are you…

R1: Well it’s very straightforward landlord/tenant relationship from a contractual standpoint. But it is a partnership between us and the customer. And to bring back to what I said earlier again about we give a lot of control to the customer.

INT: That is right. You said that.

R1: It depends right.

INT: If they want it.

R1: Right. The customer controls the operation of their data center. We provide a guideline that we would suggest and they would actually be performing those actions. And we would hold any type of audit to ensure that they are doing what they are supposed to be doing. If we were to do it on behalf of them then we would…just like any other operations provider where we would have a very firm schedule of when things need to happen and through a change management process that all the options that make sure that everyone is agreement with whatever it needs to become.

INT: Between all of you here, either you do lease space or the two are from other companies. And what I am wondering about is who pays the electricity costs?

R6: So we don’t lease. We are wholly internal. We don’t lease. We don’t provide these services. We don’t buy any services. But that still doesn’t mean that a large corporation doesn’t have separate parts of the company. IT and facilities are separate parts that don’t meet until you get very, very high up. And in our particular company the facility organization and the real estate organization pays the electric bill. IT doesn’t. But yet IT is generally the people putting the equipment into the data center and even driving how they are owned and operated or built and operated. So the person doing that doesn’t necessarily pay the bill for doing it.

INT: And you actually anticipated my next question so you can also talk about is your data center run as a single organization or are there various bosses for various things and different budgets? How siloed are you basically? Anyone want to address?

R2: I will answer. So we do - - we –

INT: David.

R2: This is David. We lease our data centers. We lease our data center space in multi-tenant campuses and currently do pay the utility bill on all of our spaces. We also have a fairly lean…and again, it is a growing organization so we have a very lean structure and so all of the costs trickle up to one place, one organization, and that one organization has supervisory control over selection of hardware, selection of environment, selection of all of these things.

INT: How about you Mark? How is it segmented where you are?

R3: That is all…with corporate real estate facilities handles all the operations and the infrastructure.

INT: Okay. So it is all controlled.

R3: IT itself as far as service, that is separate, so we don’t [do that 45:23].

INT: Tarif or Thomas?

R4: So for the data center and the floor space that we own, we pay for the power but not IT through the facilities and it just comes in as a single bill to that location. For the equipment, and actually for the co-loads that we are in, it is part of the lease but we don’t get a separate bill. It just comes. We pay a flat rate per month again, based on demand and everything else where we are. For the what I will call the environments of the data centers that we own they are managed and maintenance and everything, a lot of those are paid for by me.

INT: Got you. And Tarif?

R5: On our side of the industry does data center provide us the customer pace for the power that’s consumed by the servers and storage and network devices and also pays a factor to account for the cooling that the power then is consumed –

INT: So it is factored into their cost of service.

R5: Basically multiply. We measure the part they use and multiply that by the PUE, which is one reasons…customers know that is one of the reasons why customers are all very interested in how efficient our data centers are. They are more efficient.

INT: Right because they are paying for it.

R5: Yes. And then on the web posting site where we own the servers we pay for the power that we consume.

INT: One more question really just by show of hands, does anyone buy or sell equipment…does anybody buy equipment on the secondary market? So one person, Thomas. His company does. Does anyone sell equipment on the secondary market?

R6: When you say sell equipment on the secondary market, what do you mean?

INT: What I mean is used or refurbished equipment. Do you either buy or sell it?

R6: We have sold both IT and facility equipment on the secondary market and I expect will continue to do so.

INT: Okay and same with you over there? Okay. Now we are going to delve a little bit more into energy efficiency. Most of you said after a while that it was a very important consideration, although not as important…there were usually some overriding factors. Am I interpreting most of you correctly there that it is fine if things were very efficient as long as it matched with these other reliability and availability and so on, those kinds of concerns.

R: Can I ask a quick question, completely off topic. Is lunch going to be brought in?

INT: Oh I meant to say lunch is not being served until 1:30 at the conference.

R: Oh okay.

