

ENERGY EFFICIENCY IN THE DATA CENTER[PRINT DOCUMENT](#)

Welcome to TechWise TV on the Cisco interaction network. Please remember to submit your technical questions in the field provided at the bottom of the viewing console. You can also email questions, comments and suggestions to techwisetv@cisco.com. Thank you for joining us and enjoy the show.

VALERIE ST JOHN: Whether your data center is a single server or a room full of racks, the inconvenient truth is that it's consuming massive amounts of energy.

AUDIENCE COMMENT: We've done some math that basically says a one-use server running 24/7 365 puts about as many emissions as a Toyota Camry driving 15000 miles per year.

VALERIE ST JOHN: Today our sites run efficient and responsible IT as we focus on energy efficiency in the data center.

AUDIENCE COMMENT: By doing the right thing you can save money. You can make your data center last longer. You can potentially lower your power bill or at least defer buying that next net new facility for some period of time.

VALERIE ST JOHN: Data center power consumption has more than doubled since 2001. We'll define efficiency in the data center and give you steps you can take to create a leaner operation.

AUDIENCE COMMENT: It takes more energy to remove the heat generated by servers than it does to actually power the servers. In fact servers plus the cooling actually represent well over half the energy consumption in a typical data center.

VALERIE STJOHN: We'll look at how to go green to get more green using Cisco's efficiency assurance program to consolidate resources, conserve energy and increase the bottom line.

AUDIENCE COMMENT: What we want to be able to do is provide a resource for our customers, particularly our IT folks to come in and learn more about this stuff because we're all in learning mode here and we all can learn from each other.

VALERIE ST JOHN: The digital universe is big and getting bigger making storage a huge problem. We'll look at how EMC's information lifecycle management system can rein in costs and curb energy usage.

AUDIENCE COMMENT: We have exploding data growth. We have legal and business requirements to keep that information for longer periods than ever before. Who's going to hit the delete button on any of this information?

VALERIE ST JOHN: How do you do more with less? We'll show you how to dump old and underutilized servers through virtualization.

JIMMY RAY PURSER: We're buying these incredibly high-end servers and using about maybe four percent of what they can do. So the real answer is virtualize them. Virtualize those servers to actually put more processes on one server that can truly handle it and make that server work for you.

VALERIE ST JOHN: Kermit said it first, it's not easy being green. But we're up to the challenge as we zero in on energy efficiency in the data center. This is TechWise TV, technology you can use from geeks you can trust only on a Cisco interaction network. And welcome to TechWise TV. I'm Valerie St John along with Cisco's solution experts Robb Boyd and Jimmy Ray Purser.

ROBB BOYD AND JIMMY RAY PURSER: Hey Valerie.

VALERIE ST JOHN: Good to see you guys. Our focus today, energy efficiency in the data center. It's not easy being green but it is easy to see that energy consumption in the data center is reaching a crisis point. We're going to dig into that in detail of course. But Robb, the question I have is would you go green purely for altruistic reasons as a company?

ROBB BOYD: I think that's what you can certainly speak to and those are noble. But the exciting thing about the fact that we're talking about energy efficiency and green in the data center, these type of things lend themselves very well to saying we don't have to make that tradeoff. We can make it for business reasons, which ultimately are going to have to be made at the end of the day. Thankfully we can point to either thing, it makes a lot of sense. But I think we're going to focus on the technology side today.

VALERIE ST JOHN: Okay well let's get right to the tech, somebody who has gone from Tennessee orange to California green to maroon today. What are some of the technical options for going green?

JIMMY RAY PURSER: Well you know when it comes to green, we're breaking this down in two categories. We're looking at the environmental impacts of it, which is the kind of stuff that makes the headlines and we like to brag about it. Then there's the cost savings of actually not using as much energy that actually affects our stock holders, our bottom line, that type of stuff. If we're starting out from the environmental impacts, this actually started back in 2006 with RoHS, reduction of hazardous substance, that was acted in law or a regulation or whatever by the European union as a way to reduce some of the most hazardous substances to the environment like lead, mercury, cadmium and a bunch of other m's that I have no idea how to even pronounce. But it was a way to keep this stuff out of landfills. And manufacturers when they're making this equipment, they're reducing that. And you see equipment today that are stamped with a RoHS stamp on it to actually show that they're RoHS compliant. It's also sometimes

coupled with WEEE. Some people call the standard RoHS WEEE. WEEE is how you throw the stuff away, dispose it and things of that nature. In the manufacturing process, we're looking at not only saving money by not using much heat, but also when we have to retire this equipment, throw it away, that we're actually building equipment that's actually safer to dispose of.

VALERIE ST JOHN: What's great is that if I'm a CEO of a large company or midsize company, where do I begin to see the financial benefits of using this technology?

JIMMY RAY PURSER: Well the real benefit comes into where we're actually saving the cash. Let's just face it. When we're building components and servers and stuff to be green, if you will, we're using more efficient components. More efficient components, they cost more money. So because of that we're actually paying a little bit more but we're expecting that pay back out. A lot of that actually has to do with how we're laying out our data centers, using these new energy efficient type of power supplies and stuff. Let me go to the whiteboard here and just kind of draw out something real quick. One of the most common designs of where people are saving money is by reducing heat in the data centers. Did you ever see that in Die Hard 3 where they had that one data center with the great big fans on it? That'd be cool if that was real. But anyway it actually works a little bit different. What we do is that when we have a data center and we've got our good old racks of servers here, one of the things that we have is what's called hot lane/cold lane or hot aisle/cold aisle depending upon how it is. Typically you have your hot equipment. This would be the hot side right here. The space between the hot side is a little bit wider. Usually about four tiles is typically what we recommend to let the hot equipment ventilate out down this row if you will. Then you have the cold lane is right here so that we're not actually sucking in hot air to cool the equipment. It's how we're positioning this equipment. This is typically two tiles wide. And typically what I recommend if we're looking at doing this is that you have perforated tiles that are between these cold lanes here so that the air can float through conduction. We'll talk about that in a lot more detail. And we use non-perforated tiles over here. And if you have your racks are using about 4 kV or higher, then typically we don't use tiles here. We use grates so we can actually get a lot more cooling in. And by pulling all this cold air out, we're saving a lot of money because number one we don't have to worry about cooling the data center a lot more. We're actually using the natural flow of air. And we're also not sucking in the hot air and heating up our equipment. That's really important. In particular, we're putting switches in here and a bunch of different equipment other than servers that have different ventilation options that do side-to-side venting instead of front-to-back.

ROBB BOYD: So obviously the design aspects weigh heavily into this because you're talking about taking advantage of some natural things. But there's also optimization. We talk about using resources more efficiently whether it be your data or the actual servers and stuff that's done there. The thing that I've always struggled with is if we suddenly make dramatic increases in optimization or we're using the assets that we previously invested in much more efficiently, are we now looking at equipment that's no longer needed as much?

JIMMY RAY PURSER: One of the things that we're doing is we're just looking at ways to utilize this gear a little bit better. Usually servers are not bought in mass. So I got a data center like we've drawn out here. I don't typically go out and buy 100 servers and put those in. Typically there's a retirement plan. And what we're really talking about is utilizing the higher speed processors. The more memory, the more power that these servers have. Instead of running a single operating system, a single application and stuff, looking at virtualizing these or actually even using --. To be honest with you, using some of the power management utilities that come with a lot of these devices can actually take advantage of the voltage step-down features that are in CPUs that I bet 90% of the data centers out there don't even use today.

