RunAs Radio

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RunAs Radio is a weekly Internet Audio Talk Show for IT Professionals working with Microsoft products. The full range of IT topics is covered from a Microsoft-centric viewpoint.

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Anil Desai Focuses on Hyper-V!
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[Music]

Carl Franklin: From runasradio.com, you're listening to RunAs Radio, the Internet audio talk show for IT professionals with Richard Campbell and Greg Hughes. This is Carl Franklin, introducing show #52, with guest Anil Desai, recorded Thursday, March 27, 2008. RunAs Radio is produced each week by PWOP Productions, providing professional audio and media services online at pwop.com.

Richard Campbell: Hi, this is Richard Campbell. You're listening to RunAs Radio. With me as always, my co-host, Greg Hughes.

Greg Hughes: That's me. Hi Richard, everybody.

Richard Campbell: How are things, sir?

Greg Hughes: It's pretty good, you know, we've had a little bit of time off back doing marathon recording sessions.

Richard Campbell: Oh yes.

Greg Hughes: Yeah, but that's good. Some great content, this show and a few upcoming shows. Pretty excited about some of the things that we're talking about. Lots of new technology.

Richard Campbell: Yeah. We seem to be lining up some really fun shows lately. Hey, I got an email for you.

Greg Hughes: All right, let's hear it.

Richard Campbell: "Hi guys. I've got to say I love the show. I listen to both RunAs Radio and .NET Rocks! all the time. While I sometimes feel disappointed that the show doesn't run as long as .NET Rocks! you manage to cram heaps of good stuff into the half-hour, so… I've listened to Scott Kveton's talk on OpenID and Brad McGehee's talk on being a better DBA several times now and I still pick up new things I've missed before." It's an interesting thought that he listened multiple times to try and get a little deeper into it.

Greg Hughes: Yeah, that's one of the cool things about recorded shows is you can play them back as many times as you want.

Richard Campbell: "Your stuff on PowerShell has been fantastic. I reckon that a sys admin without scripting skills is doing himself a disservice. I'd love to hear the Microsoft scripting guys on the show, though I'm sure there wouldn't be anywhere near enough time for them to brag about anything and everything scripting and I'm sure that Dr. Scripto would love to get his mug on your homepage."

Greg Hughes: You know, that would be a lot of fun to get the scripting guys on here. I think we need to try for that.

Richard Campbell: They're one of the guys who are also running those crazy scripting contests and things for PowerShell as well.

Greg Hughes: That's right. Well, you know, their whole website with all the script stuff on it has always been a lot of fun too.

Richard Campbell: "Good work and bring on the next show. Cheers, Mike Hansford, Melbourne, Australia." Thanks very much for your email, Mike.

Greg Hughes: Yeah, thanks Mike.

Richard Campbell: And I'm also worried, did we go for exposed PowerShell? Because we did a bunch of PowerShell shows pretty quick together too.

Greg Hughes: We did. We did a lot of PowerShell and so -- you know, that would be another good piece of input to get from the audience. Do you like it when we do shows of a similar topic that are pretty close to each other? Would you rather see them spread out? Also, what other ideas or topics for shows or people that you know of that would be good to hear from. Just let us know. Send us an email, info@runasradio.com.

Richard Campbell: All right, Greg. Let's introduce our guest. Anil Desai is an independent consultant based in Austin, Texas. He specializes in evaluating, implementing, and managing IT solutions. He has worked extensively with Microsoft's Server products and the .NET development platform and has managed environments that support thousands of virtual machines. Anil holds numerous certifications and is a Microsoft MVP for Windows Server – Management Infrastructure. Anil is the author of numerous technical books focusing on the Windows Server Platform, Virtualization, Active Directory, SQL Server, and IT management. He has made dozens of conference presentations and is a frequent contributor to online and print magazines. For more information, please see AnilDesai.net, that's A-N-I-L-D-E-S-A-I-dot-net. Welcome Anil.

Greg Hughes: Hey Anil.

Anil Desai: Thanks. Great to be here.

Richard Campbell: Server platform, virtualization, Active Directory, SQL Server, and IT management. Are you sure that's a specialization?