INT: And so I am going to do my best to get you out of here in time to go to that. It goes until after 2:00 or 2:40, but I am going to try to get you out at the beginning of that lunch. So I know I can tell you are hungry and I am too, because all I have had is sweet things all day long. [Laughter]. So oh, but good question and I am glad you asked it. So how many of you just by a show of hands have made major investments in improved facility energy efficiency recently? So two of you have? So that would be like cooling equipment or airflow?

R6: It’s a variety of equipment. It’s UPS’s. Its chillers. Its lighting. Yes.

INT: So that’s Dave. And Tarif you had your hand up too?

R5: Yep.

INT: And what kind of things?

R5: It goes from what we just heard to things like a system that is based on artificial intelligence that provides dynamic control of our crack units; our cooling system crack units and measures that…

INT: Sorry. Haven’t heard that term either.

R5: Crack units?

INT: What’s a crack unit?

R5: Well it’s this thing that you buy from dealers and you chop it up into your…

[Group laughter].

R5: No. Crack units are the - - the air conditioners on the floor that provide the airflow.

R: They make it cooler.

INT: They make it cooler. Okay.

R2: The acronym is air conditioner or air handler, depending on…

INT: I see. It is an H at the end.

R6: Well depending how you spell it. It could be a C or a C-H.

INT: Thank you.

R5: So there was a model where you had a certain number of crack units in a room and you run them regardless of what your load density is looking like. And we have invested in a system, which detects what the load densities are and controls –

INT: Turns things on and off.

R5: Turns things on and off. So that has a significant return on investment because it works.

INT: And I am assuming…we have talked a lot about decision factors. I am assuming it is the same kind of decision factors in investing in the facility infrastructure as we’ve talked about previously. They have to be reliable and –

R6: Yes it has to be cost effective.

INT: And cost effective and all these things. Do you try out these in a few facilities first or do you just go wholesale?

R5: So what I just described, the manufacturer, because it was a new development the manufacturer came to us and said here is what my system will do and we said show me. Put it in one of our smaller rooms and we measure.

INT: And we will see how it works.

R5: And if it is good and the numbers are right I will roll it out system wide. And that is what happened. I have had other manufacturers come and say, “Here use my system.” And I have said show me and they haven’t and I haven’t.

INT: Thomas, do you try things out?

R: R2: When it comes to new technology yeah. As I said, we really haven’t explored looking at more [inaudible due to simultaneous dialogue 51:56].

R6: For us, I want to see it working somewhere else comparable to me before I am going to buy it.

INT: So is that important on this side of the table too that you want to have some demonstration before you are going to adopt something new?

R: Yeah. The latest thing we did was the [inaudible 52:13]. We did just one aisle to see how it worked out.

R2: Yeah –

INT: David?

R2: Demonstration is critical and I also think that echoing Mark’s opinion is that a lot of organizations will use…everyone talks about cutting edge, leading edge, current state and these are all different at the progression or the evolution lifecycle of the particular - - if you are at discovery verses tried and true. So a lot of us will use what we will call N-1 technologies, so it is like - - so whatever is the brand new thing on the market we will call that N and N-1 will use the generation that came - - that was the predecessor of that.

INT: So you are almost early adopters but not quite. [Laughter]. That is what it sounds like in my sociological view of the world.

R2: Sure.

R6: I have to see it work first because if I screw up I could take the company down. That would be a bad thing.

INT: That’s important? [Laughter].

R: It’s painful to be first.

INT: Yeah. It’s painful to be first.

R: It’s very important also for the mission critical industry and it is very, very hard. If you think about facility infrastructure changes it is very hard to test it in a way, because when you have a live facility it doesn’t matter what happens. You can’t risk uptime because you want to test some sort of piece of infrastructure. So companies are now…they really rely on that particular vendor to quantify and show those - - that their system works the way they are claiming it to work. And it takes a lot of guts really to implement those types of changes inside of a data center. I am sure Tarif, whenever he was evaluating that technology that he just implemented, it took a lot of time and a lot of brains together to make that decision, because if something goes wrong.

