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Stephen Herrod; Chief Technology Officer; VMWare
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Evan Shuman: Welcome today to the next installment in the Cisco Technology Audio Series. I'm Evan Shuman.

Virtualization is hardly a new concept, having first been demonstrated back in the late 1960s. But with today's Internet speeds and bandwidth, the idea of virtual servers reducing hardware risk while potentially cutting costs is becoming very attractive.

Dr. Stephen Herrod is the Chief Technology Officer at VMWare and has been one of the industry's most enthusiastic cheerleaders for virtualization. Steve, thanks so much for joining us today.

Stephen Herrod: Thank you, Evan.

Evan Shuman: Where do you see virtualization going, let's say, two to three years from now? How do you expect it to change?

Stephen Herrod: One great example would be almost anyone who's providing a service over the Internet that has peaks and valleys, and the way today's CIOs have to think about it is typically really guessing when that load is going to come and where it's going to come from, and as a result, they have to highly overprovision their data centers, put more hardware in heat and cooling needs into there. And that guessing is really something that we want to eliminate altogether. We really think about virtualization as letting people right-size their resource usage, only to use enough that is needed to satisfy the needs of your customers as they're coming in.

So a great example would be something like a t-shirt store, who has a great product that really starts to sell as Christmas comes on. But let's say that they've really hit it big this year with a great t-shirt. They would have to somehow very quickly provision new servers and really build out more data center space if they wanted to satisfy their needs, and two things could happen. One is that they've really overbuilt and they're not able to reap the benefits of all their investment, and the other is that they're just not ready to handle the load because they underprovisioned.

What we really see virtualization enabling in the next two or three years is this flexibility to certainly leverage your existing data center as much as possible, but when you really need to spill over and have got better capacity or better needs than you have, you'll be able to seamlessly move your workloads and your e-store out to a neighbor data center. Perhaps it would be your own, or it could be one that's provided by a third party. And that flexibility to handle peaks and valleys in demand and really right-size your resource usage is something that will be fundamentally different from what you have today. And I truly believe in the next three years or so it will be pervasive across servers and desktops.

And what's going on is pretty fascinating. It started as a way to really carve up a single machine into multiple virtual machines and to really benefit from what's called server consolidation. But what we've found over the last few years as people have really started to adopt it is that it's a bit of a Swiss army knife tool, where you can find uses for it you never dreamed of. And increasingly, it's being used for increasing the availability of your workloads, making it faster to provision for your various customers, and providing forms of elastic capacity as people move to more and more dynamic data centers.

On the other aspects that are pretty fascinating is that its pervasiveness really is growing on a few fronts. Certainly, the more benefits we just talked about, but it's really applying to all applications as we go forward. With progressive improvements from our various hardware partners, such as

Cisco, we're making it possible to run all of the workloads, even the highest-end databases, within virtual machines. And what's more, it's also applying to more and more use cases. People tend to think about it as a data center tool, but we're very rapidly seeing adoption move into the use of virtualization for enterprise desktops. And I think you'll also see that as we move to the increasingly mobile world of phones and laptops.

One of the most interesting areas that we're looking at right now is actually how does virtualization enable the much-discussed cloud computing in a way that really lets customers use it on their own terms. And by that, I mean we really look to it as a possibility for running any type of application while benefiting from the notion of cloud computing, where it's running somewhere on the Internet.

Evan Shuman: As we move to that next level, if you will, of virtualization, what impact do you expect it to have on the network infrastructure?

Stephen Herrod: So it's absolutely a huge part of the world, and in fact, I think of the network as really the glue that holds together what we call virtual infrastructure. And, just quickly, virtual infrastructure is the next phase of virtualization. The first one is carving up a single machine, but the next is when you carve up a collection of machines but then tie them all together so that they can provide more than the individual pieces by themselves. Forrester has actually started to call networking the "new back plane of computing," and we really do feel that way. And why it's so important is that there's so many types of communication that need to go on between these different systems that are providing this infrastructure. Everyone will initially say, "Okay, a virtual machine needs to talk over the network to do whatever it's doing," but there's so much underneath in the infrastructure, too, things like v-motion, where we're able to move live virtual machines between systems, management heartbeats, access to IP storage, storage v-motion, and even things like fault tolerance, where we're keeping two different virtual machines in lockstep. All of this relies on a very robust and a very predictable network pattern, and that's why we're so interested in working together with Cisco and all of our network interface controller companies, as well, to make sure that you can put quality of service and very high bandwidth with low latency together to provide this.

What's also interesting is that's talking about within a -- to some extent, within a single data center, why is the network so critical. But another part towards this notion of cloud computing, if you will, is the notion of mobility across data centers is increasingly something we're focused on. Two very clear examples today are around disaster recovery, and the second is around the desktop, and let me just give you a little detail here.

Disaster recovery is something that has really been taking hold of virtualization because it makes life a lot easier. You can copy your virtual infrastructure to another secondary data center over the network and have it easily come up and run on whatever hardware is there. That's in contrast to a really difficult process of matching data centers today. So as we look to make two different data centers in perfect synchronization, the network will be ultra-critical there.

And then the other angle, the desktop is another case. We have an approach where you can run your desktop while it's out in the data center, and you can connect to it over the network. And that relies on remote display protocols and very fast access to seeing your screen. But we also look to check out your virtual machine, if you will, and stream it down to your laptop or mobile device for those times when you want to go on, for example, an airplane. And, again, there, we'll look at very high-speed networking as a way to make that virtual machine come your way.

So, overall, the network is just huge in the next phase of virtualization, and we're really looking forward to some of the work we're doing together to deliver that.

Evan Shuman: Now, to really take virtualization to the next level, you're going to need a lot of

application support. How far along do you see ISVs today with optimizing their applications for virtualization?

Stephen Herrod: We're really seeing a transformation right now. It actually first hits on licensing and support policies, which has been a major focus of ours, to make sure that companies are comfortable with their applications and know how to make their business case on top of applications when they're in virtual machines. So we've worked hand in hand with a lot of companies to help them develop those best practices.

Once you get past that, you do move to just a great opportunity, and our mantra from day one is to make applications run better when they're in a virtual machine than when they run on physical hardware -- better performance, better manageability, and better availability and security, as well. And so I think increasingly you'll see a set of folks who are actually developing applications from the get-go within a virtual machine and leveraging some of the unique properties of that virtualization layer to do things they've never done before.

Evan Shuman: That's true, but today, how many ISVs do you see really making that a priority?

Stephen Herrod: It's interesting. We have a notion of something we call virtual appliances, and what this means is that it's a prepackaged, ready-to-go virtual machine that's developed by an ISV. And what they do is they create a virtual machine that you can simply download and start running. Think of it kind of like digital music. There's no installation and no configuration, so it's very easy for that end-user to use.

So we have something we call a virtual appliance marketplace that has 700 different virtual appliances on it, which again, are dedicated examples of applications for virtualization, and we get just massive number of downloads. At last check, it was about two every minute of these virtual machines. So it's really moving quickly. I wouldn't say we're over the tipping point yet, but we're definitely seeing growing momentum towards that.

Evan Shuman: Excellent. Well, it's been a very, very intriguing discussion. Appreciate your time today.

Stephen Herrod: Thanks very much, Evan.

Evan Shuman: For the Cisco Technology Podcast Series, this is Evan Shuman. For more podcasts on technology and other global news information, please go to newsroom.cisco.com. That's newsroom.cisco.com.