ROBB BOYD: Okay but what you're saying though is as we increase the intelligence of the assets that we're deploying, there's going to be a natural lifecycle that as we continue to improve our optimization on this thing because it doesn't all happen at once.

JIMMY RAY PURSER: No absolutely not.

ROBB BOYD: Then it makes sense because you can retire them within a normal depreciation schedule and those type of things, right?

JIMMY RAY PURSER: Absolutely, absolutely, you're going to write that off in taxes obviously. And as you're buying more higher efficient servers with higher efficient power supplies that are 90% efficient, then actually our older stuff kind of takes care of itself. It just gets retired.

ROBB BOYD: We're running out of time but I want to get this quickly because I think this is critical. The idea here is obviously we say green really is about energy efficiency. So we're talking about optimization of these resources. And we're going to get into more detail throughout the entire show. But what I want to understand is how do you know when you've made improvements, which I think brings up, is there some basics you can give us on benchmarking or setting a standard for saying here is how to establish where you are now so that the things that we recommend you do could be measured against that?

JIMMY RAY PURSER: Yes I wrote a paper on that and one of the most important things to look at is obviously see where you're at today. Do a logical benchmark. Get a copy of your bill and see how much energy you're actually using over a few months time period, not one month and say oh I'm going to save this much cash. Look at how that rolls out. And then as you're making improvements start comparing back and forth to your bill. And you've got a real hard set of data that actually can show you how much money you're saving month-by-month.

ROBB BOYD: Okay very good.

VALERIE ST JOHN: Jimmy Ray, good stuff, thank you.

JIMMY RAY PURSER: Thank you, Val, appreciate it.

VALERIE ST JOHN: Now Robb you sat down with data center guru Doug Gourlay who talked a little bit about the greening of the data center. What was your key takeaway?

ROBB BOYD: He talked about the history of constraints, which I found --. It's interesting as you look over time, he talked about the fact that we moved to this notion of being space constrained to then being cooling constrained and that now we're looking at things from a power constraint perspective. And he says that has now become the key metric upon which we measure or evaluate a data center is the power constraints.

VALERIE ST JOHN: Interesting, let's take a quick look.

DOUG GOURLAY: So now we're seeing that power became the metric that you size new data centers on. And as such, we said how can we maximize the workload, the applications we run, out of a given facility with a fixed power constraint? It defined the sort of physics envelope we work within. And now what you're seeing is pretty much Cisco in the network and then every other company out there doing the right thing I feel, which is focusing on how do we lower the power draw while maintaining the workload and the workload growth because have you ever seen a company say I'm not going to add new applications. My workload is going to be flat and not growing.

ROBB BOYD: Yes exactly, we're done.

DOUG GOURLAY: Oh yeah we don't need any new applications for the next seven years, we're fine. No workload growth continues and as such we have to figure out how do we make the data centers we have, these in some cases quarter billion dollar infrastructure investments last longer.

ROBB BOYD: What's the reality of people's decision-making process on that because do you have to make a choice between I want to do this for altruistic reasons because I believe in supporting the green agenda or whatever it may be? Or are there actually things that we can point to and go no there's really good financial reasons for doing this?

DOUG GOURLAY: I think we're in the world of both right now which is like the low-hanging fruit. By doing the right thing, you can save money. You can make your data center last longer. You can potentially lower your power bill or at least defer buying that next net new facility for some period of time which gives you a deferral on OPEX, savings of not having to pay the CAPEX. That's CAPEX deferral and that's good for business. So I see people doing the right thing today for a combination of altruistic reasons with financial remuneration at the same time.

VALERIE ST JOHN: This is an area of great change and it's going in the right direction. Robb's entire video interview with Doug Gourlay is available on the show notes. Click on the right side of the viewing console for the podcast. What are the first steps in creating energy efficient data centers? We agree that no one vendor can address the situation. But we have three of the top players with us today, EMC, VMware and, of course, Cisco. So in segment two, we'll start with Cisco and Rob Aldrich aka Cisco's Mister Green. So where does a company begin when the goal is a more efficient and environmentally sound data center? To help us figure out what that means at Cisco we're joined by the very tall Mister Green, Rob Aldrich, welcome Rob.

ROB ALDRICH: Thank you Valerie, I appreciate you having me.

VALERIE ST JOHN: So talk about what took you off the basketball court and brought you to Cisco because you look like you just stumbled out of a game and made your way here.

ROB ALDRICH: The jolly green has arrived. It's an interesting story. I feel very lucky in that I'm able to be paid at what I'm passionate about. I studied environmental sciences at university. That's what my degree is in and soon after I realized I couldn't make money at that. So I quickly jumped into IT, well I should say facilities. I spent about ten years in the facilities space working on power and cooling design for enterprise-class data centers.

JIMMY RAY PURSER: Awesome, that's cool.

ROB ALDRICH: So between those two it's a great fit for really what all this green stuff is about today.

ROBB BOYD: We'll you're obviously finding a way to work the background of your passion into some real technologies. So let's talk about that for just a moment here. Would you agree that the focus is less about the green term that gets so abused and more about energy efficiency and really focusing on what can we do to positively affect energy efficiency?

ROB ALDRICH: Perfect point Robb, so when you look in green, green is a social and political term primarily.

JIMMY RAY PURSER: Uh-huh, that's right.

ROB ALDRICH: Efficiency and sustainability are scientific and technology terms. So this is why you don't hear a lot of green marketing from Cisco because we're really trying to hone in on what aspects of the green agenda that we can support. But ultimately the customer sets that agenda, not us.

JIMMY RAY PURSER: Oh man, I love to hear the term sustainability because that's, from an engineering standpoint, that's exactly what we're talking about in how electronic equipment is actually taking the electricity in and sustaining itself more effectively. That's a great term instead of green.

ROBB BOYD: Well let's get right to it, you've got your focus on data centers. Where are the big wins in data centers? Is there some low hanging fruit that we should be looking at first before we move into the more minor tweaks?

ROB ALDRICH: Yeah absolutely and you should prioritize and structure what's doable and what the returns will be. But I think the first thing that we need to understand as IT professionals is what is our impact. A lot of us don't even realize that the number one source of greenhouse gas emissions in the world is electrical consumption or emissions that are generated from burning coal.

ROBB BOYD: I'm always amazed at how much energy is lost in the process of just getting it to your facility. And granted we may not be able to control a lot in our domain, but then once it gets there, this is where we say all right now what can we control. And so he talked earlier about establishing a benchmark. So you're saying that's a good thing to do as well?

ROB ALDRICH: It's a great thing to do. And I always go back to this report that Gartner released last year where they basically put IT on par with the airline industry in terms of emissions.

JIMMY RAY PURSER: You're kidding me.

ROB ALDRICH: No I'm dead serious.

JIMMY RAY PURSER: How do they figure that?

ROB ALDRICH: Well you basically look at all the coal that you burn. I mean 55% of the world's electricity still comes from coal. Seventy percent of the electricity that we generate is by burning fossil fuels. So there's no surprises to consider. And we've done some math that basically says a one-use server running 24/7 365 puts about as many emissions as a Toyota Camry driving 15,000 miles per year. So we need to understand this as IT professionals what's our impact. And then to your point we've been doing a lot of work over the last couple of years here at Cisco to be less professorial in our guidance on green and more prescriptive. What are five or ten things that you can do tomorrow to get started on this that don't cost a lot and that will have a dramatic impact on your IT operation?

