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Richard
Campbell

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.



Greg
Hughes

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**Brian Randell Educates Us On Virtualization Services for
Developers!
August 6, 2008**



[Music]

Brandon Wehn: 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 Brandon Wehn, announcing show #69, with guest Brian Randell, recorded live, July 16, 2008. RunAs Radio is produced each week by PWOP Productions, providing professional media and podcasting services online at pwop.com.

Richard Campbell: You're listening to RunAs Radio. I'm your host, Richard Campbell, and with me as always my co-host, Greg Hughes.

Greg Hughes: Hey, everybody. Richard, how are you doing today?

Richard Campbell: I am well, sir. How are you?

Greg Hughes: Good. Happy birthday again.

Richard Campbell: Thanks.

Greg Hughes: Of course, when people are listening to this, of course, it's past your birthday.

Richard Campbell: It will be a month later or so, but, yeah, it was like your birthday right when we were starting this show you've had another one too.

Greg Hughes: That's right.

Richard Campbell: We're all getting older.

Greg Hughes: Yeah, well, yeah.

Richard Campbell: And we're plotting for various conferences in the fall so there'll be more RunAs. TechEd Europe looks like it's going to come together. We'll be there in Barcelona again, so lots of chances to see us and if there are any shows anybody out there we aren't doing for you, we're trying lots of ideas, I got a cool one today, but feel free to send us an email, info@runasradio.com. So, let's roll right to our guest, Brian Randell, a senior consultant with MCW Technologies, LLC. For over 20 years, Brian has been building software solutions and educating his fellow developers. Brian spends his time teaching Microsoft technologies to developers, working with new and emerging technologies like Visual Studio Team System 2008, and consulting worldwide for Fortune 500 companies like Microsoft, state and local governments, and small businesses. Brian enjoys helping people get the most out of their software. He does this through training for Pluralsight, and speaking at events such as VSLive!, TechEd, and the PDC. In addition, Brian shares through the written word. Brian currently writes the Team System column for MSDN Magazine. He is the author and lead

instructor of Pluralsight's Applied Team System and Applied Windows SharePoint Services courses. You can reach Brian via his blog at mcwtech.com/cs/blogs/brianr. He's also a good buddy of mine.

Brian Randell: How the hell are you, Richard?

Richard Campbell: I am well, sir. I'm just thinking, how many continents have I been drunk with you on? I don't know if that's a good measure of relationships, but I think it's like four.

Brian Randell: I think we're four. I don't rate as good as Steve Forte, but I think you and I have shared many places in the world.

Richard Campbell: No, I'm at six with Steve Forte.

Greg Hughes: Who does?

Richard Campbell: The best part, at TechEd US, I said to some of my Strangeloop cohorts when I saw you is if Stevie Forte shows up here, Brian Randell will pick him up and shake him around to say hello and literally at that moment, Stevie Forte walked in and you delivered.

Brian Randell: Yeah, it's just the love brothers. It's the love we have for each other.

Richard Campbell: It's all about the love.

Brian Randell: Let me extend my hearty happy birthday wishes also, to you.

Richard Campbell: Oh, thank you sir. Thank you very much. We're all just getting...

Brian Randell: Another year, more danger to have.

Richard Campbell: Oh yes, I'm graying up well. So, I've had you talk on .NET Rocks! and at other places about virtualization because you've certainly been living and breathing that and we've talked about virtualization a lot on the show but I think one particular angle that I know you're really knowledgeable on is the things that IT folks can do in virtualization for developers. We really think on the IT world a lot about virtualization for our production systems and for test systems, but what do developers need out of virtualization?

Brian Randell: Well, you know, fundamentally, regardless of the platform, we don't even have to pick a platform, just virtualization in general just opens the door for developers in so many ways. I mean the obvious, you mentioned test, the ability to have your code running in different environments as opposed to



thinking, "Well, it might work okay," you now can have all this multiple VM that simulate your different production environment based upon operating systems, typical configurations, as well as what's really kind of go really well into compatibility running with this particular version of Office, this particular version of your production system, maybe this version of SAP, this particular SQL Server database, etc., and I think having the flexibility of multiple environments that are relatively cheap compared to what used to take us to have real hardware around is just phenomenal.