Anil Desai: Yeah, I'm thinking about branching out a little bit. People always ask me when I say that, they're like, "So, what do you do well?" "Yeah, I'm actually thinking of some of that stuff, so…" Yeah, it is kind of a broad range. You really hypedme up there so I have a lot to live up to.

Richard Campbell: Yeah. Well, it's funny when you -- I tend to focus on scalability issues, which means I do dip into web servers and SQL Server and all those different technologies, but purely out of focus of how do you make this stuff go faster.

Anil Desai: You know, this stuff, it's all really interrelated nowadays.

Richard Campbell: It's true.

Anil Desai: It's the days of where you can be just the network guy or just an OS guy. It's kind of changed. It's all interrelated these days.

Richard Campbell: All right. Let's start at the top here because we were chatting before the show started about Hyper-V. That seems to be the topic on everyone's mind these days. As of this moment, when we're recoding the show, Microsoft is at Released Candidate 0?

Anil Desai: I'm not sure if it's even a number. It's just called a Released Candidate right now. It's the only RC out there though.

Richard Campbell: So, even though Windows 2008 is shipped, Hyper-V is not quite done yet.

Anil Desai: That's right. Windows Server 2008, the RTM version ships with a beta, the only beta of Hyper-V and then there's a Release Candidate version you can now download, so you can update that stack in Windows Server 2008, but, yes, it's still a beta.

Richard Campbell: And I think Microsoft said something like 180 days after shipping of Windows 2008, they were going to ship Hyper-V. It sounds that they are more less online. I imagine this will be the only Released Candidate that will be "*finaled*" in a few more weeks.

Anil Desai: I don't know if there's an official word on that, but, yeah, they definitely seem to be on track to me, that's six months deadline.

Richard Campbell: And I am fascinated by it because I've run my own gear so I've been wanting to move to a virtualization solution for a while and Microsoft seems to be playing catch up all along here. It seems to me like VMware is the dominant player and there's Sand and -- there's a whole stack of different products.

Anil Desai: You're definitely right and I think that's fair. I think with Microsoft virtual server, which was originally based on acquisition from a company called Connectix that Microsoft bought doesn't have the architecture and the type of, you know, the performance, those types of benefits that people kind of expect nowadays with virtualization and Hyper-V is kind of aiming to solve all that.

Richard Campbell: Well, the biggest thing for me looking at Hyper-V is 64-bit OSes.

Anil Desai: Yeah, that's a big one, definitely. Also, people didn't know Hyper-V only runs on the 64-bit edition of Windows Server 2008.

Greg Hughes: Now, I was speaking with somebody -- maybe we should step back briefly and talk about really just what the heck is this Hyper-V thing. I was speaking to somebody who runs an IT shop the other day who has been doing virtualization for several years and didn't know what Hyper-V meant.

Anil Desai: Right, yeah. The name just describes it all, right?

Greg Hughes: Exactly.

Anil Desai: It's gone through several iterations. It went under the codename of Viridian with Microsoft and then briefly it was called Windows Server Virtualization and then they got rid of those 10 syllables and now it's Hyper-V. The name comes from the term that this is Microsoft's Hypervisor and basically a hypervisor is a layer that sits between the physical hardware on a server and the operating systems that run above it. So, a Hypervisor would be most analogous to VMware's ESX server type implementation, although there are architectural differences. Is that too detailed or should I give a higher level overview of Hyper-V?

Richard Campbell: I think that's very sensible. I get the sense here for folks who are new to virtualization and I don't know how many there really are because this has been around for a while there that this has been a movement in the industry that included -- I know BIOS settings I have to set correctly to take advantage of it. Only certain processors do it correctly. It seems like we're finally out getting all the bits together to really build serious virtualization machines.

Anil Desai: That's totally true and Microsoft, they've really upped the ante as far as like what kind of hardware you could run this on. As I

mentioned earlier, no 32-bit host servers, you're got to have virtualization extensions in your Intel or AMD CPU. Now, on the server side, this isn't a big deal. Just about every server you buy today would support it, but they're basically saying, "Look, you know, performance and security are so important that we're not going to try to support host servers that were created four or five years ago."

