Data Center Interview – December 4, 2014 @ 8:52

INT: To start things off, it would be great if you could tell me a bit about your role in the company with regard to data center management.

R: Okay.

INT: You probably know I spoke a few weeks ago with your colleagues Rona and Michael who had some interesting insights. But from what I understood, they are less involved in the data center management decision process.

R: Correct. So I am Director of Data Center Services. So I have responsibility for managing all of the EMC’s corporate data centers worldwide, so the...we host all - - our hosting of our applications is all internal. So its internal business units. We do not host external customers.

INT: Right. I noticed that from your questionnaire. So to get us going, could you tell me the top three factors that you consider when setting up a new data center or doing a major upgrade to an existing data center that would involve replacement of a major IT system or a major infrastructure building system?

R: So efficiency; I guess that is probably the first right, because we are…even though we are only hosting internal applications and internal business units, we are still compared to external industry costs. So efficiency of either the back end facilities infrastructure or even the internal IT infrastructure that is installed. The other thing…other thing I think that…other than efficiency is…and this plays off of efficiency is space management I guess densities, how many DMs for instance do we get on a specific environment and then uptime obviously right? That is what I am really measured on where we can be at a higher cost and maybe less efficient but we want to maintain our six nines uptime as defined by the uptime institute.

INT: And when you talk about efficiency, are you referring to energy efficiencies specifically or efficiency more broadly?

R: Efficiency more broadly. The focus is energy efficiency right, but being a large company, we get cost breaks on our energy consumption because of how much we use. So energy efficiency is a primary factor, but space is also…efficiency, cooling efficiencies, how much power are we using in the back end to cool the infrastructure. So those are important factors and if we are building out let’s say a whole new data center, which we did down in North Carolina, we also look at the external environment. Are we building a data center in an area that has great network connectivity so that we can have full redundancy in our networks so even though the data center is up and we don’t have great network connectivity and multiple carriers that we can depend on; that is a major factor too? You could build a data center in the middle of North Dakota and maybe that has great energy efficiency, but there is probably not a lot of network connectivity there. And we also look at the people factor too. We are usually typically hiring high levels of people rotating; college hires through as part of an intern program. So we look at the environment of what’s the education of the area that…where - - where we would be building a new data center.

INT: Okay. So those factors would affect where you might decide to locate a new data center.

R: Correct.

INT: Okay. And the connectivity issue, does that then relate back to the issue of uptime and reliability that you were just mentioning?

R: Yes. So we always have say typically, but I should say always…we always have multiple carriers. So whether it be a Verizon, AT&T, British Telecom, if it’s international, we always have multiple carriers. So, if the carrier is having an event we still can [field over 06:06] it to the secondary or tertiary carrier. And then we also have multiple drops that are geographically dispersed coming in and we work with the carriers to make sure that happens so that if there is a specific problem…down in the east coast let’s say, we still have connectivity out to the rest of the world.

INT: Okay. And how often about do you perform a major upgrade at a data center, whether it’s for an IT refresh or a facility refresh?

R: So at a specific…in an individual data center it’s typically five to six years. But we’re…because of the multiple data centers that we have, we are typically performing a major upgrade in one of the data centers like every two years. So we may be doing something in our Hopkinton data center and then two years later in our corp. data center and then something in our Durham data center. So we are pretty much performing upgrades routinely almost annually.

INT: Okay. So are those happening generally on a set cycle for any individual data center then?

R: No it’s more based on capacity. So two things really. Capacity, are we running at a capacity in a specific data center. We constantly have optimization programs in place we are replacing older gear that we typically run for three to five years with new gear and is that giving us enough space. And we will do some power and then besides capacity the - - it would be overall efficiency type initiatives.

INT: Okay. And so when you are in the process of making one of these upgrades or setting up a new data center, how do you primarily gather information about what new equipment and technologies and facility management strategies are available?