ROBB BOYD: What tops the list?

ROB ALDRICH: I think obviously from an IT standpoint, virtualization is number one. Virtualization enables consolidation through improved utilization, a lot of zations there. But it's important to take a blended view of virtualization. We're all very familiar with server virtualization. A lot of people don't realize that Cisco, what VMware can do for servers, and they'll be talking about that a little bit later on in the show I believe, we can do that for storage.

ROBB BOYD: You're talking from a network perspective.

ROB ALDRICH: From a network based virtualization, correct.

ROBB BOYD: Okay what else?

ROB ALDRICH: But it's very important to look at your facilities as part of virtualization. If you go and implement virtualization in a facility that was not designed to accommodate it, you're not only going to not achieve the maximum efficiency gains, you're also going to increase your risk.

JIMMY RAY PURSER: How can a facility not be designed for virtualization? I mean we're talking about consolidating.

ROB ALDRICH: Because when the facilities are designed, one of the things I used to do is we would design for a high and a low level, a window if you will of facilities utilization. And that's primarily your UPS, your (inaudible) power supplies and your (inaudible) your computer room air conditioning. Now if those go above that window, it's really bad because that's when you just die. If you go below that, it's almost as bad because things run very unstable and they also run very inefficiently. And a way to determine that is you look at any product that consumes power that has some sort of a power supply in it like in IT's case, a switch mode power supply, there's a certain efficiency curve. And the higher that's loaded, the more efficiently the product runs. So with virtualization it's a fantastic thing because it can improve your operative efficiency. But you have to take a blended view when implementing.

ROBB BOYD: Yeah too much of a good thing. All right a couple of other things I know that are important here. Obviously you talked about consolidation. When we talk about elimination of SAN islands, when we talk about storage utilization and increasing that there, we've got some technologies and some things that can help people in that direction?

ROB ALDRICH: Sure, sure so there's really two solutions that we talk about that have a hardware background if you will at Cisco over the last year or so. They were both born out of Cisco IT. And as part of my role, I work very closely with Cisco IT. I work with our large enterprise-class customers and I also work with our product design teams. I'm sort of the liaison between all these folks. So the solutions that we talk about were implemented within Cisco IT, the first being collapsing SAN islands and using a technology we call IVR, inter-VSAN routing, which is inherent to MDS or Nexus. And basically what this allows you to do is drive up your utilization. And in our case we were able to take our storage utilization across a range of assets, not just a particular SAN island, but all islands. We were able to bring it from roughly 35% to almost 70% utilization.

ROBB BOYD: Bridging the islands essentially there too.

ROB ALDRICH: Yes, across a range of assets and we were able to do that as we grew from 2 to roughly 10PB of storage. So we were

able to do that as we grew. The second example would be how we are taking a functionality you typically see in appliances and we're collapsing those into the network. So what we found within Cisco IT is every time we rolled out a logical server group, we would deploy appliances to deliver services particularly like application delivery, load balancing, firewall services, things like that. These appliances standalone are only like, you know you say ah that can't be that big. These are just one --.

ROBB BOYD: They add up, don't they?

ROB ALDRICH: But hundreds of them add up.

ROBB BOYD: And they all have power supplies and they have everything else you need to do that.

JIMMY RAY PURSER: Let's break this down a little bit. So we're actually talking about here, number one you said about VSAN routing and consolidating your islands. So if we have a bunch of our SANs over here, you're actually talking about, let's say we have three of them, collapsing these down. What is a real example that you used at Cisco to collapse these down? How many did you --.

ROB ALDRICH: We basically you could put an HR SAN, you could put in sales SAN, you could put in CRM SAN. We basically had a SAN for each business unit or each business function. And each of these might have had their own utilization. This guy might have been at 10% utilization. This guy maybe this was really good at 50-60% utilization, which by today's standards is not that bad. And then maybe this one was atrocious at 5%. By being able to blend those all together through our inter-VSAN routing technology, now you just could draw a cloud around the whole thing. And now this becomes one common infrastructure that you can share. And in the case of the appliances what we found is rather than have what we worked out to be a 1200 watt incremental loading for every server group, we collapsed these into service modules within the Catalyst 6500 series. And now we can support up to 250 contexts, and in this case context is a logical server group, by a one-time incremental loading of 800 watts. So in our case that was 24000 watts versus 800 watts.

JIMMY RAY PURSER: Man that is unbelievable.

VALERIE ST JOHN: You've offered a lot of options up here. My head is spinning.

ROB ALDRICH: Sorry, there's a lot to do.

VALERIE ST JOHN: A key component of this would seem to be the planning. And you have quite a number of planning tools to show us?

ROB ALDRICH: We sure do. The old Ben Franklin adage and that's preservation's worth a pound of cure. So vendors I think over the last couple years have been talking a lot about green. We've been espousing that facilities and IT should work together. But in most cases that's where we've stopped. We say hey go work with your facilities department but how many of us are really giving you tools to enable that?

JIMMY RAY PURSER: Let me ask you something. Sorry Rob I don't mean to cut you off. You're a facilities guy. What has been the best approach to work with IT because IT tends to be different? I mean working with facilities you're certainly --. I mean I've never worked with facilities before. We had a (inaudible) guy. How would you bridge that?

ROB ALDRICH: It's tough because we tend to be different animals for the most part. But what I'm finding is --.

JIMMY RAY PURSER: Yeah it's all you guys.

ROB ALDRICH: But what I'm finding is the facilities guys coming out of college nowadays they grew up with laptops. They understand IT better than they ever have before. They know Ethernet. Ethernet is the network they know. The old building management analog systems, those are kind of the old guards. So what I'm finding is that is helping. But typically the reality of it is it requires a painful event that makes them work together. So I'll share a story. In our case at Cisco IT we were planning a server deployment. And IT spent about four months working out all the different technical specifics on the server side. The last call they made was to facilities and said hey guys I need 100 amp drop in the back of data center 5. The call was met with laughter because there hadn't been 100 amps available for two years. So IT just burnt three months of a planning cycle. So what we do within Cisco IT is we now have two fulltime facilities professionals on the IT payroll and they serve as liaisons.

JIMMY RAY PURSER: That's cool.

ROB ALDRICH: So you need to invest in resources to bridge the gap between the two.

ROBB BOYD: Language translation.

ROB ALDRICH: Absolutely.

ROBB BOYD: I don't want to run out of time, if we get a chance to look at the site, what are the key takeaways there?

ROB ALDRICH: Sure so what we released just about two weeks ago at Cisco Live was a beta release of what we call the efficiency assurance program. And again to your point earlier, efficiency is how we support the green agenda. And what we want to be able to do is provide a resource for our customers, particularly our IT folks, to come in and learn more about this stuff because we're all in learning mode here and we all can learn from each other. So the way this is structured in this beta release is primarily three main

sections. But before that we've got an introductory set of videos that tells you a little bit what it's about. And we've got a quick tour. That's me just walking you through the site. Here's all the moving parts so go ahead and do --.

ROBB BOYD: Is this Rob Aldrich on demand?