Richard Campbell: Right.

Anil Desai: So, definitely a move forward strategy.

Richard Campbell: And I like the way you've now set this that ESX server, that's VMware's big product, right?

Anil Desai: That's right.

Richard Campbell: So, finally, Microsoft is sort of bringing something to the table that's in that lead.

Anil Desai: Yeah, definitely.

Richard Campbell: It's funny how this market is right now. It's kind of fractured. There's always different products going on. You know, Microsoft is the commoditizer, right? They cut the value of these things and make everyone own one.

Anil Desai: That's a really good point. You're right. They do commoditize it. Right now, I could probably name off a dozen companies and there's probably like two dozen companies that do virtualization-related things, many of which didn't exist two years ago. You have an environment now where VMware is definitely the enterprise dominant player, but they become very complacent I think in my opinion as far as pricing goes, as far as kind of support policies and things like that. Microsoft's going to put a tremendous amount of pressure on that to drive those prices down. We've seen Microsoft do that before and whether you like it or not, it's generally a good I think for the consumer in that respect.

Richard Campbell: And Hyper-V is just included with Windows 2008 Server, so if you buy a 64-bit edition, you get it.

Anil Desai: That's exactly right. No additional cost for that, right.

Richard Campbell: Now, you still have to pay for the licenses for every OS that you're running on it, don't you?

Anil Desai: It depends on -- I 'm not a licensing expert, but, yeah, it depends on which edition of Windows Server you're running. I believe that if you're running the data center edition of Windows Server 2008, you get an unlimited amount of Windows Guest Host Licenses for free. So, you don't have to pay anything extra. That alone, even if Microsoft charged thousands of dollars for the Hypervisor, that's a huge savings, cost savings for people. I believe, I'd have to verify, but I think with the standard Enterprise Edition of Windows Server 2008, I think you get four Windows Guest Licenses with it, but, again, I encourage people to definitely verify that with Microsoft or the licensing guy.

Richard Campbell: You know, it's a totally fair thing to preface any conversation about licensing with, "I'm not a licensing expert."

Anil Desai: Funny you should say that. You know, if this were a print article, I'd have a little asterisk with a legal disclaimer.

Richard Campbell: Absolutely because the next thing you say after that is nobody is a licensing expert.

Anil Desai: Nobody wants to have the ultimate word on this, I certainly don't.

Richard Campbell: Oh no.

Anil Desai: Yeah, definitely. Don't sue me.

Richard Campbell: It is kind of terrifying to deal with the licensing challenges around all of this.

Anil Desai: It really is, yeah.

Richard Campbell: Especially when I start thinking about rolling up old servers into virtual servers. Even I've got a machine that I'm afraid of. It's a Windows 2000 box. It's got an app on it that I don't know if I could really extract properly and rebuild on another machine, so I'd like to just migrate that into a Hyper-V space so that I'm no longer hardware dependent and I presume my licenses probably come with me. I think I could make a case for that.

Anil Desai: I think so.

Richard Campbell: The old machine is going to turn off, so this new virtual machine should represent the license. I think that's fair.

Anil Desai: Yeah, right. Unfortunately, what users think is fair is not always what the companies do, but, yeah, what you said sounds reasonable to me.

Richard Campbell: So, what is Microsoft offering in the Hyper-V product to facilitate migrations like that?

Anil Desai: Migrations from physical to virtual or P2V migrations. There are tools in Microsoft, System Center Virtual Machine Manager, SCVMM, typically long Microsoft name. Really, I think that that's what this comes down to. When we talk about the Hypervisor being commoditized, really, the differentiator is one of the management tools you have. So, in the situation that you brought up, Richard, if you're trying to migrate a system, you don't want to have to reinstall that system. You don't even know if you can do that.

Richard Campbell: Right.

Anil Desai: System Center VMM has the ability to do a P2V migration for that machine.

Richard Campbell: So, would I be installing something on the 2000 box to facilitate the migration?

Anil Desai: Yeah, there's a small agent portion that used to do it but it can all be done online while the machine is hot.