R: So…well we work very closely with our internal facilities team and our internal facilities team will - - would bring in multiple suppliers where - - where - - because number of labs - - the lab space that we have and data centers where we have suppliers calling upon us constantly. So we look at what is out there in the industry; what do we currently have, where do we feel that even though it might be a new technology that is very efficient, has it been proven out, is there risk? So UPS typical…I will use that for an example. Typical UPS’ were all battery backup or batteries. We evaluated flywheel technology during one of our upgrades. We weren’t really comfortable with the time that it was a stable environment, but then we built our new data center down in Durham. We included flywheel technology and the elimination of batteries. So that gave us a big step up on being green in that environment as well as sort of our certifications.

INT: Okay. So when you were first evaluating that flywheel technology it sounds like you were looking to what other companies were doing and what your manufacturers were saying as the first step?

R: Yeah. It…we looked at what other companies were doing, what was the number of installs that were out there. Having a relationship with many IT…other IT companies, if we have…we can contact them and say were they happy with some of this new technology. So yeah, we looked at it. We said what is your biggest install and at the time it - - flywheels really had been installed in smaller type environments, not large enterprise data centers. And then once we - - actually, when we installed our flywheels in Durham we had the largest flywheel battery…flywheel backup system in the U.S. at that point in time, which was 2011.

INT: And so then you wanted that experience of learning in-house…then using that technology for yourself before?

R: Yep.

INT: And so is that something that you would roll out more widely now that you have tried it and are happy with the performance?

R: Yes we have.

INT: Okay.

R: So we have upgraded other data centers and increased capacity and used the flywheel technology.

INT: Okay. And does that decision making process of evaluating new technology tend to differ between your older data centers verses if you are setting up a new one?

R: Yeah. It does because you are…if you are just upgrading a current data center, you almost are gated by what’s already running in that data center. So are you just adding more power capacity? Are you building it out for more space? So you have to…in order to be…you have this economical you can’t really start from scratch. So decisions on a Brownfield data center are a little bit different than a decision on a Greenfield data center.

INT: Okay. And are your data centers run as a single organization with one budget and one team and one overall boss or manager or does it tend to be broken up into silos with separate budgets?

R: No. It’s…yeah so I control the budget for all of our data centers and I have one manager who has responsibility for the day to day operations of all the data centers worldwide. So there is consistency.

INT: So would your…okay. So would your department also be responsible for the electricity and energy costs associated with the data centers?

R: Well facilities charges us back for that, but we are responsible for trying to be as efficient as possible within those data centers. So we - - another technology that we have implemented is cold aisle containment. So we looked at cold aisle containment hot aisle containment. We did some individual studies on that and what we thought and we work with external vendors to see what was out there. We chose [Canduit 12:28] as our containment vendor. We are already using some of their racks and they…we work with them to actually build out their first cold aisle containment offering. We built that out into our new data center in Durham in two areas, did a lot of science projects around that to see what the efficiencies were and then we completely rolled that out. So it took us about…after the first install it took us eighteen months, but now the data center, which is completely cold aisle containment. And we are also doing that in other data centers here in Massachusetts campus to take advantage of those efficiencies. We had some energy efficiency incentives from external power providers in the UK who were focused on hot aisle containment. So we actually made the hot aisle containment there, because after our studies we found that any type of containment is good and is a slight different - - there is barely a slight difference between them from an efficiency standpoint. But since I am focused on the IT equipment we went with cold aisle containment and that is really our standard. But we do have hot aisle containment too.

INT: Okay. And so you feel that your department has fully internalized that incentive to reduce energy since this part –

R: Yeah. Absolutely.

INT: Okay.

R: Yeah. Absolutely because we…as I said earlier, we are still responsible for reducing our costs wherever possible. We do internal chargeback to our business internal customers. So we have to be competitive with everyone else that is out there and with our costs, platform costs for them or we may lose them as customers.

INT: Oh okay, so your internal clients could in essence either use your data center services or potentially outsource to another company so you are actually competing with those other companies to retain your client?

R: Yes. Yeah for the most part. Yes.

INT: Interesting. Does…do you buy or sell any data center equipment on the used market?

R: We - - we do not. Things that have been…that are fully depreciated and that are reaching their end of life, we typically either scrap those or if they do have some residual value we would sell we as a…we have an asset management team that would sell that type of equipment. But for the most part, no.