ROB ALDRICH: You got it.

ROBB BOYD: Any time day or night.

ROB ALDRICH: That's scary, TelePresence in my room. And then the three main sections that we structure this are a learning center. This is basically where an IT guy can go and learn more about some of the facilities and fundamentals. Why do IT talk in watts and facilities talk in amps, some best practices that we've put together based on what we've found out within Cisco IT, a planning tool section. This is really where the meat of it is. This is where we're trying to enable users to be able to build their own business case for sustainability. And the first planning tool to be released is called the green data center model calculator.

ROBB BOYD: This would be the power calculator?

ROB ALDRICH: This has elements of power in it but it's more. This is for the first time that I've seen of really any vendor out there. A lot of input has gone into this. This has been a year in the works. Our IBSG group and marketing groups have worked on this together. We talk about virtualization, some of the benefits of that from a cost-savings standpoint as well as from a unit avoidance standpoint.

JIMMY RAY PURSER: That is awesome.

ROB ALDRICH: And then the last thing that we've done, which I haven't seen anybody else do yet is we'll also tie in a CO2 emissions into this. And we're helping you project how that works into your energy usage scenario. So this is the first time I've seen that. There's a lot of very good intellectual property here that we're giving away. We want to enable our customers to --.

JIMMY RAY PURSER: That's cool, you got it up here, net value, cumulative times.

ROBB BOYD: I want to see the power calculator though before we run out of time. Would you recommend that that is a good tool as well before we go in and get some measurable specific results?

ROB ALDRICH: Sure, so we're going to be showing this in the very next iteration of the tool. But we'll give everyone a sneak peak here. And what this will allow you to do, it provides the next level of granularity down from what we just looked at. And we're going to allow users to start assigning a carbon footprint to their network. And this is something where I think when users see this and see the power of this, they're really going to start setting this as the benchmark for people to use it forward. This is going to be updated within the next month or two from when this is video play and people can check that out.

VALERIE ST JOHN: How deep is the level of detail the user has to provide?

ROB ALDRICH: It's fairly straightforward. I mean what you'll find is there'll be some things that some roles know and other things that other roles know. There's not going to be one person within an organization that could fill out all those data fields we just saw. And even if there is, they may not know how that would translate over time. So that brings us to the very last piece of this and then we'll close out. We've recognized that not everyone has the skill set to approach this internally. This is a fairly specialized skill set. So we've set up advanced services that help customers in-source talent that we have or that we have --.

ROBB BOYD: Who can access that information through that same site as well.

ROB ALDRICH: You've got it.

VALERIE ST JOHN: A lot of detail here Rob, what's the key takeaway? What should I walk away with today?

ROB ALDRICH: I think the key takeaway is I often tell the customers don't buy any products or solutions under the auspices of green from any vendor, Cisco included, until such time as you have a benchmark.

JIMMY RAY PURSER: Yes absolutely, positively, absolutely.

ROB ALDRICH: You've got to establish an efficiency benchmark otherwise you have no metric for success. And then the next step after that what's just over the horizon is today when you go through and do that efficiency benchmark, it's a clipboard exercise. I'm going over and I'm taking volt readings off of a branch circuit panel or I'm putting a fluke meter on a cable. So it's a manual system today. But what we do as we go through that is we're also giving you a network integration strategy for all your facilities. So we take it from a clipboard to an automated exercise. And IP-based power and management is going to be the next generation of all this. And after all, you can't manage what you can't measure.

JIMMY RAY PURSER: That's very correct.

VALERIE ST JOHN: Cool tools, Rob Aldrich, thanks for joining us.

ROB ALDRICH: Thank you Valerie.

VALERIE ST JOHN: Well good thing your pants are riding high because we've got a flood of information on data center storage optimization coming up next in segment three. But first let's take a look at some of the advances that our friends at APC have been making. Jimmy Ray recently spoke with Brent Bouknight, senior systems engineer, about powering our data centers.

BRENT BOUKNIGHT: One of the main advances we've made in the power is the understanding that your single-phase and smaller UPSs are as important on your network as your large three-phase boxes. Your megawatt UPS systems are backing up your servers and stuff. But this is backing up the critical aspect of your facility too, switches and phone systems. So what we've done is really focused on that aspect in giving the same modularity and redundancy components that you can see in larger UPS systems into the single-phase market. For example our single-phase Symmetra LX is a up to 16 KVA. We have a couple of different frame sizes. This is the 8 KVA rack-based model. And what that does is it has modular power modules and battery modules along with management capacities within the unit that are not only hot swappable in the field but can provide redundancy and quicker mean time to repair.

JIMMY RAY PURSER: Now you know you talked about some of the management and monitoring aspects. That's always been the tradeoff going from a single-phase unit to a three-phase unit. Any improvements there?

BRENT BOUKNIGHT: Absolutely, the Web cards that we have in here, you can monitor all the aspects of the unit over Web interfaces SNMP. You can even get Modbus output to integrate these into building management systems along with the complete graphic user interface on the front of the unit.

JIMMY RAY PURSER: Really, well pop that unit off and let's take a look on the inside of it here. That's the good stuff.

BRENT BOUKNIGHT: Let me, pulling the cover off here, you can see that we have a couple of bays for power modules. What these power modules are, these are actually double conversion, single-phase power modules. We'll take the AC power.

JIMMY RAY PURSER: These are double conversion so you can convert AC to DC back to AC?

BRENT BOUKNIGHT: Absolutely.

JIMMY RAY PURSER: That's very cool.

BRENT BOUKNIGHT: So we get the power filtering, the clean power (inaudible) output wave forms. These are the actual battery modules. You can see that these are also contained in modules. What this does is that this gives you actual redundant strings of batteries. And the more modules that you have in the system, the longer runtime you can get. So to get a longer runtime out of the UPS system, you can even add another chassis of just batteries, operate off the power modules of this rack and get as much runtime as you need.

JIMMY RAY PURSER: Oh and the monitoring from this can actually manage that other stuff too?

BRENT BOUKNIGHT: Absolutely.

JIMMY RAY PURSER: Brent this is a great story. I really appreciate your time.

VALERIE ST JOHN: On demand and on the go, this is TechWise TV, knowledge you can use from geeks you can trust. Today our focus is energy efficiency in the data center. We've defined the basics and already started the to-do list. Now we zero in on storage. We have some friends here from EMC John Morley, director of the EMC executive briefing center, and Ray Gonzalez, senior manager of EMC's IT West Coast operations. Gentlemen, welcome.

AUDIENCE COMMENT: Thanks Valerie, good to be here.

VALERIE ST JOHN: John let's start with you. How does EMC view energy efficient IT and what do you recommend for customers?

JOHN MORLEY: Sure, well I have to tell you that the energy efficient IT has become one of the biggest comparatives for both EMC as a company and all of the customers that we talk to every day. Personally I like to say that EMC views it as being one of the big four that's out there today around information and that is my information available to the people that need to use it, is it secure, am I in compliance and am I efficient in my use of energy to deliver the information to the end user.

ROBB BOYD: I think that's interesting that you rate compliance, which is something being mandated by the government, and we've got something energy efficiency, which at this point is not mandated by the government, at least not in all locations. Interesting you put those on the same level because I would agree that they're very important there as well. We hear stories about information growth and just the fact that this is something that continues. I'm sure it continues to accelerate. You guys must be the experts in how that is happening. What are we seeing right now from an information growth perspective?