Richard Campbell: And that I think brings up another interesting point. Maybe one of the few features I've seen distinct between ESX and Hyper-V right now is that sort of live switchover. I'm going to run a pair of high end virtual machines with lots of processors and RAM and I want to be able to have to back each other up.

Anil Desai: That's a good point. So, high availability is kind of a complicated thing and with both Hyper-V and -- well, with Hyper-V there are three kinds of ways that you can do it. You can do clustering at the host level, clustering at the guest level, and both of those offer automatic failover, but they rely on Microsoft Cluster Services.

Richard Campbell: Right.

Anil Desai: Yeah, so that's one thing and then in addition, what you're referring to is VMware's VMotion, which actually allows you to move a virtual machine and its memory state hot from one server to another just quickly and easily in the case of a failover or scheduled maintenance, that kind of thing.

Richard Campbell: I'm sorry, that is totally magic.

Anil Desai: Yeah, isn't that cool? That's really cool.

Richard Campbell: It's unbelievable.

Anil Desai: Right.

Greg Hughes: The first time I ever worked with a P2V piece of software is a third party piece of software and that was a defining moment being able to take an old NT 4.0 and Windows 2000 couple of machines, virtualize them and get rid of that hardware that was becoming very problematic.

Anil Desai: Absolutely. That's really cool. Basically, what you're doing with virtualization is you're decoupling the OS and the software and the services that run on it from the hardware. To be able to do that automatically is really cool.

Greg Hughes: So, to be clear, what are the options for doing the physical to virtual or P2V migration? So, in Richard's case, you had mentioned again the name of the system center component that does that. Is that the requirement or are there other options? What's going to happen here?

Anil Desai: Sure. There are numerous options. The problem is taking a physical machine and moving it to a VM. At the base level is that you do it manually. Basically, you reinstall everything, so that's not really an automated conversion at all.

Greg Hughes: That's probably not the optimal method for doing it if you're going to do it.

Anil Desai: No, it's not, especially if you're doing more than one or a few VMs, right? Microsoft offers a solution in System Center Virtual Machine Manager for doing that migration. It's focused mainly on Windows operating systems, but there are numerous other vendors out there. PlateSpin comes to mind as having -- they have a cool architecture. Basically, what they say is it lets you create hardware-independent images and then you take that image and you can deploy to a physical machine to a VMware VM to a virtual server or Microsoft Hyper-V VM, wherever you want to put it, it's just they abstract out hardware players and lets you deploy it. There's a bunch of other companies out there as well that do P2V.

Richard Campbell: So, a variety of choices and then with these failover solutions, I can use Microsoft clustering inside of Hyper-V if I really need a hot backup.

Anil Desai: Right.

Richard Campbell: I figured it wasn't that tough to do a warm solution that I can just take regular backup because I can actually back up the VM while it's still live, right?

Anil Desai: You can. You want to make sure if you do that that you use something like Hyper-V or Virtual Server 2005 R2 SP1 because it's volume shadow services enabled. The issue is you can always get a clean backup of the virtual hard disk

using Snapshot technology, but you want to make sure that the VM flushes its memory state as well.

Richard Campbell: Right.

Anil Desai: That's the trick, yeah.

Richard Campbell: So you just want to get it to a steady state. I don't think I'm that anxious about running clustering.

Anil Desai: Sure.

Richard Campbell: But I do like the idea that I can relatively painlessly and on-demand say, "All right, switch to the other machine."

Anil Desai: And the real benefit there is that you don't have to monkey with different settings for different operating systems. If you're running Windows 95, you want to do a failover or if you want to run Windows Server or Linux servers or whatever else you're running within your VM. There's a uniform way to do that and that's the real benefit from a management standpoint.

Richard Campbell: Absolutely. I mean that all NT 4.0 box is just not going to work in a cluster, sorry.

Anil Desai: That's right. Well, it's a whole different type of cluster.

Richard Campbell: Yeah, it's a completely different way of thinking. Also, I find folks find hot failover unnerving. It's kind of uncomfortable when your server reports to you that it's failed over.

Anil Desai: Sure.

Richard Campbell: As opposed to, "Okay, something's wrong here. Switch to the other server."