INT: Yeah so high risk in changing things is what I am hearing you say.

R: Yeah and data centers are big facilities, big buildings and it is just hard to test.

INT: On the IT side, so how many of you made major refreshments in IT equipment in the last few years?

R6: So we are in a continual refresh program so we are always doing it. And that is actually one of our big emphasis because there is so much more ability to gain benefit and save money on the IT side than there is on the facilities side.

INT: Yeah from efficiencies.

R6: Yeah.

INT: Other people on the IT side, have you made…is it continuous or do you have a set -?

R: It’s more continuous. We try and cycle it.

INT: Try and just be looking at what’s going on and?

R: Trying to do about the same amount every year from a financial aspect.

INT: Tarif, how about your company?

R5: I am not involved on the IT side, so.

INT: Others on the IT side?

R: We have quarterly reviews, quarterly technical reviews with all of our IT vendors and so we get…we try and get year out, two year out development, R&D development for what is coming down the pike. And during those quarterly processes we are also negotiating the next generation of racks. So I would say that while we haven’t necessarily…see, well we haven’t necessarily done a refresh as you have defined it is that we work - - what we do is we are constantly examining and re-evaluating our approved machine roles.

INT: Sounds good. And do you measure utilization? Is that part of what you do?

R6: Absolutely.

INT: PUE and…

R6: Both kinds.

R: Continuous.

R: Back to the refresh question, I think that is changing at a faster pace than we might think of today and the reason for that is because if an IT equipment refresh cycle is three years now typically how fast is software changing? And really the IT equipment is supporting the software services and the applications. So if software is changing as fast as four weeks or even three months right you are going to see that the refresh cycle on equipment is going to probably most likely increase in a couple years.

R2: So I would say that the…I would say that the IT architecture and risk tolerances…IT architecture and risk tolerances define that change.

R6: Absolutely.

INT: So Dave is agreeing with the David?

R2: So for example, just because hardware is - - so the laws moving forward that are constant are Moore’s law and Cooney’s law. Moore’s law states that etching is going to continue to reduce by half approximately every two years. Cooney’s law states that you are going to be doubling your compute per jewel every one point five seven years. Those two things are fairly consistent over time. Just because those two things occur doesn’t mean…because those two things occur that will mean that in two years you will be able to do double…in approximately two years you would be able to do double the compute in one ration. However, the risk tolerances of your business may not permit you to put all of those assets in one rack from a physical constraint, because if that rack goes down you lose a bajillion dollars.

INT: Bajillion is a lot of dollars and I like the technical term.

R2: You can quote me in the report on that. [Laughter].

INT: Now, I want you to think about this. We are going to get to this a little later, but I want to have you thinking about any technologies you have chosen not to pursue and that will be toward the end here. But just think about that. And I also want to know do you invest in maintenance or operations training for people who are running your facilities?

R6: Well yeah. So all of us have pretty much…so –

INT: In terms of efficiency?

R6: Well availability is absolutely required. Well that is going to require appropriate maintenance both in training and in actual doing the work and that generally results in that in efficiency gains.

INT: Does anyone else do operations and maintenance to?

R: To the release to the facility?

INT: In terms…the facility or IT in terms of reducing energy.

R: Reducing energy we use and…

INT: What I would call operations and maintenance training in terms of adjusting when things come on and so on.

R6: Absolutely. So part…and this is my perspective, but part of operating the facility for continuous availability is making sure that all the flows that all the filters that all the equipment is operating properly. That is doing the maintenance on it. That is looking at it. And that results in a lower cost for that given set of operations.

R4: For the facilities that we own and operate we subcontract all that out.

INT: So you have a vendor who tweaks and?

R4: Yeah.

INT: Anybody else on the training staff to look at efficiency?

R: We do a lot of modeling, predictive modeling, which enables the user to see certain behaviors of particular pieces of equipment and identify if a particular piece of equipment is being inefficient. And because we can do that we can act quicker thus being able to rectify a particular situation. That translates into continuous efficiency.