JOHN MORLEY: This is very interesting and there's a couple of points I'd like just to mention and touch with. First of all, environmental awareness has become a very large corporate responsibility. I know Ray is going to talk a little bit about that in a while. But from the data growth perspective, we are going through the --. Forevermore we're going to be going through just wave after wave of data growth explosion. And the most interesting study that we've seen recently is from IDC talking about the fact that in the year 2011 you can expect the world to create 1100 exabytes of information.

VALERIE ST JOHN: What even is an exabyte?

JOHN MORLEY: An exabyte is a billion gigabytes of data. We go back and talk about recommendations. So we're in this almost bizarre scenario today that we have exploding data growth. We have legal and business requirements to keep that information for longer periods than ever before. Who's going to hit the delete button on any of this information? And yet at the same time we're also challenged with trying to be as energy efficient and as environmentally conscious as we possibly can be. So we've seen a lot of changes both in our approach as a vendor of IT solutions but also in many of the customers that are coming in.

ROBB BOYD: I can't help but notice what is this happening here? This looks like a little growth happening on your computer there. Is that an indication of how fast --. Am I getting that right?

JOHN MORLEY: You know I'd like to say this is my personal wealth ticker here ticking up but it's not.

JIMMY RAY PURSER: That's actually Rob's.

JOHN MORLEY: This is Rob's, great. So this is from IDC. This is what we call the digital footprint ticker. And what we're looking at here is just how much information is being created in real time right now. The very interesting thing is that this number according to all of the research done up-to-date should be around 220. We're all ready at 244.

ROBB BOYD: Oh, so in other words, we're accelerating actually a little bit faster than originally anticipated?

JOHN MORLEY: Absolutely.

ROBB BOYD: So from EMC's perspective, Ray I'll direct this your direction, where do you think the low-hanging fruit is?

RAY GONZALEZ: Well there's a few things we can do today. One is align ourselves with facilities teams, two, decommissioning of redundant systems and applications. What we find today with the recent mergers and acquisitions, I think it's going to be common that we're going to see a lot of redundancy in our data center. So using something like one of our products Application Discovery Manager to scan the network, find these redundancies and eliminate them where we see them. Thirdly is going to be implementing hot and cold aisles within your data center.

ROBB BOYD: We talked about that earlier.

RAY GONZALEZ: That's right, and then fourth is consolidation and virtualization. These two items are really going to help us increase our utilization, reduce our capacities and eliminate waste, which is really the core to green IT I think.

ROBB BOYD: Yeah let's not be wasteful. How does this play into this notion of lifecycle management?

RAY GONZALEZ: Well they're different pieces within ILM, but a bigger piece is our storage tiering.

JIMMY RAY PURSER: You know what? Come on over here and draw it because sometimes it's harder to say it than actually doing it. Show me what you're talking about because you're talking about storage tiering. Tiering kind of keys me as an engineer that there's a few ways to tier data centers. There's a Cisco method. There's the (inaudible) method. Which method are you talking about here? We're talking about tiering data. I'm kind of curious what you're talking about here.

RAY GONZALEZ: Well it really gives us the opportunity to optimize our environments by storing information on the right platform at the right cost price. So EMC categorizes information in two groups. First we have our mission critical SAN environment and our business important. Mission critical is just that. That's your enterprise applications and really any information that's required to successfully run your business.

JIMMY RAY PURSER: 24 by forever.

RAY GONZALEZ: That's right. We have two tiers, tier 1 and tier 2, which is our high and midrange platforms. The key here is they both require array-level replication, expensive and requires a lot of resources.

JIMMY RAY PURSER: Absolutely.

RAY GONZALEZ: Here in business, this is where you're going to want most of your growth. This is our cost-effective platforms that are the most energy efficient. So tier 3, same hardware platforms but what we have here is either software replication or no replication at all.

JIMMY RAY PURSER: No replication?

RAY GONZALEZ: Test and dev environment.

JIMMY RAY PURSER: Oh okay, test and dev okay, that makes sense.

RAY GONZALEZ: Tier 4 is our ATA platforms and then tier 5 is --. So this essentially allows us, when we talk to our customers, allows us to focus in on a few key features of business continuity. We look at availability, performance and recoverability. Depending on what those requirements are, we can now easily align those requirements with our platforms.

ROBB BOYD: Okay so that makes a lot of sense but how does this tie into the information lifecycle management?

RAY GONZALEZ: Well the premise of information lifecycle management is that the value of information changes over time. So what is considered mission critical today may quickly become business important tomorrow.

JIMMY RAY PURSER: Oh that's true, that's cool, absolutely.

RAY GONZALEZ: But the key is really using automatic intelligence to understand when that happens and then move that information to the most appropriate energy efficient platforms automatically on the fly.

ROBB BOYD: So the idea is there's a shift in thinking applied through the technology because there's some business process and technology process change that you're talking about there as well.

JIMMY RAY PURSER: I guess I'm wondering how you validate that. How do you know when something is mission critical?

RAY GONZALEZ: Well let's look at your mailbox today. You may have 100 attachments.

ROBB BOYD: Let's not look at his mailbox but go ahead.

RAY GONZALEZ: What we can do is we can define a rule that says okay after 30 days when your attachment has been in your inbox for 30 days, we'll automatically archive that onto a lower tiered storage.

JIMMY RAY PURSER: That's cool.

VALERIE ST JOHN: Ray EMC has a power calculator as well to help us in the decision-making process, is that right?

RAY GONZALEZ: They do, yes, John you want to speak to that?

JOHN MORLEY: Yes I'll just talk to that briefly. You know at the end of the day.

JIMMY RAY PURSER: Get on over here.

JOHN MORLEY: I like being in the middle between --.

JIMMY RAY PURSER: Join the gang.

JOHN MORLEY: Very simply we're looking at everything from an information perspective and that is that IT exists primarily to deliver information to the end user. So EMC's power calculator, compatible and complimentary to Cisco's, is looking at things like how much information is in the data center, what is the power and cooling required to run those systems. And let's look at it this way and we'll talk about some of the future technologies coming. But the less data I have, the more energy efficient I'm going to be. So our power calculator is designed to look at all the information in the applications as well as all the hardware and software.

ROBB BOYD: So what can we expect in the future?

JOHN MORLEY: There's a lot of interesting things coming. So first of all we'll talk a little bit about hardware but it's not just hardware. There's a lot of software involved in there.

JIMMY RAY PURSER: There has to be.

JOHN MORLEY: There has to be and I kick off with two very simple things. How many copies of the same mail do you have in that big mailbox that we were talking about, same files?

JIMMY RAY PURSER: I'll tell you there's a bunch of Nigerian get rich schemes that I just have to save because I know that at some point I'm going to get that money, man.

ROBB BOYD: So what are you saying there though? Are you saying that's part of the future too?

JOHN MORLEY: What we're looking at is if I go to store that information, that email --. I got to let you in on a little secret. I got that get rich email too. So why store that twice? Why not just point both of us to that same file stored once. What we're referring to here is things like data deduplication. Only store it once but let everybody have access to it.

JIMMY RAY PURSER: (Inaudible).