Greg Hughes: Or as opposed to crashing.

Richard Campbell: Yeah.

Anil Desai: Yeah. What will you prefer?

Greg Hughes: I'd rather failover.

Anil Desai: Failures in general are bad, right? Yeah. No, that's definitely true and you know, you have rules that you can set up for automatic failovers and failback and things like that. If you use Microsoft Cluster Services, for example, you're using shared storage. In that case, it's important to realize that it's not going to survive the failure of your storage array…

Richard Campbell: No.

Anil Desai: If your storage array goes down. So, that's an important consideration to keep in mind.

Richard Campbell: Yeah. So, you've still got points of vulnerability. You're going to have to spend substantial money on a redundant iSCSI array to keep that from failing.

Anil Desai: That's right.

Richard Campbell: So, how many servers is reasonable on a Hyper-V machine?

Anil Desai: Oh, that's a really good question. You know, you really have to look at resource constraints. Microsoft doesn't place any numerical limit on how many VMs you can run under Hyper-V. You could run thousands theoretically. It's not uncommon. Well, it might be uncommon these days, but I mean people can run dozens of VMs on a machine that has, you know, you're running 64-bit so you can do large amounts of physical memory and that's generally one of the major constraints. Large numbers of multi-core CPUs, so let's say 16 cores or 4 quad CPUs in a single machine.

Richard Campbell: Right.

Anil Desai: 64 gigabytes of RAM and so you could -- I mean dozens of VMs and maybe, I don't know if there's any kind of record on this, but dozens would not be uncommon.

Richard Campbell: Well, especially if we're talking about older gear like NT 4.0 boxes and Windows 2000 boxes where 512 megs or a gigabyte of RAM would be a lot.

Greg Hughes: Right.

Richard Campbell: And a machine like that, so 50 suddenly seem reasonable and that's presuming they're all busy at the same time too.

Anil Desai: I totally agree. There's no reason you can't do that. Keep in mind that each VM is running basically an Intel 440BX chipset. That was high tech in the mid '90s. We're not talking about, you know, emulating some of the modern hardware stuff that we have right now.

Richard Campbell: So, it's not that advanced in the actual host or guest space.

Anil Desai: That's right.

Richard Campbell: I just wonder about how we're going to be able to handle dealing with those load

changes. Can we get to a point where as a particular host machine gets really busy, it could even offload some of its VMs to another machine that wasn't as busy?

Anil Desai: You know, you're hitting on I think what should be kind of the Holy Grail of virtualization or even of IT management and that's you have a seamless pool of capacity, you just have a bunch of physical servers, storage, network stuff. It's just one big lump and then you throw your workloads onto it and it just balances them around however they need to be balanced. So, if on Tuesday, you have more load on certain services, they might move to other hosts and all that kind of stuff, you shouldn't have to worry about it. That's where I think the industry is heading and it's just an amazing shift in how IT manages data centers. That's the ultimate goal and I think we're getting closer to it in steps with tools like System Center Virtual Machine Manager and many of the other virtualization management tools out there, they can dynamically monitor performance and move a workload from one server to another as needed.

Richard Campbell: Yeah. This is definitely a version 2 or version 3 feature I think.

Anil Desai: I think that's fair to say. Yeah, we're not there yet.

Richard Campbell: Now, we're really getting into this whole cloud computing thing that I now no longer know where my app ran. It could have been any one of these machines.

Anil Desai: Sure and ideally you won't care. You basically buy a capacity and you deploy it onto that capacity.

Richard Campbell: It just doesn't matter at all.

Anil Desai: Right.

Richard Campbell: That's going to be interesting to see if we actually get there and what that ultimately is going to look like.

Anil Desai: I hope we do, yeah, definitely.

Richard Campbell: So, System Center is the tool to manager Hyper-V?