INT: So that would be somewhat unusual.

R: Yeah.

INT: We’ve already been talking about energy efficiency quite a bit, but I wanted to delve more into that topic. You have already talked about the flywheel investment and the cold aisle containment. Could you tell me a little bit more for each of those technologies why did you decide to invest in those particular technologies at that time and what made them so appealing?

R: Well one of our…so the efficiency of cold aisle containment…first was really driven by as equipment got more dense and we had…more denser [laughter] we ran into heat issues within the data center. So we may have had pockets of heat because of dense equipment that we were having trouble cooling. So we started looking…okay how do we fix that? And we did some rearranging of equipment in the data center, but we needed more of a long term solution as things even got more power hungry and more heat specific. So we started looking at as I said, hot and cold aisle and what we wanted to do and we did those - - the first spending on that. Same thing with the flywheel technology and UPS and backend infrastructure. We looked at what was available out on the market. Cooling technology was actually designed specifically for us, four our data centers. So there were two things. It was very highly efficient and then it also gave us the ability to expand, especially our new data centers. That way we would just bring in these new trailer truck size cooling environments, slide them into place and we could just expand an additional ten thousand or whatever square feet into that data center. So we tried to make the upgrade and expansion capabilities as easy as possible in zero disruption to the current environment.

INT: Okay, so trying to avoid incurring costs by disrupting current operations. Part of the capabilities technologies is that the engineering allowed you to work with the current system?

R: Yep and zero…again, zero downtime. So no one wants to hear that in order to expand our data center we are going to have to take it down for a day or hour or…

INT: Right. And so for instance, with the cold aisle containment with the heating issues, obviously the new system saves on cooling costs. Was there also a benefit in terms of uptime or reliability? Was there any issue because of those?

R: Yeah. We are starting to look at that right now. We’re looking at two things there; the reliability of equipment that we know intuitively that it is going to be more reliable because the…we are not getting wrap around heat and there’s no hot spots. We can see internally to the equipment that it has the capability what the temperatures are running at to that equipment. And we have been tracking that for a while now and what we want to do next is raise the temperature in the data center, which will give us additional efficiencies. So we run our data centers at seventy-two degrees, which was the older standards, ASHRAE has upped those standards to say that you can run it at eighty to eighty-two. We’ll - - we are going to range the temperature in one of the data centers to see how that works with - - that’s one hundred percent cold aisle containment, probably seventy-eight by the end of this year. And we’ll do it in increments while we are still monitoring the internal temperature of all the equipment as well as the failure rates.

INT: And so the cold aisle containment system, has that now been rolled out to all of your data centers or are you still in the process of rolling it out?

R: Still in the process, unfortunately because of the way the data centers were built over time and we have got Legacy data centers, they are…we wanted to stay with a standard cold aisle containment as well as power so we need to do some relocation of equipment in the live data centers. So getting that downtime, relocating, doing end of life replacement, we do it in a manner that is the least disruptive to the business. So we may wait to cold aisle containment in a specific area of the data center until that IT equipment goes end of life. It will be replaced so then we will rotate that equipment.

INT: So you have plans to roll it out but you are just waiting for the right time for each individual data center that will minimize that disruption?

R: Right.

INT: Have you recently made any other investments that proved efficiency on the server utilization side like virtualization?

R: Yeah. We are one hundred percent virtualized.

INT: Has that been true for a long time or is that something that you moved to in recent years?

R: Well we own VMWare so [laughter] it was part of overall strategy to show external customers that it can be done; we can be one hundred percent virtualized in all our platforms. So it started 2008ish I think with new equipment coming out and then there was a full blown push that we did add a specific project called Sweep the Floor that took every single piece of equipment…every single server and virtualized it.

INT: And do you measure equipment utilization using [specific metrics 21:17]?

R: We do. We do. We do. So it depends on the individual cluster. We do over subscription in our clusters. It depends on if it is business important, mission critical and whether it has development test clusters. We can have higher densities in those areas. So the goal is to…probably to get to an average of seventy percent, but we’re probably closer as an average right now of fifty-five to sixty percent. What we try to have in place is VMs On Demand. So there is that balance of high density within the clusters as well as having the capacity so that we can spin up a VM within twenty-four hours for the business when requested.

