



## IBM IT Innovations Experts Forum Meet the Experts – Dr. Jia Chen

Hello, my name is Jia Chen, I am with IBM Systems and Technology Group. Today I'd like to talk to you about Green IT. Over the past few years we have seen an explosion of the number of servers in the IT industry. What's more importantly, these servers are running with hotter chips which are packed more densely, so to power a data center not only will you have to power these servers and storage networking devices associated with it, we also have to find a way to remove the heat that they generate and take them out of the datacenter.



To give you a rough idea, in the datacenter, roughly 60% of the power is used for the power and the cooling, 40% only goes to IT equipment, and of the 40%, only 1/2 of those goes to servers, and 1/3 of those in the servers is used to buy processors. But the most serious question is in the datacenter the average utilization of these servers are only 20%, which means 80% of time these servers are twiddling their thumbs, doing nothing. So power and cooling has become the most critical challenge that is facing our IT industry today.



Well at IBM, our approach to this challenge is to look at the problem holistically from end to end, all the way from atoms, molecules to hypervisor and software. To give you a quick example, for instance, in the atoms and molecules area, we recently announced an air gap technology, where we used nanotechnology to really move that from a lab to a fab and be able to remove the material in between the metawires in the chip and dramatically improve the power efficiency.



For another example on a more system level, for instance, consolidation and virtualization. Recently we also announced we are consolidating 3900 servers onto 30 z Linux. By that we are reducing 80% of the electricity used and 85% of the space usage.

While other examples, if you look at in the datacenter point of view, you've got many servers but not all of them are running at full utilization being used, so one idea is to turn some of the servers off using active energy management.



Other examples will be the technologies that we're bringing into the datacenter - for instance we're bringing water cooling into the datacenter. We have this offering called Cool Blue. What it does is: it has a rear door heat exchanger where it can remove over 50% of the heat that is generated by the server, and this way it avoids the intermixing of the hot and the cool air. What's more, this runs above dew point so you don't have to worry about condensation issues.



Another example of this is we look at the chiller.

So in the datacenter a lot of power goes into the power and the cooling, and a lot of that goes into the chiller. We introduced this new material, phase change material, it can store the coolness at times of the electricity utilization is low, for instance during nights or weekends, and then the coolness can be released into the data center during peak electrical utilization.



These are just some of the issues and solutions about Green IT. We invite you to learn more at IBM with us.