INT: Great. I am just going to run through this list. We have talked about a lot of these things and I am going to tell you the ones I think we have talked about, which is we have talked about performance a lot in terms of your decisions related to energy use. I think we have uptime and reliability and all those things we have talked about quite a bit as being important. I don’t know that we have talked about location climate specific issues. Is that something that is important in your consideration at all about what technologies you choose and if you can reduce energy use?

R: Huge.

INT: Huge location? And it affects energy use?

R: It does. It - - it effects energy use significantly, but as we defined the original question, when you choose - - so in the general context, if you are making decisions about environment it has to first pass the other business criteria. The other business criteria in this case is are there talented professionals in this area, is there fiber in this area, is there low cost of power? Are all these things met first and then if you are in the right climate then it will impact your operating expense. So it is a very symbiotic relationship.

INT: How about is financing…the availability of financing, is that something that affects any of your decisions related to energy use?

R6: No. Financing for me has no input whatsoever. It is not a money availability issue. It is back to what I said at the very beginning, what’s the total cost of ownership, what’s the ROI on the solution.

INT: Others of you financing, borrowing?

R4: [Mine only relates to 1:03:03] energy.

INT: Utility or state incentives or tax credits?

R6: Ah. So those can be very important. I would say I have spent many millions on things that I wouldn’t have spent if the tax incentive hadn’t been in place.

INT: Others of you? How many of you used either utility or tax incentives to make efficiency improvements?

R: Yes. I have used –

INT: Like David has and?

R4: Efficiency improvements at their basic tax [inaudible 1:03:34]. At the end of the day, it is a finance vehicle right, so it doesn’t necessarily even - - that it is more efficient. I think these markets out there are realizing the business implications of a data center thus to attract businesses to that particular location cities are creating these tax incentives and whatnot. But that doesn’t really mean that –

INT: Might not be related to energy efficiency?

R6: Well let’s talk about a couple that are. [Phone ringing]. Woops. My apologies. So let’s talk about –

INT: You had a call! [Laughter].

R6: Two specific things. So we just got done with an LED lighting retrofit in one of the locations. The only thing that made it…it took it from being completely unrealistic from a price and return on investment to being something we couldn’t turn down because of various governmental incentives everything from federal to local in a power company that we would never even thought about it but when we were approached and go essentially you have got a couple year payback on it. It was like done! And now that’s efficiency based. The other thing is climate or pollution base, tax incentives on wind power, solar power. Absolutely essential to bringing the cost down to a level where I can pursue it. And I am actually pursuing - - like many of my peers, very large significant investments in running a good portion of a company on solar and/or wind that I could not pursue if it wasn’t for tax credits.

INT: So how many of you have used either utility or state incentives to change - - make - - so it sounds like three of you have, four of you have.

R: If you could repeat the question for me, because there’s two elements. I think when - - what Dave is talking about is purchasing renewable energy credits and what we are - - let’s not mistake this, there is not a direct coupling between renewables and data centers and that is partially due to the reliability element of things. So if we are talking about looking into a particular - - the original question was that we are looking at a region who is looking at us to use different energy efficient equipment because that’s going to provide us with the tax incentive we will do that. But in terms of alternative energy –

INT: I agree. Those are two different things and they certainly aren’t offered everywhere, particularly the renewable incentives aren’t offered everywhere. How about federal and state efficiency policies? Does that effect what you have to change?

R: Absolutely. It’s a policy right. If it is mandated there is no…

R6: If it is mandated I have to have this missions control and generator I am going to have. If I am talking about deploying something in a non-attainment area or potential non-attainment area that can affect siting choices. Regulatory environment is a key factor in choosing to or not to locate in specific locations.

INT: So do other people agree with what Dave is saying or anything to add? No? And do any of you have company-wide energy efficiency policies that are in place written down? So Dave does and Tarif does. Thomas does.