JOHN MORLEY: Absolutely, now the other thing that you can build into that is also the concept of something like power aware information management. We're providing information access to end users based on Ray's mission critical or business importance metrics. Let's put in an energy efficient metric in there. How critical is it to the company to spend money on energy to give you access to your Nigerian get rich quick scheme?

ROBB BOYD: That might be a little lower on the priority.

JIMMY RAY PURSER: Not for me.

JOHN MORLEY: Those kind of things coming along on the hardware side is very exciting straight away because we're looking at things like component improvements so power, cooling, fans, the introduction of technologies like flash disk drives --.

JIMMY RAY PURSER: Ah that's good stuff there.

ROBB BOYD: So this stuff will make big differences. How do you bring all this together though? Is there kind of a suggested blueprint for what you would want to see in a customer environment?

JOHN MORLEY: Yeah there is and maybe what I'd like to do is kind of bring some of the themes together to wrap up and give you that perspective. So I'm going to jump forward here a little bit. Ray talked about information lifecycle management at EMC. We're going to talk about taking this right across the stack. So working in Rob Aldrich has talked about Cisco's world and what Rob Smoot is going to talk to us about VMware. What we're looking at here is a little small, generic infrastructure. I've got some networks in here. I've got my servers in here and I've got my storage arrays NAS and SAN. At the end of the day, it's all about my end users getting access to their information. So the right level of service to the right user around the right information. So basically we've talked a little bit about tiering across all these different layers. What I want to give you a concept in what we're all working on and what we're advocating to customers going forward is that basically what I've got here is I've got a pool of available disk, some that's flash, some that's ATA, different energy size and disk sizes.

ROBB BOYD: It doesn't matter except that you can leverage it appropriately. Sorry go ahead.

JOHN MORLEY: You can provision virtually within that. It's the exact same conversation we're having with all of our customers with Cisco as well around all the network capabilities. It's the exact same conversation that VMware is having at the server level. You know what starts to happen here is we start to talk to customers about instead of understanding solely the storage or the network or the server offering, let's take that level of service around that information and let's give them a single service level right across the infrastructure stack.

JIMMY RAY PURSER: Vertical virtualization.

JOHN MORLEY: Absolutely.

ROBB BOYD: We're seeing all the elements are in place to make that happen. I see that coming.

JOHN MORLEY: Absolutely and you know what our last point may be on this is that I went back and start and said you know we need to benchmark. We've got to make sure that energy efficiency is part of that benchmark. So that's where EMC sees energy efficiency going. That's what we're trying to do.

JIMMY RAY PURSER: That is very clever.

VALERIE ST JOHN: John Morley, Ray Gonzalez with clouds and squares and rectangles that could save us money. Thanks very much for joining us.

RAY GONZALEZ: Thanks Valerie.

JOHN MORLEY: Thank you, Valerie.

VALERIE ST JOHN: We'll talk more about virtualization with our next guest Rob Smoot from VMware in segment four. But first Jimmy Ray and APC's Tappleigh Fallon talk about cool innovation in the data center.

JIMMY RAY PURSER: Tappleigh in the field we actually call these the ovens. We love the convenience of it and we kind of tolerate the heat and all the problems they cause but there's a (inaudible) you guys have got some great ideas on rack management, right?

TAPLEIGH FALLON: That's right, what we're trying to do is really address the needs of the customer. A lot of the different trends that are affecting the closet server room data center, things like virtualization, network conversions, unified communications are all creating different challenges. And one of the major challenges is being able to manage the power and cooling within the room. What we have here and what we're displaying today is a combination of different products that create a complete solution for your data center and beyond. For instance what you see right here on this screen is a product called our Infrastructure Central. That's our centralized management platform that allows you to view all the various different physical infrastructure components within the room. So you can take a look and see what your security is like with your NetBotz camera. And you can take a look at what the different temperature, humidity, air flow and so forth measurements are within your data center. And you can do this all from one place.

JIMMY RAY PURSER: You can even check (inaudible) flow and stuff if you wanted to. This is a really full three dimensional solution.

TAPLEIGH FALLON: It is. It's a real management tool versus just monitoring and checking and seeing if something is working. We can really set parameters, set up alerts, see different graphing and reports and so forth. And especially in a room where you don't have people going in and out of there every day, it's key to make sure that at least the room is okay and at a good temperature and especially with a lot of the new products that are being put out there in terms of high density servers, high density switches and so forth.

JIMMY RAY PURSER: We've always said in the field that security starts with physical security. If you don't have physical security then you have no security. I know that we've got built in cameras here. We can take snapshots and get video feeds. This is really a pretty intelligent system.

TAPLEIGH FALLON: That's right, NetBotz is actually a very cool product. What you see right here, this is the NetBotz unit. It has a camera attached and it has the integrated environmental monitoring. I can show you on this screen a little bit with the actual view. You can see the various different cameras set up in the booth so you can physically see what's happening in the room. And then also again the readings of the air flow, audio, dew point, humidity and temperature and that sort of thing. So it really kind of gives you an entire view of what's happening from power, cooling and environmental standpoint. So you saw on the front there this is one of our signature cooling products. It's our in-row cooling product and this version is the RC model, which is a chilled water version. So that's why you see some of the pipes here. That's where you're going to have the inlet and outlet of water going through the unit. The nice thing about the in-row cooling philosophy is that you're putting the cooling actually where the heat is being generated. So the server equipment, the networking equipment is putting out heat. And you want to remove that heat as quickly as possible out of the room or else it's going to escape to other areas and be bad essentially for the equipment. So what this is doing is putting it a lot closer versus the more traditional approach of having a perimeter craft.

JIMMY RAY PURSER: Just kind of blanket it everywhere.

TAPLEIGH FALLON: That's right and it's constantly blowing cold air.

JIMMY RAY PURSER: Very expensive.

TAPLEIGH FALLON: Very expensive, so this is a good product to use whether it's by itself or in combination as a hybrid with more traditional cooling as well. So it really helps those hot spots.

JIMMY RAY PURSER: So you're shooting the cold air out through the front and then the equipment is sucking that air in and it's pushing out here in the back, right?

TAPLEIGH FALLON: That's right, so the cold air is being blown out, being taken in by the equipment and then, as always, the hot air is being blown out the back. Now in this configuration what we have is a rack air containment on the rear. Now you can have this cooling unit by itself and it cools up to 17 kW.

JIMMY RAY PURSER: 17 kW, this unit?

TAPLEIGH FALLON: Yes this unit. If you add on this rear rack air containment, which is about a six to eight inch extension off the rear of the --.

JIMMY RAY PURSER: This unit here?

TAPLEIGH FALLON: That's right. You add this on and contain it with some plexiglass right here, you can get up to 30 kW of heat of power and cooling.

JIMMY RAY PURSER: 30 kW.

TAPLEIGH FALLON: In one rack, that's right.

JIMMY RAY PURSER: You are kidding me.

TAPLEIGH FALLON: No, it's pretty incredible and starting to be reality as well in everybody's data center.

VALERIE ST JOHN: If servers represent the largest energy drain in a data center, then reducing them or making them more efficient would logically move the data center in a greener direction.

ROBB BOYD: That's a good point. It takes more energy to remove the heat generated by servers than it does to actually power the servers. In fact servers plus the cooling actually represent well over half the energy consumption in a typical data center. But Jimmy Ray that begs the question are there some answers we can take advantage of there?

JIMMY RAY PURSER: Get rid of them servers.