Anil Desai: System Center is Microsoft's tool to manage Hyper-V. You're going to be able to find management tools from all of the major vendors, you know, CA, HP, Dell, Altiris, you know, everybody is going to be basically be supporting Hyper-V if they aren't already making plans to do it when it comes out. Microsoft's solution is Virtual Machine Manager and that's their big value. If you say that the Hypervisor has been commoditized and the real value is the management tools, the System Center stuff is really what's going to differentiate -- people aren't using VMware just because ESX server is just so amazingly awesome. It's a good product, but with VMware's features like VMotion and their virtual infrastructure and their hot backup, consolidate to backup type features, that's the real value they're getting out of virtualization and Microsoft's competitor is the System Center Suite.

Greg Hughes: So, it sounds like from a management standpoint, what you're saying is that their System Center -- I 'm trying to think of the SSVMM here, right? If we're talking…

Anil Desai: SCVMM, yeah.

Greg Hughes: Oh, I'm sorry. SCVMM, you're right, and other products, but these are products that somebody who has maybe management means above doing a few virtual machines, you know, doing a larger environment would take advantage of, but this is something that you buy in addition to Windows Server 2008.

Anil Desai: That's right. It's a totally separate product. It's optional. You don't need to purchase it, but, you know, you can.

Greg Hughes: What's the threshold? I mean maybe you can give some descriptions or draw up some pictures. When do I need System Center Virtual Machine Manager or some other product in order to help me do my job well.

Anil Desai: You know, that's a really good question. A lot of people wonder, you know, a lot of us do a lot of systems administration manually without any automated tools. I would say once you get above like, let's say, more than five host servers running maybe 15 virtual machines total, at that level, you're really are going to start looking at automation just like you would with physical machines.

Greg Hughes: So, what are the things that I need to automate. What end up being the bottlenecks I need to try to find solutions for at that point?

Anil Desai: Yeah, I'd say the whole life cycle of the VM. The first part is probably capacity planning. So, let's say you've got a new VM, you want to put that NT 4.0 VM somewhere, which host do you put it on? That's one of the questions you need to figure out. Then you need to do the actual deployment process. You're actually configuring the VM, bringing it up, making sure that's configured properly, all that kind of stuff. Once it's up and

running, you need to worry about monitoring it to make sure that you're not running into any resource constraints and then you need to deal with the operational stuff, basically making sure that the systems are updated properly, the patches are machine, that you shut down VMs that are no longer needed, all that kind of stuff. If you're dealing with a few VMs, you can do that manually, but as you get to a larger number, it could quickly get out of control. It's kind of a problem that a lot of people call is the VM sprawl analogous to server sprawl, which is what we're trying to address with virtualization right?

Richard Campbell: Yeah. So, here we are getting rid of server sprawl by concentrating the machines and instead we end up with more VMs than the number of servers we reduce by.

Anil Desai: It's still a better problem I would say, but you know what it points to is that management is the key. This technology won't save us if we're bad at managing our systems.

Greg Hughes: Exactly.

Richard Campbell: Microsoft has never stopped us from hurting ourselves.

Anil Desai: That's absolutely true. In fact, we're making it easier, right? With great power must come great responsibilities, so that's what we're looking at here.

Greg Hughes: There is a tendency when you have lots and lots of servers and lots of application servers and machines out there to try to rather than just maybe pare things down and try to think about what you really need to consolidate your apps to just say, "Well, we'll just make virtual machines out of them."

Anil Desai: That's one of the things is, for example, if you're trying to deploy a new database or a new web server, really, you need to look at do I even need virtualization for that if I've got a SQL Server installation. I mean that server can handle 20 or 30 databases as I needed to.

Greg Hughes: Right.

Anil Desai: Maybe I don't need to do a whole new stack with an OS and all that stuff. It's probably not necessary.

Richard Campbell: Well, it's an interesting thought as to what should be virtualized and what shouldn't be. I certainly feel like SQL Server is better as a bare metal installation because it's so resource-intensive, so IO-intensive.

Anil Desai: You know, that's a really good point. There's this tendency for people to look at it and say, "Hey, maybe I should just virtualize everything." No, I don't think that's the right solution. There are different approaches to virtualization and you really need to look at it. Like you said, in the case of a SQL Server that's really able to fully utilize its hardware. For now at least, there are some advantages to keeping it on a physical metal.

Richard Campbell: So, any other exceptions?