R: We are in the process of development.

INT: David is in the process. Okay. And we’ve talked about reliabilities and split incentives. I am going to skip over those because I want to get to…and we have talked quite a bit about how you estimate and consider energy savings I think in your decision making process so I don’t think we have to go over that again. Here is a critical question. Thinking about all the factors you have mentioned so far that effect your investment decisions, do you weight them against the upfront costs and incorporate any of them into an ROI or payback calculation? I think actually maybe we have talked about this. So I think we have gone there. You have already filled out your questionnaires so now we are getting to that part of the discussion and we are going to get out of here soon! So I want you to look at your back page, if you would. And tell me first of all, what I am interested in learning about what you put on your back page is how many of you have done most of these things? How many of you have not pursued certain things because of potential problems with them or you just weren’t aware of them? And a couple of…if you would each pick what your favorite thing that you do use and tell me why? So let’s start with pick your favorite things, one thing that you really are always going to do because it is so effective and efficient? Let’s start there.

R1: All right. This is Jose. My favorite from this list is a facilities management category and it is predictive modeling of future IT deployments. That is my favorite.

INT: And why is it your favorite? Can you say? I don’t know whether it is possible to articulate, but.

R1: There is a precursor to that and that is being able to actually calibrate a data center after you have fully commissioned it because that gives you a baseline data set of how that facility is going to be performing. So in the future you can use predictive modeling to understand the IT behavior and how it would affect the overall data center systems.

INT: So it looks like just glancing over, you actually use most of the things that are on this list and there aren’t really any negatives?

R1: Well a lot of these are best practices, so hot and cold aisle that is a best practice. Blanking panels absolutely and close to the racks, if you want to do that sure. DCIM software, it’s starting to gain momentum, although there is a missing skillset there but that is a different conversation. Industry…yeah so all of these are best practices in my opinion. And again, we are not the end user; we are just a provider. So that is how I answer these questions.

INT: So let me skip over here to Dave. Most of these things I see from…because you are sitting next to me too I can see most of them you are using. And do you agree with what Jose is saying about best practices, most of these things?

R6: Yeah. That was going to be my first comment is these are best practices. These are things that everybody should be doing most of. There might be things that for a particular company don’t make sense based on that company’s business goals. But for the vast majorities, these are best practices that should be done. And the real question of efficiency or autonomy or less polluting, which is a term you have heard me use several times is how we do these things. So they should be done. It is how should we implement the - - who has the best solution for energy efficient lighting, who’s server is going to perform the best on this particular thing. And you said what are the favorite? My favorites or my two favorites are virtualization and doing that virtualization on energy efficient IT equipment, which is high efficiency power supplies but it is also putting the right software on them that is going to get the most out of that asset both from an energy perspective and from a dollar perspective, because I always focus on the IT side far more than the facility. Facilities are reasonably efficient compared to the IT.

INT: Great. Others on this? Can you pick your favorite and tell me why it is your favorite and do you use most of these?

R5: With this the best practices, my favorite here I would go with the modular facility design for data center expansion and two factors there. If you are building a ten megawatt data center five two megawatt pods is the way to go so that you don’t invest upfront in any ten megawatt infrastructure that sits idle awaiting load. And that is one thing. It is a smarter way to go financially and then from a practical perspective, when you are building a second pod or a third pod, as you are expanding you don’t want that construction activity to in any way impact your live load. So the separation of pods.

INT: Who else? Thomas can you give us your?

R4: Under the server category the virtualization decommissioning, consolidation, efficiency, but it’s not from a power consumption perspective that interests me. It is just from a more of a cost savings perspective. If I can eliminate servers I can eliminate maintenance and I can eliminate support. I can simplify the environment.

INT: And do you use most of the things that are on the list?

R4: Yeah they are best practices and you use them when you can and then you grow into them over time.

INT: How about you Mark?

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 R3: Yeah same thing. Most of the facility items we do.

INT: Because you are basically facilities. Special favorite?