Richard Campbell: I remember my first encounter with VMware was being able to run DOS 6.1 and Windows 3.11 virtual environments for backward compatibility testing.

Brian Randell: Yeah, it's true that just the range of operating systems we have to consider particularly, you know, it's nice to be on the latest greatest operating system, I mean people like us, this is what we do for a living, we're always running the current stuff plus, you know, whenever we get a beta, we're running that also, but real production systems, real environments in lots of companies, they can't move as fast as Microsoft or any other software vendor does. So, to be able to stay on a consistent platform and have that available when you need it particularly when the hardware tends to age, to be able to run that old environment on modern hardware is just I think phenomenal both for the IT pros as well as developers.

Greg Hughes: Isn't another area where development teams can potentially benefit is where typically they might have to wait on IT to build something or to configure something or to turn it up or to turn it down, the old story where it's like, "Well, we need to have a new build server brought up to do build automation, for example, or a test automation server," where they had to do those as one-off things being able to repurpose and make things just more agile, also makes it cheaper, isn't it?

Brian Randell: Oh, absolutely. In fact, once again; regardless of vendor you choose, there are tools out there that let you set up self-service portal so developers can go and say, "You know what? I need an extra built server," or "I need a test environment server," and submit a request for a web interface or which client interface and depending upon the infrastructure within minutes, you can have that machine spun up. They can use it and when they're done, it's not a piece of hardware that someone had to requisition, allocate, deliver, plug in, put a tag on, it's something that gets used and gets returned to the Ether so to speak when it's not being used. You just get such better hardware utilization as well as you mentioned the developers are getting stuff delivered

in a responsive timeframe. Where you used to have to fight IT; it's now more like a team environment where you're working together.

Richard Campbell: Can we actually get to a point where we can safely and securely allow devs to provision themselves for resources like that?

Brian Randell: Oh absolutely. If you look at Microsoft Systems Center which is what I'm more familiar with, it has a self-service web portal where you can specify templates for types of machines and your basic sysprep images and you could specify restriction as to who can allocate, how much RAM, and with System Center features, it will look at resource allocations so it can find the best host to run the VM on. This is just getting better every release.

Richard Campbell: Interesting. My concern would be that devs will love to spin up VMs and will never turn them off and as an IT guy, I'm afraid to throw anything away because what if there's a custom version of the app there that we need.

Brian Randell: Well, I mean part of that, this once again, this is where we start getting into communication. You know, there needs to be a distinction between VMs that are spun up for test and short lifecycle and that those have an automatic reclamation process where it says, "Look, if you're not actively using it, we see utilization go down for more than four hours, it gets reclaimed. Tough." On the other hand, you can request a ticket and say, "I want this to be in development for a week," versus you might do a lot of your core development within a VM and that's not touched by IT that's managed and runs in your local workstation. I think it's making a distinction between the types of VMs and you got to watch out for VM sprawl. That's why you got to have tools like System Center or VMware I'm sure has – I forget what they call it -- they have a product to help you manage if you track all the VMs, make sure you're up on your licenses but as well as you mentioned, you just don't have the things enough in resources.

Richard Campbell: How big is the licensing issue in a development space like this? Doesn't MSDN Universal essentially cover us if we've got one for every one of our devs?

Brian Randell: Effectively, so first disclaimer, I'm not a lawyer, I'm not qualified to give legal advice.

Richard Campbell: And I would point out that I don't know if there's anybody in the world that's actually qualified to talk about licensing.

Greg Hughes: Including the lawyers.