INT: Do you currently use all the energy efficiency technologies that are built into the servers or do you turn it off?

R: Yeah. We do, but there is not a lot of…because we are global there is always somebody using the environment. We may have scripts running at night once the orders for the day have all gone into the RP system. So it is not like there are idle environments sitting around or idle storage sitting around. We are constantly running simulations, development tests and platforms. So we spin down wherever possible but it’s really not on our large scale.

INT: So it’s some of those features to reduce power during idling just aren’t that relevant.

R: Right. We do a lot of real time measuring…measurements. So we completely track our power utilization in each data center using building monitoring systems, Johnson Controls. And you can see within the environment that there is not a lot of idle CPUs sitting around with power going down.

INT: And do you tend to think about facility efficiency and IT utilization efficiency together or separately?

R: We…we…I said earlier, we have a real good relationship with our facilities team so we think of them together. So we don’t…we don’t drive our facilities team to a specific requirement. They understand that and I think it is probably because they were brought up in an IT environment and an IT company at EMC so they understand the criticality of the uptime. And if we are going err we are going to err on decisions around uptime and they do the same thing. So they are not driving us to reduce costs really in the area because they know that we are always looking at that. And there are constant programs in place, whether it be with local utilities for us to…not only the data centers but across the corporation to reduce costs. So I think everybody from the data center team as well as the facilities team is always looking at where can we save money for more efficiencies?

INT: And are there any energy or utilization efficiency technologies that you have chosen not to pursue?

R: No. There’s…I don’t think so. No. I can’t think of any off the top of my head. If there…there are newer emerging ones maybe we haven’t looked at yet. But for the most part, we have looked at everything and implemented them in some fashion. It may not be one hundred percent, but in some fashion.

INT: I think I asked that question to Rona and Michael and they mentioned something about free cooling. Is that something?

R: So right. So we have different…again, because of the different ages of the data centers, so Hopkinton data center has plain frame so it’s a closed loop mechanical system and in the cold months when the temperature drops below…I think it is thirty-something degrees, whatever that is, the water will instead of going into mechanical cooling will go into a large plate outside, which is being cooled by the environment and by the cold temperatures and the water is recycled through that. So we have plate and crane in Hopkinton. In Durham we have free air cooling and that was resigned to sixty percent of the year. We can bring in outside air to either one hundred percent cool data center or at least mixed with the return air data center to…if it is too cold we don’t want to bring in complete cold air and if it is too warm we may add a little bit of mechanical cooling. So sixty percent of the year we use free air cooling in Durham and if we can raise the temperature up to seventy-eight degrees like we are planning, we should be able to go up to almost eighty five percent of the year for free air cooling, because it still drops down below seventy-two degrees at nighttime. So yeah when we have…we look at the time of the data center is built and what is the best practices there.

INT: So you rolled it out in that data center because it made sense but it just hasn’t made sense to do that in all of the rest.

R: Right because of when they were built. What we look at when we upgrade, so we are doing some upgrades in our Hopkinton data center and we looked at does it make sense to at least cool parts of the data center with some free air cooling and it just got too complicated with the mechanical controls to actually do that. So we decided not to.

INT: So it would have been too costly to install there?

R: And then risk. It comes back to that risk thing too right? Once the mechanical system get too intricate and too detailed on how to manage the environment…you are not sure if things are going to fail over the way they should during different scenarios. So it is not just that efficiency. If you did lose a chiller for example, there’s certain sequences that must come back up in order to cool the data center back down because you basically only have minutes. So if you are bringing in outside air and you are doing mechanical cooling and you are doing plate and frame it starts getting a little bit risky there.

INT: Do you also use maintenance or training approaches to reduce energy use?