R3: Well, we have the BFDs with everything [inaudible due to low volume 1:14:13]. Most of these things we have.

INT: And David? I am sorry.

R: I would say that our problem is that we have had to build to maximum possibility or we have been real slow using up our load so we are not as efficient because we have got [inaudible 1:14:38].

INT: Yeah. You [inaudible 1:14:39].

R: It’s been a problem for the last five years.

INT: And how about you David? Last but not least.

R2: My favorite is energy efficient hardware.

INT: And why?

R2: Because it interests me most.

INT: That’s a good answer. [Laughter]. Okay here is a really - - I have two more questions and this one I want to know as much as you can tell me about some companies…we have talked about payback here and just various feedback thoughts that have been discussed. But some companies in other industries have told us that the payback period they need to justify investing in energy savings technology or energy saving feature is less than the amount of time before they perform a major upgrade. So for instance, some technologies may pay back in one to three years but the equipment lasts ten years. So instead of you using a ten year payback frame it is a one to three year payback frame. Is that true for you or do you match…do you use a longer term payback based on the life of equipment? Just tell me what you can about this payback issue?

R4: For us it is…there are two separate components.

R6: Yeah. That is what I am thinking.

R4: It is the life of the asset more goes into the financial depreciation and financial treatment of the asset require and that’s completely separate. We will make investments in things that we know within IT okay we are going to get a two-year payback on doing this and what that effectively does is drop your run right in year three and beyond. That then becomes money that hopefully you can hide from your CFO and you can actually use to do some of the things that are the best practices in another category.

INT: Tarif, you must have an opinion on this.

R5: Actually, it is more on the IT side so I am trying to stay out of it.

INT: And how about over here?

R: I am with Tarif. That is the IT side so I –

R6: Can you read the question again please?

INT: So I am going to boil it down. A lot of times we are told that businesses, all kinds of businesses investing in energy efficiency, they want a one to three year payback.

R6: Yep.

INT: But we know that some of this equipment is much longer life than that.

R6: Yeah.

INT: And that will be paid back say for ten years and not just one to three years. So we are trying to understand what drives that opinion that we all often hear?

R6: So I will tell you how it works inside of my company that I don’t how common it is or not. If I want to do an improvement for an energy efficiency reason or you could say a cost reduction reason, it better pay for itself in one to three years. I am not going to get it funded if it is not paying for itself that quickly because we can take that same money, invest it in something else that is going to grow the business and return profit. Now, if I am replacing a long life piece of equipment, whether it is IT or facility I want to buy the most efficient one and I am going to go back and I am going to look at what is going to have the lowest total cost of ownership, highest return on investment and I am going to push for the efficiency features in that. And that will be a consideration in purchasing that equipment, whether it is a piece of facility equipment or in IT equipment. But it is not going to cost me to purchase that piece of equipment.

INT: Do you have more flexibility than the one to three years?

R: No. If I am doing an efficiency improvement and I can’t make it pay for itself in three years there is virtually no chance I am going to get the money. I will give you an exception to that. If there is what I will call a marketing reason; if I need to have a seven-year payback on an energy efficient improvement but we are going to be public about what we are doing and use it to help market the company as being a good company then I have got a chance of getting that done. But it has to be something that the company essentially marketing, government relations, public relations can take and go hold the banner up and say this is what we are doing. That is the only way.

INT: You are exemplary in some…

R6: Yeah. That is the only way I can do that.

INT: And you were going to say something?

R: I was going to say that one to three years is definitely is what is expected for being able to make that decision to do that change. Anything above three years, the [net percent 1:19:36] value of that money – boom - it just goes away or dissipates to the fact that it is not cost effective.

INT: So any other insights on this one to three year payback or if you have more flexibility than that? No? Are you all on that same…how many people are on that same kind of?

R: I will go one to two.

INT: One to two. You are even less! Okay. And how about you David?