Brian Randell: But the way I understand it to be clear, is yes, if you have an MSDN license, that gives you effectively 10 licenses to test operating systems and that's exactly what those licenses are for, making a distinction between your production licenses where if you want to run your Exchange in SQL Server or other environments within VM. Microsoft has got some very interesting licensing which a lot of people tend to not appropriately pay attention to because virtualization is so easy to spin up a machine is that you have to understand the licensing requirements to the point that if you host and buy licenses with Datacenter Edition or with Enterprise Edition, you get a lot of I want to say free, but you get effectively a number of licenses included with that host purchase.

Richard Campbell: Interesting.

Brian Randell: This applies to whether you use Microsoft Virtualization or a competitor's product. So, for example, if you buy Datacenter Edition of 2008, the way I understand it is you can run unlimited number of VMs on there. That takes care of your operating system licenses. That doesn't take care of your CALC, it doesn't take care of your user drives or any of the software that runs the VM, but it eliminates the need to have the additional Windows licenses.

Greg Hughes: On the MSDN Universal side or whatever they're calling it now; I think it's also...

Brian Randell: Well, if you want the official name, it's Visual Studio Second Edition with an MSDN premium subscription.

Richard Campbell: Oh man.

Greg Hughes: There you go. Well, they changed it a couple of years ago, but I think it is important to point out that the difference in licensing, a fundamental difference in licensing on those MSDN licenses for development and test is that you're licensing an individual to be able to use multiple copies of each product as opposed to licensing an installation of a product for people to use.

Brian Randell: Oh absolutely. That's definitely a key distinction. In fact, one of the big changes they made in MSDN premium, the current replacement for MSDN Universal, they actually changed licenses to say that you could use the copy of Office that came with MSDN for office type work. The problem people didn't realize beforehand, you could only use the Office software that came with the MSDN if you're writing add-ons from it.

Richard Campbell: Interesting.

Greg Hughes: Right.

Brian Randell: So they actually modified it to support that.

Richard Campbell: Which is probably modifying the primary use case.

Brian Randell: Exactly.

Richard Campbell: You brought this up earlier, this whole I can see where an IT operation has several different standard configurations like an XP with Office 2003 and a Vista with 2007 and so forth, and so I'd want to keep templates of those configurations that then tests can spin up to make sure a new version regresses between all the different configurations that are appropriate for the Enterprise. It's interesting to me to think about where does the licensing for that leave? Does the template represent a license or is it just a spin up?

Brian Randell: Well, technically, in the case of System Center to speak to that product, the template defines the configuration, right?

Richard Campbell: Right.

Brian Randell: The template is associated with a VHD. The VHD then, there are two ways to set up. One is you set up the VHD to be sysprepped so when it loads up, a dev can know their key.

Richard Campbell: Right.

Brian Randell: On the other hand, you have the idea, well, it's a temporary VM. You can always use a trial edition license.

Richard Campbell: You've got 90 days. It's not going to be around that long anyway.

Brian Randell: Exactly. Well, I think 60 days with Windows Search 2008, plus if you use SLMGR, you can get a few more days out of it. Yes, depending on the OS you're using, they have different date that you use, but the point is that's where a trial version are sometimes just as useful versus what are your real cost, particularly don't activate. There is need to activate the image if you're going to dump it within a day. So, I think once again, Microsoft is going to be trying to get you to do things. If you're doing the right thing which is my developers usually need licenses to test and we don't ever use those for productions. So, we don't mix, for example, our library of tests in dev images with our production images because you can go one step further and have your portal spin up a new developer's workstation environment where it literally installs Visual Studio, installs all the dev tools and that's an environment that's going to live beyond those 60 days



or whatever the time that is for the OS. So, I think that's what I imagine is you have to really consider that you be very clear and concise about what templates map to VHDs which in turn have been prepped with a particular version of the operating system.

Richard Campbell: The nice thing is this is really an encouragement to sysprep those kinds of configurations so you're not actually consuming a license until you use it.