Anil Desai: Sure. You need to look at compatibility. So, there are things that you can't do within a VM. For example, if you need to do graphics acceleration, if you need specialized access to certain types of USB devices, those aren't available, host bus adapters for a fiber channel-based SAN, those types of things are not always compatible, certainly not with all virtualization platforms. So, those are deal breakers. Other things are if your virtualization platform doesn't support, for example, let's say 64-bit OSes or large memory support or multiple CPUs. These are the types of considerations at least for now that you need to worry about with deciding whether or not you can virtualize an application.

Richard Campbell: What do you think about the web farm as a virtual farm?

Anil Desai: That's an interesting thing. A web farm is good because you have many different approaches to being able to kind of virtualize that. I mean we've got stateful and stateless load balancers, we've got network level load balancing, that kind of stuff. Then we've got things like, for example, the .NET architecture. You've got shared memory that you can use. You can store session state and the database or in the shared memory pool. You have different ways to kind of almost virtualize that. You're basically creating like a cluster of web servers. So, I guess I would ask people that are looking to do that. There's certainly no reason you can't run web servers within a VM, there are some advantages to it, but what exactly are you looking to gain from it. If that's portability, if that's the ability to dynamically spin up and spin down VMs, those are good reasons, backups, disaster recovery, those are good reasons.

Richard Campbell: I mean typically with a web farm, we have symmetrical machines, so I like the idea of being able to spin up and spin down where I might only have two or three running at the low time, but as the peak comes up, I start firing off more and more and more, modifying my load balancing rules to incorporate those machines into the farm.

Anil Desai: Absolutely. You can certainly do that. You could also do that with physical

machines depending on what else you have running on the same machine.

Richard Campbell: Right.

Anil Desai: Basically, the idea is with virtualization, it allows you to combine otherwise incompatible workloads on the same physical box.

Richard Campbell: Plus, I found most web farms when you're doing it the old-fashioned way, the bare metal way, you really want symmetrical gear. It's a whole rack of Dell 1950s. When you start mixing different kinds of gear, you have more challenges and balancing improperly.

Anil Desai: That's absolutely true. That's the issue that we run into where you don't have that layer of hardware abstraction and the hardware really does matter and I totally agree with you.

Richard Campbell: I guess what I worry about in the virtual web farm is the networking side of things and I wonder if you could speak to how well networking performs in the Hyper-V space.

Anil Desai: Sure. I don't have any statistics or anything like that about the overhead from virtualization standpoint, but the virtual network stacks really are fairly, fairly transparent if you're looking at performance. The virtual networks give you the ability in the Hyper-V for example to do VLAN tagging so you can create separate VLANs with the same physical segment. It's generally considered a best practice to have dedicated network adapters or at least network adapter ports or port teaming so you can keep up with the bandwidth requirements for all of your different virtual machines. As far as like a percentage overhead, I don't really have any numbers on that, but I would say probably in the single digits is what you're looking at from a performance standpoint, but keep in mind, when you're running a dozen VMs, they're all going to be competing for network resources and they're not aware of each other so that's a potential management issue.

Richard Campbell: I've certainly read, although I've never done this myself about folks that are putting many NICs into a virtual machine, host machine so that each VM has its own dedicated NIC.

Anil Desai: Yeah. I think that might be going into an extreme where each VM has its own dedicated network interface unless you're doing that for security reasons because they can certainly share. There aren't that many workloads that you're going to run at least at a full gigabyte sustained unless they're using it for shared storage, but, yeah, you can certainly do that. There's no reason you can't have 16-NIC boards in a machine if that's what your workload needs.

Richard Campbell: 16 sounds like a lot, but it's interesting to know that I can for these low load machines where network communication isn't critical, I could just share a NIC and then in a high load scenario carve off that one VM and say, "Here's a NIC just for you."

Anil Desai: Absolutely, or just say one of these NICs has access to the production network, one of them has access to a test network only, and that really helps secure your environment. These machines can't be -- you can't connect to them and they can't connect to each other based on the rules that I've set up in my virtual network. There's definitely a lot of flexibility there.