R: Yeah. So what….one of the…I think the questions on the questionnaire is blanking panels. So in the old days no one really cared about blanking panels and sealing up every environment and the direction of what the air flow was. And there are pieces of equipment that are side exhaust or front exhaust. So part of the training there that we look at is everything needs to be you have blanking panels now. We do full sealing of the environment in the cold aisles, orientation of the equipment and if we can’t orient it correctly then we have sheet metal shrouding design so that we can redirect airflow from the cold to the hot and not mixing air. So yeah there’s…that’s part of the training and again, more science projects that we do as we are going through. [Laughter].

INT: I have a list of factors here that you might consider when choosing technologies and some of them we’ve actually already touched on, but was curious to find out more about any tradeoffs or synergies between energy efficiency in these different factors. So the first one is performance in terms of uptime and reliability. We have already talked about that quite a bit that for some technologies you might avoid making the investment because of concerns about uptime.

R: Right. So we are a little unique because we build our own storage and we build our own backup equipment and we are heavy partners with specific vendors like Cisco or over a period of time, Dell, whoever we were. So that’s part of our decision making process too but that doesn’t mean that if something is needed in a specific area that we wouldn’t go out and use somebody that is…has a high reliability or better performance.

INT: What about climate or other location specific factors? It sounded like for instance in the Durham facility that certainly effected…the climate affected your cooling choices.

R: Yes.

INT: That is generally true?

R: Yes. So we look at…again when we…before we decided on Durham multiple locations throughout the country and internationally too for our other Enterprise data centers and we could have got moved into an area where we got one hundred percent free air cooling, but the connectivity wasn’t there or we…so there are different - - we always weight different factors. It’s not just about the efficiency or risk or…in our decision making.

INT: Right. You mentioned some of those already, the availability of qualified staff as well as the connectivity.

R: Yeah and can you get there kind of thing.

INT: Right. Okay. What about financing? I know you mentioned that you received some incentives in the UK for some of the energy efficiency investments. Was that an important factor in your decision making?

R: It was brought to us by facilities and the same thing here in the U.S. is their incentives they signed up for. And we can help them with that so yes there are incentives that facilities brings to us to say…which will help reduce our budget in charge back, too. Right, they’re not going to charge us back for power or space, then their costs go down and they are going to reduce our costs. So we work closely with them on many different efficiency initiatives that are driven by the local utilities.

INT: And then can you also negotiate with the local utilities about your electricity rates like if you make certain investments will they lower your rates because of that?

R: Absolutely. So down in Durham we put our own substation in coming off the main transmission lines. So that gave us two things. That gave - - that reduced the overall power consumption because they knew exactly how much power we were going to use. It took us off the main grid so that if there were any problems on the main grid, we would not experience them, the local grid. So yeah we negotiated with them and fund initiatives that would help us with our reliability and costs.

INT: And what about financing constraints in terms of would you ever not invest in something because the upfront costs were too high, even though it seemed like it might have a good payback?

R: No. We do ROI on everything so when we built out our Durham data center we did ROI on everything, so the mechanical cooling to the flywheel technology to the height of the raised floor, so even the different heights of raised floor and the size there that was optimum was three feet. So we look at everything and we do an ROI on everything. But it doesn’t mean that we have to have a positive ROI in a specific period of time. We just want to understand that so that there may be an ROI on flywheel technology was one year and ROI on something else might be longer. But because data centers have a life expectancy of twenty to thirty years, we…usually our ROIs all come out very positive.

INT: So you are not looking…you don’t have a specific ROI threshold cutoff where the company would say we are not going to invest if the payback is more than x number of years?

R: Right. Not with data centers.

INT: And then is that prior ROI consistent with the other business investment decisions in the company?

R: No. I think they would be different because there is depreciation of equipment is three years and depreciation of….larger assets can be there from five to twenty…this ROI yeah factors like right now all our data centers are in EMC owned buildings. But I the past they could have been leased buildings. So and as we acquire companies do we keep a data center up and running? Do we migrate that data center from an acquisition to our current data centers? Are we going to impact the business? So there’s a lot of different factors there.

INT: And then how do reliability issues in terms of maintenance and repair come into play when you are evaluating a new technology that may improve energy efficiency?

R: So our data centers are designed to be N+2 for all mechanical infrastructures. So we look at the reliability of everything and make sure that there are really zero single points of failure in any of our data centers.