Brian Randell: Exactly and once again making a distinction because a lot -- you know, an organization is going to have lots of, you know, once you start getting about 25, 30 desktops, you start getting to the environment where you might want to consider running your own KMS server and when you get about 5 servers, you can run a KMS server for activation. Well, you start thinking, "If we're going to do that, we want to make a distinction between systems that get activated and count against our licenses with Microsoft versus things that are one-off, non-domain VMs versus domain VMs." These are all things to consider. That's where having a tool like System Center is just really mandatory beyond a couple VMs because you want to track licensing, you want to track usage, you want to make sure you're spending the right amount of money. You don't want to buy too many licenses but you don't want to buy not enough.

Richard Campbell: Right. The reason we spent some time on this is that when it's just IT folks in there and they're managing this whole space themselves, they're pretty careful about how they use licenses, but where we've basically given developers the ability to spin up their own VMs, you've got to be able to give some of that responsibility for licensing over to them as well.

Greg Hughes: A lot of the time, that's where the MSDN license really comes in handy.

Brian Randell: Well, I think that's critical that you make the distinction in developers. Developers tend to ignore licenses. We hopefully have someone who can take care of all that and I think it needs to made clear what they have available to them and that's where the self-service portals need to have some intelligence back to some kind of meter that says, "Okay, Brian allocated has five VMs available based upon his license," whatever it is because you're right, your licenses are assigned per person, they are not assigned to a group or a pool.

Richard Campbell: Right.

Greg Hughes: I think microsoft.com/licensing is a place that I've ended up pointing people to a lot in

the past and they do actually have a toll-free number which is 800-426-9400 and I have no idea how many times I've written that down but I've called it a number of times. If you have licensing questions, that's really the place to go.

Brian Randell: Yeah, definitely you don't want to take our advice. You always want to get your environments backed out, know what you're doing and then sit down with a Microsoft person and get it in writing and say, "Okay, this is what we're supposed to have." That way you've done your due diligence and you covered everybody.

Richard Campbell: Right. You always want to check yourself because in the end it will be your butt, so check for yourself.

Greg Hughes: They have licensing specialists in all their offices and that's all they do is answer questions and help out with licensing questions.

Richard Campbell: A different model of virtualization for developers and I'm running into this more and more which is I have remote developers and I want to keep control of the IP so the dev environment lives in my datacenter and they are RDPing to it using terminal services.

Greg Hughes: Yeah.

Brian Randell: Yup.

Richard Campbell: So...?

Brian Randell: That -- go ahead, I'm sorry.

Richard Campbell: No, you go ahead. I want you to grab on to that because I think this is fascinating.

Brian Randell: Well, it's so fundamentally, number one, if you're going to do that, the biggest thing is provide the right hardware. I think the biggest mistake people make is they look to virtualization for developers and they don't give the developers the right hardware infrastructure.

Richard Campbell: Is this really about the amount of horsepower?

Brian Randell: Oh absolutely. Well, particularly start thinking about large scale. We need big boxes, lots of cores like Hyper-V supports 16 cores. You want the ability to make sure that people have enough RAM in the VM. That means we're talking minimum 2 gigs per developer, more if they're going to be doing development for BizTalk, SQL Server, and SharePoint, all those things often require installing the tool locally and the server locally. I know you do those on BizTalk and SharePoint and then you



got to make sure that they have the right IO segment. One of the big problems is people say, "Okay, we have this big RAID array, but it's an old array. Maybe it's RAID 5 and maybe the disks are only 5400 RPM. We bought some bigger disk because they were cheaper." You're basically making your developers suffer. That's going to cause a revolt. On the other hand, you get a nice fan set up, you've got dedicated LUNs per VM, whatever you can do and you start giving them the right amount of RAM. You give them a good performing technology like Hyper-V. Well, then you're going to have developers that won't care because they'll like the fact that they don't have to worry about all the management of the local resource. They just know they pick up their VM, it's got the availability on demand, they can get to it anywhere they can get an RDP connection.

Richard Campbell: It's also a snap to back up, I mean all those virtualization advantages.