ROBB BOYD: Is that the answer?

VALERIE ST JOHN: Thanks, Jimmy Ray!

JIMMY RAY PURSER: And next guest. You know what? Yes it really is actually to be honest with you is that a lot of folks who are buying servers are buying these really high speed processors, a lot of memory, a ton of disk space. I remember when I supported 300 users and was using a 9 GB disk drive. Laptops have more than that now. But so we're buying these incredibly high-end servers and using about maybe 4% of what they can do. So the real answer is virtualize them. Virtualize those servers and actually put more processors on one server that can truly handle it and make that server work for you, make it actually work for the money you paid for it.

ROBB BOYD: That makes sense.

JIMMY RAY PURSER: Yes virtualization is the key.

VALERIE ST JOHN: Okay if we want our energy efficiency agenda to be a success, virtualization has got to be on our must-do list as Jimmy Ray says. Let's get some details now straight from the source. Welcome Rob Smoot, group product marketing manager from VMware. Rob, welcome, thanks for joining us.

JIMMY RAY PURSER: This is the source, VMware.

ROBB BOYD: Well and that's exactly why you're here so Rob my question for you is today's model broken? Have we had this proliferation and this growth of servers that's out of control? Is there a way to reining that in?

ROB SMOOT: Yes absolutely, in the last while we've gone crazy buying all kinds of low-end servers, X86 servers, that are very, as you mentioned unutilized, 5, 10, 15% utilization is not common. So virtualization allows you to consolidate those servers. You can get 10 and in some cases 20 or 30 servers onto one physical server. And that dramatically increases the utilization and those energy savings fall directly to the bottom line. You can get as much as 80% reduction in power and cooling. As you mentioned the data center is very inefficient at cooling down the servers and the other IT equipment. And so there's tremendous savings possible from virtualization.

ROBB BOYD: Jimmy Ray what are we seeing from a CO2 production side of things. Are you seeing these things tie in together when we start taking advantage of things like virtualization?

JIMMY RAY PURSER: Well yes, I mean you look at a server, a typical server today I'm sure you guys know puts off an average of about four tons of CO2 per server. That's a lot.

ROBB BOYD: That's every year. And that is year after year, four tons of CO2 per server. That's like taking a car and a half off the road. And it's a tremendous environmental impact as well, which is of course on the top of company's agenda these days. You said you had a quote something about the amount of energy consumed in Thailand or something?

JIMMY RAY PURSER: Yes actually the CO2 that we actually are consuming and putting off, or not consuming of course but putting off from these servers, is actually equal to all of what Thailand does. That's incredible if you think about it.

ROBB BOYD: Yes because there's so much excess capacity in the industry. The typical data center has three years of excess capacity and if you were to think of that as a manufacturing plant and say you're running the plant, you'd probably be fired if you had three years of excess inventory sitting around. And that's what's really happening in our data centers.

ROBB BOYD: Well it is no one can really see it. Well I've got a question for you though. When we think about virtualization and stuff, is that all that VMware really does though because there's a little bit more to it than just thinking okay I'll just virtualize my servers and that's it? So what else is there?

ROB SMOOT: Virtualization is about a lot more than server consolidation. That's usually where customers start with virtualization. But it's really about the availability of your applications, the flexibility in operating your data center, very simply the ability to provision the server in a matter of minutes instead of days or weeks that it might take. But in terms of energy efficiency, one of the things that is really important for customers is to ensure that they get the same level or better level of service and availability and performance out of their infrastructure. The greenest data center is an empty one you could say. But that's not the most desirable, at least productive. And so we have a whole suite of products that are about optimizing the data center including energy. One of them a good example is Distributed Resource Scheduler or DRS, a product that uses the ability to migrate a virtual machine from one physical server to another without any end user impact or downtime. So it's migrating it live, no downtime. And as a result you can do workload balancing across an entire farm of servers. And we've extended that to account for energy efficiency so that if there's unutilized capacity, unneeded capacity over a period of time in the data center, you can simply power down servers and migrate the virtual machines to other physical servers in the data center.

JIMMY RAY PURSER: Hang on, stop, stop, stop, stop. There's a lot of things going on here. If I'm looking to actually consolidating a whole bunch of servers here on one server, and typically this is as (inaudible) okay I've consolidated, onto the next project. But you're saying that you have another product that actually will allow me to literally move one machine to another server?

ROB SMOOT: Yes and this is usually the same product that customers are using to consolidate that has VMotion included in the suite. And the VMotion moves one of the virtual machines or many from one physical server to another. And it's imperceptible to the end user. There's no downtime. So things like planned downtime.

JIMMY RAY PURSER: What's (inaudible) with that?

ROB SMOOT: Well in terms of maintenance you can maintain the hardware without having to impact the end users or the applications. In terms of power consumption, if you don't need the capacity in the data center over a period of even during the day or maybe at night, I think of this as the nights and weekends plan like your cell phone plan, 40% of your energy is consumed at night and on weekends. So if you were able to power down the physical servers and run those applications on fewer servers, you can get 40% reduction in energy.

ROBB BOYD: I guess the idea is in times of high need you spread it across. You need all the infrastructure load balanced and

everything working to support the busy business. But then now when things done, you say you know we can run this -- this became a smaller business during these hours. So now you're rebuilding your data center on the fly to support a different sized business during that timeframe.

JIMMY RAY PURSER: Well that's cool because that reminds me of that demo we saw at Live when the guy was using the EEM scripting. And he was bringing the Cisco switches offline and then bringing them back up at like seven o'clock in the morning and stuff, kind of a very similar type of thing.

VALERIE ST JOHN: Hey Rob, what about desktops and storage? What's the impact of virtualization there?

ROB SMOOT: The desktops, similar to servers, are highly underutilized. You might leave your desktop on at night and you're cooling the desktop much the way you are in data center. You're just doing it in a larger corporate environment. So these desktops can be centralized and consolidated on servers in the data center. You can get as many as 40 desktops to a server. And then you use thin clients at the endpoint. And the thin clients can consume about 90% in some cases less energy than the traditional PC. So they use the thin clients. And then on the replacement cycle, you're only replacing them half as often. And so you can extend that replacement cycle for the hardware. And the e-waste that results from the quick replacement cycles is eliminated as well.

VALERIE ST JOHN: Before you go Rob --.

JIMMY RAY PURSER: Can I say something?

VALERIE ST JOHN: Yes sure, go for it.

JIMMY RAY PURSER: Is there a break over point here where I'm looking at getting rid of. I've got all these servers here and I'm looking at adding on these servers. Is there a delta that I'm looking at where it becomes kind of cost-ineffective because I'm buying just a higher-end server to support all this virtualization?

ROB SMOOT: The savings in terms of the hardware where you could eliminate the need to purchase a 10, 20 pieces of hardware and that trickles down into the facilities, into the storage as well. In some cases you may be centralizing your storage. That savings far outweighs the beefier server, the larger server that you might be using in the post-consolidation scenario. The hardware savings are dramatic and the energy savings now, energy is one of the top cost items for data centers. You can pay for it just in the energy over the course of --.

VALERIE ST JOHN: Before you go just so that we're not confused, we're talking a lot about virtualization, it almost sounds like we should be virtualizing everything all over the place, all the time. What are the guidelines for us?