R2: I honestly believe that the question - - that question is really a good question for people who own and operate their own data centers that are making investments in things that have somewhere between a ten and twenty year depreciation lifecycle or those types of tax treatments because then you are starting to ask the question of this thing…like you said, a ten year lifecycle, it pays back for itself in one to three years. When you don’t own and operate your own data center like me and you are constantly purchasing IT equipment that…the tax treatment is the tax treatment is the tax treatment. It is the CFO’s problem.

INT: How about you Mark?

R3: Well, we put a thing in originally with the most sufficient we could but we had to replace it [inaudible 1:20:57].

INT: Right. Right. Okay.

R3: It really is an issue. Yeah.

INT: So this is my last question and I really am getting you out a half an hour earlier than I was planning to, so thank you so much for helping me out.

R: And that is after we expected.

INT: Yeah. I understand that. I was being selfish. I was. I admit it.

R5: The essence of a compromise.

R: Because I have asked the right question. [Laughter].

INT: Actually, I do feel for you honestly. So these are all the main questions. I just want to take this last chance and you really provided great information by the way. I can’t tell you how thankful I am for all that you have done and also naming yourself often. I enjoyed that too. Do you have any last questions or comments? It can be either about what we talked here today or if you had any other thing you wanted to say to the EPA because I promised you could do that. Let’s just quickly go around the table. If you have a no comment that is fine too, but who wants to start? Anything you want to say? Anything additional that we haven’t talked about? Dave wants to start.

R6: Yeah so I really look at efficiency and greenness, which are different things, but related as a competitive advantage. And so I am going to be efficient in green because it is going to save me money and help me sell more products. The fact that it is also a nice thing to do for the planet and our employees and our customer is almost really a secondary goal, a very important one but. I drive a Prius not because I want to save the planet; I drive it because it is the most cost efficient nice vehicle I can get around with and it actually does save me money over driving something that doesn’t get a lot of mileage. I hope that makes sense.

INT: Yeah. It makes total sense. Anything else about efficiency or anything you want to convey that you? We are going to go just around the table. Tarif you are on.

R5: I am good.

INT: How about you Thomas?

R4: For me I would like to see something done to encourage companies to do it and give me something like…I came from a different industry, consumer goods and they had energy star ratings on the product or what the product uses and that would actually drive consumer demand based upon that product using less. Right now I am selling food and beverage. Allow me to put a logo on my product that shows my company agree to help try and get the Prius driving people to sell my product.

INT: He is going to get Dave to buy a product.

R4: No, but give me something that will help drive either top line growth or bottom line margin increase. That would help me sell it within my company that makes some of these investments.

INT: How about you Mark?

R: I am good.

INT: Nothing? I bet David has something.

R2: Yeah. So Energy Star has…they haven’t necessarily done the greatest job of keeping up with the program that they started, which was phenomenal, which was the Energy Star benchmarking program. So they have a program out there that publishes benchmark servers with different configuration types at different loading capacities. Often they do that in tandem with an organization called SPEC.org. There is a benchmark called Power J. What I would request if I am requesting it at all…

INT: Lunch is coming in I guess.

R2: Then I would request if I am requesting it at all is to bolster that program and to make and expand the reach of the different types of hardware configurations so when people do go to model out environments that there is an agreed upon standard or at least there is agreed upon platform for the benchmark and the published results.

INT: Jose to finish this conversation up with all the pressure on you.

R1: At a higher level, obviously the EPA being the organization, I just will tell them to get smarter on data centers. I think there is a very big misconception data centers are real. We need them and they need to change these questions really. These questions are more of maybe pairing individuals in a particular group set. But I think they need to get more - - and real data of how data centers are being used today so they can actually have a good baseline to whatever policy they could think about lobbying for. And the flip side, any type of incentives that they want to offer up to different companies.

INT: Certainly, a lot of what we are doing here today does not cover everything the EPA is doing and there may be more things going on. We are just working for this one pretty small research arm of the EPA. But anyway, that comment will get back. I want to thank you. I want to let you go.

[END OF FOCUS GROUP]