INT: And do customers effect to your energy investment decisions? I know that you mentioned that you are competing for your own internal clients. So how does that affect your energy effectiveness?

R: No. It - - it really doesn’t. We are really industry leading in a lot of areas that we are…our data centers are build. So we do customer tours of our data centers, not specific to EMC equipment – there’s all EMC equipment in there. So, we can share that as customers are coming through. But that is part of our EMC briefing program for external customers. We have a group within IT called IT Proven so we are some of the first and best customers for EMC, where would - - product, where would you have some good reference? So our salespeople use us for reference and a lot of the questions that come back to us are around being - - at least come back to me are data centers and how do we do things. So we show them and open up the data centers to customer tours.

INT: We talked earlier about some of the sources you use to gather information about new technologies that…talk to vendors and then you do your own in-house testing. Do you general - - are you generally able to get pretty reliable estimates for the likely energy use before trying them out?

R: Yeah. And that’s where we come in with like I said, you are going out to other…we are on the cutting on a lot of things but we also look to see have you installed these anywhere else. So we don’t look for or put into contract guarantees, but for instance, the design of the Durham data center was designed to be a 1.3 PUE. We track that all the time and because we are so large the design firms that we work with, external design firms meet their commitments to us because they want renewed…repeat business.

INT: And are there estimates of energy savings that you don’t believe or don’t bother looking at?

R: No. I think…again, I think we have looked at everything. I think that we make conscious decisions sometimes of what we do want to use and what we don’t want to use. So I will go with the hot aisle cold aisle containment example again, because the data centers are there for reliability to run the equipment, we went with the cold aisle containment. But if you were to ask a facilities person what would they prefer, they would prefer hot aisle because that way the temperature of the air coming back that they need to cool is hotter, which makes all their back end equipment more efficient. So there is a larger delta T and that’s a big drive there - - their number off of. So they would rather go with hot aisle containment. So they - - we talked about that; what are the real numbers there. And because they understood our goal of having the one hundred percent uptime and less failures, they went with cold aisle containment with us.

INT: So you mentioned that you do an ROI calculation on all the different investments that you are considering. So what would tend to go into that calculation? Obviously you have the upfront costs and the expected energy costs. Would you also…

R: Maintenance.

INT: Maintenance. Okay. What about uptime or would you just…are you just shooting for one hundred percent uptime and then so you wouldn’t necessarily?

R: Yeah. So we are shooting for one hundred percent uptime so we make a decision to go with something that has redundancy like two of them in order to achieve our one hundred percent uptime.

INT: Okay so that is something that you are not going to compromise on so you wouldn’t incorporate a cost to produce uptime.

R: Right.

INT: And then do you have a standardized set of business metrics that you would also map into that ROI calculation?

R: No. It’s up to your financial ROI. We do have some sets of business metrics that we have to talk back to the business…show back to the business of what it costs, capacity, utilizations, all those things for each thing that is important to them. But network availability, all those things.

INT: We’ve done some case studies in other industries and what we have heard a lot in other industries is that they are looking for an ROI or a payback period when they are investing in an energy savings technology that is substantially less than the lifetime of the investment. Is that true for you? You indicated before that it is not necessarily true.

R: It’s not really necessarily true because…and again, if that - - that payback may be different if we are replacing a piece of IT equipment. There might be a more stringent guidelines on a payback period for that or introducing a new piece of software or replacing an old piece of software. But for the data center itself, because again, the lifetimes is twenty to thirty years, it - - there is…you are really looking for any payback period. If it was thirty years you probably wouldn’t do it, but typically no payback period is really longer than five or six.

INT: And so for –

R: Actually, I can say for one of them that we did not implement that was a longer payback period was Bloom. Do you know what Bloom is? It is generating your own electricity. So Bloom…you can look on iTunes and find it there. So Bloom is a technology where you are generating your own electricity onsite using natural gas and I think Google has several of them. But the payback period there was - - was more than ten years.

INT: So you are not looking for a particularly short payback period but you need something…

R: Reasonable payback period. Yeah.