ROB SMOOT: Today the technology has really advanced fairly quickly in the latest generation of technology. When you look at virtualizing, it's CPU, memory and the I/O requirements of your application. And ESX which is our hypervisor allows us to get up to 60,000 I/O.

JIMMY RAY PURSER: That's an excellent product by the way.

ROB SMOOT: In CPU you can have four-way virtual machines. You can have 64GB of memory. So technically the resources are there so you can virtualize almost all applications including Exchange, Oracle, larger databases. The reality is a lot of customers will start with the lower-end, the low hanging fruit and then work their way towards the larger applications. But we have a lot of customers who are virtualizing even the most resource-intensive applications.

VALERIE ST JOHN: Okay virtualization is often thought of only as a server capability. But there is combined benefit here, Jimmy Ray.

JIMMY RAY PURSER: Yes you know I mean actually one of the things that we're looking at when we're starting to consolidate these servers and get rid of them is for every one server we're taking out, we're also decreasing our energy, our heating and cooling, the maintenance, a lot of things go with actually consolidating our server architecture here. It's really, to be honest with you, it's just really good data center design. I mean we can call it green. We can fly it in that banner and stuff and that's cool. But in the end it's just really solid, educated data center design just by doing that type of stuff, in my opinion.

VALERIE ST JOHN: Thanks guys. Rob Smoot with VMware, thanks for joining us, good information.

ROB SMOOT: Thank you.

VALERIE ST JOHN: Well Robb before we wrap this up, let's take another look at your interview with Doug Gourlay.

DOUG GOURLAY: There is so much more we can do with high voltage AC distribution, with energy efficient Ethernet that automatically rate adapts based on load, with automated load balancing across our services. What if we make our firewall modules and things (inaudible) on land. What if I automatically load balance it across a network service and when it's done and when I don't need it, I turn it off? I don't reduce the load across five of them. I turn three of them off. And then when I need them, I start bringing capacity back online as quickly as possible but saving our customers energy. So that means we have to now monitor, manage and meter the real-world power draw of these. And what we already took a step to doing with the data center assurance program is giving our customers, for the first time ever, the actual power draw of our devices in a 20 to 25z ambient environment. You wouldn't believe how many customers I've seen take a switch that has two 6,000 Watt power supplies and go well that's 12,000 Watt of heat. Now I need 3,000 cubic feet per minute of air to go through there to cool if off. And you're like ah dude it's really only

generating 2,500 Watts of heat. You're like oh it is?

ROBB BOYD: So we're over-chilling those rooms for no good reason.

DOUG GOURLAY: Maybe not the room but at least that particular rack and that's 80% waste. Yet cooling is 50% on average the cost of power in the data center.

VALERIE ST JOHN: And the entirety of that interview can be found embedded in the show notes so check that out. We're delighted to be virtually joined once again via TelePresence by Marcello Hunter with learning at Cisco. Welcome Marcello.

MARCELLO HUNTER: Thank you, it's good to be back.

VALERIE ST JOHN: So you're going to talk to us a little bit about data center certifications, which is part of the newest family of certifications here at Cisco. That's kind of the hot new thing these days, isn't it?

MARCELLO HUNTER: It is. It's so hot in fact that we've expanded the family of our data center training and certifications. Last year we released training in storage networking and in data center networking infrastructure. And we just finished adding to that group of training and certifications by releasing the newest data center application services training and certification. And as a group both the storage networking and the networking infrastructure, and now the newest application services, have been so popular that up to 1,500 people have gotten themselves trained and certified around the world, most of them in the last several months.

VALERIE ST JOHN: No kidding.

ROBB BOYD: Well that's a testament obviously. Are we seeing that from --. Obviously a lot of those are channel partners jumping on either its requirements to be able to service and install and sell certain products that fit into that environment. But it's a differentiation not just for channel partners. But we're seeing some customers uptake on this stuff as well?

MARCELLO HUNTER: We are. We allow anybody in the world to earn the training and certification. And so many of them are our channel partners as they seek to stand apart in data center specialization. But we are also seeing many people at our customers, at companies and organizations who are responsible for the equipment in their data center, and they're coming and getting trained and certified as well.

VALERIE ST JOHN: Marcello does this data certification process at Cisco address sustainability?

MARCELLO HUNTER: It does. In fact some of our newest training in application services and our newest updates to the networking infrastructure training which address the newest equipment from the Nexus 7000 and the Nexus 5000, also talk about how to use those in a sustainable way in a sustainable data center. And we are releasing our newest upgrades to CCIE storage. And some of the topics that are addressed in CCIE storage also address sustainability as well.

VALERIE ST JOHN: Excellent, Marcello Hunter with learning at Cisco, thanks for joining us.

MARCELLO HUNTER: Thanks for having me.

VALERIE ST JOHN: Well Robb, lots of stuff today.

ROBB BOYD: Yes, absolutely.

VALERIE ST JOHN: Do you have any final, I don't know, philosophies, thoughts, ruminations?

ROBB BOYD: I do, I do, thanks for offering. The idea here behind what we've discussed, I think the implications become very clear. If you take this quote from Forrester, the true cost of a product or service will be measured in terms of price plus the energy it consumes over its lifecycle. Forrester wrote about this in a paper. It was green IT should feature in your sourcing plans. And we talked about today six areas where IT can impact your green initiatives. It was virtualization of resources, big one, big one. Collapsing appliances into the network, that one may be something we're overlooking. Centralizing branch office IT, hopefully that's in place for a lot of people already. Better buildings management, so how do we tie facilities into this. And then not only just changing business behavior but also looking at how we change business process. Now for Cisco being part of the green IT solution, it's not just about individual products or solutions any more than it's about the individual enterprise. It's literally about transforming the business ecosystem for the future, creating a new mindset and using IT to its fullest extent across all sectors. In this way, human beings and the environment will benefit and the best companies will survive.

VALERIE ST JOHN: You got me right here, I'm tearing up.

ROBB BOYD: Well I didn't mean to do that to you.

VALERIE ST JOHN: Good stuff. So Robb Boyd and Jimmy Ray Purser, I'm Valerie St John, thanks for joining us on TechWise TV. To find out about future episodes or to check out a complete archive of previous shows, be sure to visit the Cisco interaction network at cisco.com/go/interact. JEANNE BELIVEAU-

DUNN: We have the charter of really understanding the technology, understanding the career tracks, understanding the business of our customers. We have adopted a new Web community which we are now bringing to market to help enable, empower really our

technical audience and be the place that they can come to get the facts, the straight scoop about what it takes to shine in this industry and what it takes to be competitive in this industry and to provide the best value to their employers. We're starting off with maybe having most of the contact from Cisco. But over a very, very short period of time, we're expecting to see lots of great contact from our customers, our partners. We want the best of the best to be learning from each other and then mentoring on down. And this is our way, our contribution to really giving the community something back that they need to be able to collaborate and do this together. So now I want to introduce you to really my favorite people in the whole world. Joachim Meuhler, I'm from Germany. My name is Misha Segal from (inaudible). I'm Tref Jones, I'm from the UK. Cisco Action Network, this is a real solution for supervising and then we say MPLS backbone. My name is Natali (inaudible). I'm Jonathan Sherwin, I've been in the networking business nine years. Jan Benetska, I live in Denmark. I'm working for Dimension Data Belgium. I'm working currently as a presys in core networking.