Brian Randell: It really is a good mix as long as IT provides the right hardware, if the developers aren't going to really care if they can't get their job done.

Richard Campbell: But it sounds to me like we're really only talking maybe four to six devs per box when you're talking about your typical 4U Dell 6650 class machines, 16 gigs of RAM. I don't know that I would want to go more than four, five, or six developers on that box.

Brian Randell: No, absolutely not. Like I said, it's definitely relative to what they're developing. I mean a guy who's writing class libraries that stacks calculation, you're going to be able to shove a lot more VMs in there especially if you're running XP versus Vista and you're not doing anything fancy like WPF. You obviously have to understand what your developers are doing. I had a customer work with BizTalk. Well, they were smart. Their VMs all ran with 3 gigs of RAM because they're running BizTalk and they had them partitioned. They all have fast disk IO and they loved it because they can get to a flow in the developer's workstation, they could RDP. We did a work in the conference room and everybody just RDP'd into their workstation. It was great.

Richard Campbell: And very powerful stuff. I also think that now we really get that ability to give them a separate web server so they can practice the proper upgrades to things in a separate database so they can experiment with that as well.

Brian Randell: Well, you know it's very easy when you have the VMs under management control. You can easily pause and you can back it up. You can shut them down in a heartbeat if you find that there's some kind of weird worm going on in your

system, whereas, when you have a bunch of physical machines that you have to deal with and the fact that developers can do physical harm on purpose or accidentally to the machine, you know, when IT is responsible for making sure developers are productive, it helps that they can have a little more control while still giving developers this freedom inside their environment to do what they need to have control to run a web server. That's really a good compromise between the two.

Richard Campbell: It's an interesting balance. What about the infrastructure for devs, things like Team System and their source control and so forth? Are all those things best virtualized or should they be on bare metal? Does it make a difference?

Brian Randell: Fundamentally these days, there are few things that can't be virtualized.

Richard Campbell: Oh.

Brian Randell: But it always comes back to two things. Number one, is the vendor who makes the software going to support you? Was their support stable? Vendors will play loose and fast with this when they're trying to get you to buy their stuff, but ultimately the vendor who makes the software is the one who can tell you they will support it 100%. That said, VSTS, Microsoft supports it in a virtualized environment, both Hyper-V virtual server as well as they will support it in VMware. Now, granted if they get a weird thing that they can't do, they might ask you to duplicate it physically but that's the standard response that you will hear on anything.

Greg Hughes: Yeah.

Brian Randell: When you look at what you virtualize it comes back to hardware. VSTS for example, lives on top on top of SQL server, Richard. You and I both know any application that's going to have high IO, well, put it to VM where you know that partition across the physical RAID array, well, you got to do the same thing. You can't expect it's going to magically perform well. It can perform worse.

Richard Campbell: Right, no question.

Brian Randell: The biggest problem I've seen is people virtualize and don't give the VM enough resources. I see people trying to take advantage of VMware's memory sharing feature which is great from an IT perspective but if you don't have a good guest work on the load that's going to be present for those VMs, you could really hurt your team and really slow them down. So, if you're going to virtualize, you got to make sure once again, fast disk, lots of RAM, and you'll do fine.



Richard Campbell: I wonder if we're struggling the instrument or virtual environments well just in terms of getting a sense of this VM is struggling for resources, it's low on memory or it's low on processor and so forth.

Greg Hughes: Don't some of the newer virtualization platforms help us to do that and sort of automate some of that?

Brian Randell: Yeah, all the platforms do that like Virtual Server Hyper-V has the exposable performance counters that are available to the standard system monitoring tools as well as the System Center, whatever it's called now, it used to be MOM, they have management packs that lets you monitor that threshold, so all of the stuff is there but you got to know how to use them. I mean the problem is virtualization sometimes is so easy we just jump into it,

Greg Hughes: Right.

Brian Randell: We don't apply the same logic that we did against physical hardware and physical system.

Richard Campbell: Right.