Richard Campbell: Of course, I think primarily we focused on the operation side of virtualization, but the test lab is just a huge place for using virtualization.

Anil Desai: Absolutely, absolutely. It's one of the first, you know, people that have been using VMware for seven or eight years and things like that. That's probably where they started. A lot of us run Microsoft Virtual PC or VMware Workstation or something like that on our computers, where a lot of us started.

Richard Campbell: Yeah. Well, it was mostly about keeping all those old operating systems alive because I remember test labs that had a DOS box and a Windows 3.1 box and a Win 95 box and you feared all that hardware and the fact that I could roll it together into one reliable machine and then make three copies of it to run more tests simultaneously is incredibly compelling, back in the early days of virtualization anyway.

Anil Desai: Absolutely, and not only just having that heterogeneous environment you had to support with all these wacky boxes, you also had to worry about like rolling them back, you know? Let's say I was doing a test on a DOS or a Windows 3.1 box and I wanted to go back and retest something with a new build of my application. Man, that was a pain. You were sometimes sitting there with a stack of floppy disks.

Richard Campbell: Yeah or using Ghost and every time you wanted to do a reset, it was two hours?

Anil Desai: Sure.

Richard Campbell: Definitely the journaling abilities have been very interesting. I wonder if we haven't really exploited the full potential of journaling of the operating system that way. It's nice to have the

roll back, but I also see possibilities on the op side for some kind of disaster recovery.

Anil Desai: Well, there's that and so you can treat it transactionally. VMware has shown that they actually allow you to record the actions that you make in an operating system transactionally and then play them back. At first, when I was looking at it, I was like, "Well, that's a cool trick, but who's going to use that?" Well, it's great for simulating things. I mean you can actually go in and simulate the changes you make to an OS and watch them as they're played back visually as you see them.

Richard Campbell: Now, you got me fixated. Of course, web farms are near and dear to my heart because of other work that I do so now I'm thinking, "Wow, wouldn't it be cool to keep a journal of a heavily loaded web server in a test and be able to rerun that load over and over and over again?"

Anil Desai: Yeah. I mean lots of tools like, for example, SQL Server profiler allows you to capture activity and then replay it. To be able to do that on just typical virtual machines in a test environment, any operating system, yeah, it seems like it has some potential there.

Richard Campbell: Any operating system, any application, you don't have to have something like profiler to capture exactly what you needed. You just capture the state of the machine as it went through those problems.

Anil Desai: Right, right.

Richard Campbell: Oh, so many possibilities.

Anil Desai: Absolutely.

Richard Campbell: We've already blown through a half an hour and I feel like we've just barely touched the surface of what Hyper-V is going to do for us.

Anil Desai: Definitely, I agree.

Greg Hughes: I have one more question though because we touched on automation a little bit, you mentioned it. What are some of the key things that with Hyper-V and Windows Server 2008 that can be automated and the other things we've talked a lot about management interfaces? So, just real quick at the end here, what are those management interfaces that are available and how can people hook into this system in their larger scale deployments?

Anil Desai: Greg, I think that's a great way to end because I think if I were to underline any point of this conversation, I would say management is the key. So, to answer your question what are the real benefits, Microsoft Virtual Server currently can be automated using a COM-based model, so you're basically older technology, but it still works. Hyper-V actually has WMI, Windows Management Instrumentation APIs built into it. In addition, you can actually use Windows PowerShell to be able to do a lot of your management as well. Now, add to that also the graphical type tools like System Center Virtual Machine Manager, you've really got a really easy way and open way to be able to manage your virtual machine much, much better than you can manage your physical one. So, all of those are really big advantages and to me, that's the real key. That's kind of the takeaway point here is that Hyper-V might be great, VMware's ESX is great as well, these are good products for creating virtual machines, but the key of it comes down to being able to manage them and to get to the environment that you really want.

Greg Hughes: Absolutely. Thanks very much. What a great half-hour. I know I've learned some stuff and hopefully our listeners get a lot to take as well.

Anil Desai: Yeah. Thanks for having me Richard and Greg.

Richard Campbell: Thanks very much, Anil, and we'll talk to you next week on RunAs Radio.