INT: And so you said you would need a shorter payback potentially on IT equipment though. Is that just because the lifetime of the equipment?

R: Yeah because we are replacing it every three to five years anyway, because of how fast technology is changing. So we are not going to use anything more than five years. Five years is the outside length of time that we would use a piece of IT equipment.

INT: So you would consider anything that would payback within the expected lifetime of the equipment?

R: Yes.

INT: So I am now going to turn to the questionnaire with the technology that you filled out. That was very helpful. And I notice that you basically are using and would use again almost everything that we asked about, which makes sense here. You are an industry leader –

R: Yeah in some form or another right? Each data center is completely different. It may not be appropriate for one data center, but within the other data centers or if we built something new on them we definitely look at everything.

INT: So you are using all of these somewhere. Except there was one that I noticed you said you wouldn’t consider, which was under clocking.

R: Yeah. And that comes back to again that we are pretty much utilized 7/24 and if it is not being used for development then it is used for simulations or it is…so we are constantly using that.

INT: So under clocking just isn’t that useful.

R: No. It is not really applicable.

INT: Are there any of the technologies that we haven’t talked about so far that is something that was an interesting decision process that you looked at recently that you would like to talk a bit about?

R: I think maybe in our choice of our new…the building, when we decided to build down on Durham that was a decision to buy an existing building or build new and because of experience that the facilities team had…so all of EMC’s equipment goes through a full range of temperature testing in environmental chambers. And how they built out the environmental chambers gave us experience on how we wanted to build out the data center by eliminating all the facilities equipment in the room. So our newer data centers have no facilities equipment in them. They are one hundred percent whitespace dedicated to IT. So no air handlers, no PDUs. Everything is outside the room to not generate heat within the room that we have to exhaust. It is part of another source of heat I guess. So we looked at different buildings and we decided to buy basically a warehouse size building and build the box in the box kind of building. So there is a building inside a data center surrounded by the outside warehouse in order for us to get the most efficiency.

INT: So that is an infrastructure engineering design feature that you developed for that data center?

R: Yeah.

INT: What we have heard from a lot of companies that expected that shorter payback period was that they saw it as a hedge against uncertainty. And I was curious since you are not necessarily looking for super short payback periods, if you are concerned…if in your company there is a concern about the uncertainty associated with the payback of the investment.

R: No. I think probably again because we are an IT company and we have a roadmap and we know what’s coming for the next releases of IT technology. We know…I think we are very certain that there is less uncertainty of how long a product or a technology is going to last.

INT: And is the future price of energy something that you worry about?

R: Everybody does, but…yeah I guess everybody does. But we typically have multiyear contracts with our utilities for that because we have a pretty defined amount of power we are going to be using in a specific region so that is something they can count on of consumption. So we are not going up and down. Typically we are going up.

INT: Great. Well I have actually run through all of the questions on my list, which is great. This has been a really valuable discussion for me to learn about these investment decisions and your thought process in going through the decision. So I really want to thank you for your time. Do you have any last questions for me or anything that you want to mention about your energy efficiency related decisions?

R: No. We look for lead certification. So the buildings that our data centers are in are typically at the very minimum silver, but actually right now I think that we have gotten to at least gold on all the buildings where our data centers are. And I guess the other question is so how do I get my hands on a copy of the report so I can see how we compare to other people that once it is all published?

INT: Sure. We can definitely get back to you. I wouldn’t expect the report to be finished for several months because we are still in the process of course of gathering data from various companies. So we can definitely get back to you when it is completed to share a copy of the findings.

R: That would be great.

INT: Actually, could I follow up on that lead building point that you just mentioned before I let you go? Now, are you looking for lead certification primarily because its cost advantageous or is it they are also…is it a corporate policy or something that you like to show to your customers?

R: Yeah. So I think it is something to compare us to right to make sure we are all looking at the right things. So I think that is probably the first point and I think the second point there is customers don’t ask so there are customers that have specific manufacturing or lead certification or security. Everybody is looking at something different so we try to make sure that we play in all those areas and have the different certifications, ISO certifications or whatever to make customers want to do business with us.

[END OF INTERVIEW]