Brian Randell: It just becomes so easy to play with things. You got to apply the standard rules and then go one extra step and say, "Where does virtualization change things?" Number one, you're going to have a box that you're going to be hitting probably closer than 90% to 95% utilization because you're going to say, "Well, how many VMs can I get on here based upon RAM and available disk space?" Whereas, before was, "I'm saving up a box to run SQL server." So, you tune based on SQL server, not based upon virtualization plus the workload that's inside it.

Greg Hughes: Right.

Richard Campbell: As far as disk storage is concerned, I don't know if you have personal preferences here, but it seems to me that virtualization was made for iSCSI.

Brian Randell: You know, I don't have mostly because the wife wants me to keep the house a house and not a datacenter, I'm right now just using, I have hardware RAID arrays where I'm not using iSCSI or any SAN technology. I do know from talking to people -- Chris Kent is a good idea. They use lots of iSCSI and SAN in his environment. Definitely large arrays are what it's at. The big thing is make sure you're being smart about disk space versus performance. You know, both major technologies out there, VMware and Microsoft technologies support

dynamic hard drives. That means they only allocate the space they need until they need it. Well, that's like saying to your database to auto grow, Richard, right? I mean that's not going to be your best performance option.

Richard Campbell: Yeah, there are consequences to that.

Brian Randell: Exactly, so when it comes to our virtualization of hard drives, you only want to do fixed drives versus dynamic drives. Dynamic drives are good for testing and playing around where you wanted to just throw things away but for production system, you're going to want fixed disks and then you want to make sure based upon your RAID technology and your overall server technology whether its network-based through iSCSI or Sand versus a local array, how you're segmenting the individual underlying drives to the individual virtual drive because your virtualization technology lets you create more than one virtual hard drive for an environment, which means you can partition them against across multiple LUNs, multiple physical hard drives.

Richard Campbell: I do see that people are running into issues with load testing as well using virtualized environments. Obviously, you want your load test environment to match your production environment to some degree but we get into this virtualization cascade and start doing load tests; I don't know if you've seen this where really the results get distorted because they're running in a virtualized space.

Brian Randell: I think depending on what you're trying to measure, right? Are you measuring the host? Are you measuring the VMs inside the host? It's going to be a big issue of how your results get skewed, but absolutely. In fact, Hyper-V, because of some of the things they do in the low-level VM bus, you can see basically better perf inside the VM to do one directly across the hard drive because of the way they do caching and other things.

Richard Campbell: Right.

Brian Randell: So, understanding those distinctions and understanding -- the other thing right now, you can't just look to any website. You got to use any advice whether I write an article or you read something from Microsoft or VMware, you just take that as basic guidance but you got to set up and test it and use your brain in your own environment because every environment is going to be subtly different based upon the hardware you buy and how you configure things. So, you're going to have to load test to understand what the numbers look like in your virtualized environment and then maybe do some comparison testing with some real machines and do



some rough, you know, "Okay, if we have three virtual machines to do the test versus three real machines, what is our SKU level based upon amount of RAM, disk, etc.?"

Richard Campbell: Actually, figuring out those results and pulling them back in such a way to know that this is where the issues lie. I just think we really don't sit on a great set of best practices yet in terms of utilizing virtualization this way.

Brian Randell: No, because I think whenever we start with some of the very basic mechanics, right? How much disk space? How much RAM do I have? How many cores do I have? I mean that's where we're starting. It's then going back to what's an IO intensive application versus the processor intensive application. Will having multiple virtualized processors help or hurt the actual application performance in a VM? I don't think we today have all the knowledge out there. At least it's not shared knowledge, that's for sure. It's not known knowledge and I'm sure everybody in their environment has certain knowledge of how things work in their environment. We don't have the ability to say, "Here's the common best practices," like we do with SQL Server. We have some very hard and fast rules we know with SQL Server how to get the best performance out of it.

Greg Hughes: Right.

Richard Campbell: All right. One more topic because we're running down on time and that is the utilization of virtualization in QA. I haven't done this yet, but have you seen folks actually being able to use, finding a bug, snapshotting the state of the machine at that point so they can basically hand that bug to the dev as is?

Brian Randell: I don't think people are doing that. What I've seen people do is they will actually just leave the VM running and they will tell the dev that's available and here's the RDP.

Richard Campbell: Yeah, here it is.

Brian Randell: Definitely doing that, you have the recording feature available in many of the test products so people will just take recordings. That's a very popular thing because a lot of those things can be attached to your bugs in your system. In fact, the new version of Team System has integrated recorder features, that kind of stuff. You could obviously take that one step further with interactive recording of the VM session, but obviously having the ability to have a snapshot available and to say, "Okay. I saved a snapshot. It has a bug," that's a really powerful feature particularly if you use Hyper-V or some of the VMware process to support the snapshot where you

can even have multiple paths through the snapshots where you go two different directions and try different scenarios.

Greg Hughes: Sure.

Brian Randell: I'm not seeing people doing that yet. I think part of what it comes back to -- the thing that started this conversation was infrastructure and management.

Richard Campbell: Right.

Brian Randell: How do you manage all these VMs? Once again, how are you going to manage all those snapshots?

Richard Campbell: Yeah, that could definitely cascade out of control. You end up with a lot of the VMs that way, but on the other hand, the ability to fight back from cannot reproduce as a bug resolution is pretty powerful for me.

Greg Hughes: I've seen it and I've done it before. I had a customer once and actually did a P2V of a buggy environment and actually because we tried to troubleshoot it remotely ended up taking a virtual machine of the environment and we're able to find a resolution based on that, so a little bit different than just saving a snapshot but still leveraging virtualization to be able to take an eyeball look at a machine.

Brian Randell: Well, I think that's a great example particularly if you don't have any hardware issues where the issue is always software configuration.

Greg Hughes: Right.

Brian Randell: If you're able to take that environment and create a virtualized environment that you can test and really bang on without having to worry about the real system is really huge.

Richard Campbell: Yeah, there's huge potential there. I think we don't have enough infrastructure for the test environment to make that easy yet, but I think it could be a very compelling area. This feels like an area of future development for virtualization for devs.

Brian Randell: We definitely see, you know, obviously Microsoft is keen to building more tools like System Center. They're working on the new Virtual System Center 2008 which will support not only their existing virtual server environment but it's going to support ESX server from VMware as well as Hyper-V from one console. You can see them and I know VMware has an entire product dedicated to the test lab. In fact I think it's called Test Lab, but correct me



if I'm wrong. They have a product for that. I mean we're starting to see the maturation. I think the big thing is that virtualization is gaining such a large mindshare. We're really going to see huge investments in virtualization across the enterprise and development and tests are going to get a lot of attention.

Richard Campbell: Awesome potential. Brian, thanks again for coming on the show to give us some insight into what's going on over here, things we can do.

Brian Randell: Thank you for having me. You know I have no lack of fun talking about this stuff. I think it's great.

Richard Campbell: Well, and it's your excuse for buying all that heavyweight hardware for the house.

Brian Randell: Hey, I've got stuff to do, man. I'm working here. I'm providing guidance for the industry.

Richard Campbell: That sounds like a pitch to the wife all the way.

Brian Randell: Yeah, I'll make sure I play back this recording. Make sure you edit out this little part.

Richard Campbell: Any final thoughts, Brian?

Brian Randell: No, just go forth and prosper. Just remember a virtual machine requires all the love and care that a real machine does. You've got to patch it. It has to run an antivirus and you've got to watch those licenses regardless of the vendor. Make sure everybody gets their due because you want vendors to be around so they can build great solutions.

Richard Campbell: You bet. Brian Randell, thanks so much for coming on the show.

Greg Hughes: Thanks Brian.

Brian Randell: Thanks guys.

Richard Campbell: And we'll talk to you next week on RunAs Radio.