

POWERING THE NEW IT GENERATION

# VIRTUALIZATION REVIEW



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# Adjusting to **Azure**

The increasing adoption and importance of Azure means virtualization professionals need to rethink a lot of things, including their own jobs

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# Rethinking IT, From an Azure Perspective

The IT skills you have are not the skills you will need—working with Microsoft Azure means having to relearn ways to get the job done more efficiently in the cloud.

By Paul Schnackenburg

**For Microsoft IT professionals taking steps into cloud computing, it means working with Azure.**



**W**e live in interesting times as IT professionals and the skills we need tomorrow are not the same ones that we've honed for use in today's environment.

A case in point is public cloud computing. Some things are the same—networks, VMs, sizing for application loads, clustering. And some things are totally different—hybrid networks between on-premises and the cloud, no access to hardware, paying per hour instead of once every three years, infinite scalability, new privacy and security concerns. For Microsoft IT professionals taking steps into cloud computing, it means working with Azure, which is familiar but different.

**The key to understanding public cloud computing is to see that there are many levels of service provided.**

In this series of articles, we'll look at the various components that make up Microsoft Azure as it applies to IT pros. We'll look at automation, cloud and mobile services, network traffic, diagnostics, and a slew of other features. First up, though, let's look at Web Sites, Virtual Machines, and autoscaling. (Note: throughout this series we're covering the version that came out of the BUILD 2014 conference.)

Azure provides compute, network, data, and app services in an elastic, self-service, and metered fashion for business across the globe. There are two interfaces to monitor, configure, and set up these services: the HTML 5 web-based console that works in all modern browsers and a PowerShell interface for automation. Azure is both an infrastructure-as-a-service (IaaS) cloud in that it offers persistent virtual machines that can run your business workloads and a platform-as-a-service (PaaS) cloud which provides a platform on which to run your own code.

### **Compute Services**

The key to understanding public cloud computing is to see that there are many levels of service provided, from just a simple VM hosting service to a complete platform. Generally the higher up in the stack you go—meaning the fabric is more abstracted away from you—the less control you have but the easier your deployment is. So, if you're writing your own app to run on top of Azure's fabric as a PaaS application, you don't have control of the underlying OS in the Web Role/Worker Role VMs, as Microsoft will keep these updated with patches. On the other hand, with a VM in IaaS you're responsible for patching, antivirus and backup. Both come under the heading of compute services.

A basic building block in Azure is a cloud service which can contain one or more VMs under IaaS or one or more tiers of Web Role/Worker Role VMs. Generally PaaS requires apps that are written for the cloud, whereas IaaS VMs could simply be existing business services that you are comfortable moving to the cloud.

### **Web Sites**

Web sites lets you build web-secure and scalable applications, using frameworks such as .DotNetNuke, DasBlog, CakePHP, Wordpress and others. Or you can use WebMatrix to create a site from scratch using APS.NET, PHP, HTML 5, CSS 3 and Node. You can use either SQL

**A sign of the new Microsoft is the open source project Kudu, also known as Site Control Management.**

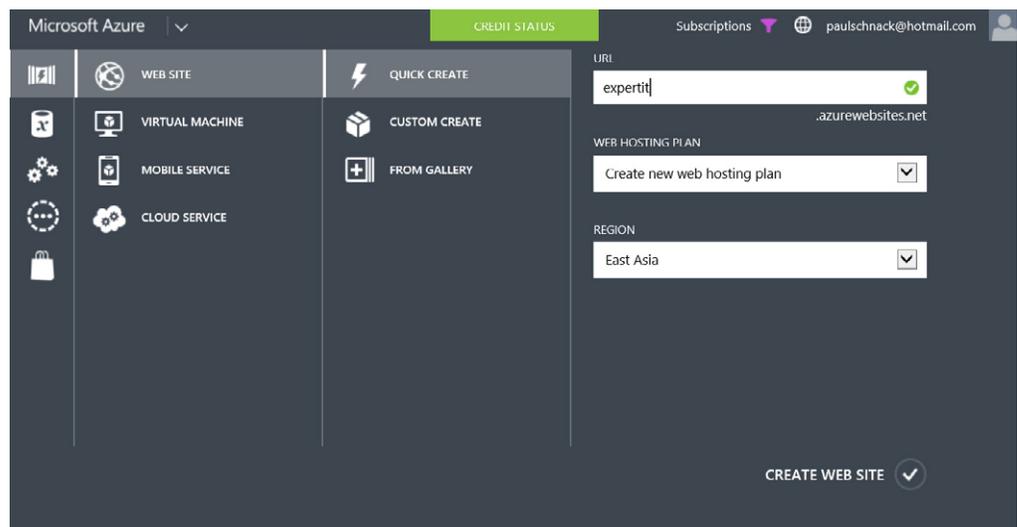
server or MySQL as the database for your site and if you're collaborating on a larger site you can use CodePlex, Github, Bitbucket or Team Foundation Services for source control.

Recently released in preview is the concept of Web hosting plans, which work well when you have different sites (with different "sizes") but you want to manage and pay for them under a single umbrella.

A sign of the new Microsoft is the open source project Kudu, also known as Site Control Management which you reach by putting .scm after your site's name (<https://mysite.scm.azurewebsites.net>) and logging in with your deployment credentials. This is a hidden gem for web developers and gives access to a lot of troubleshooting and diagnostics tools. Another neat trick is that apart from the web console and PowerShell you can use your on-premises IIS manager to connect to your Azure Web Sites.

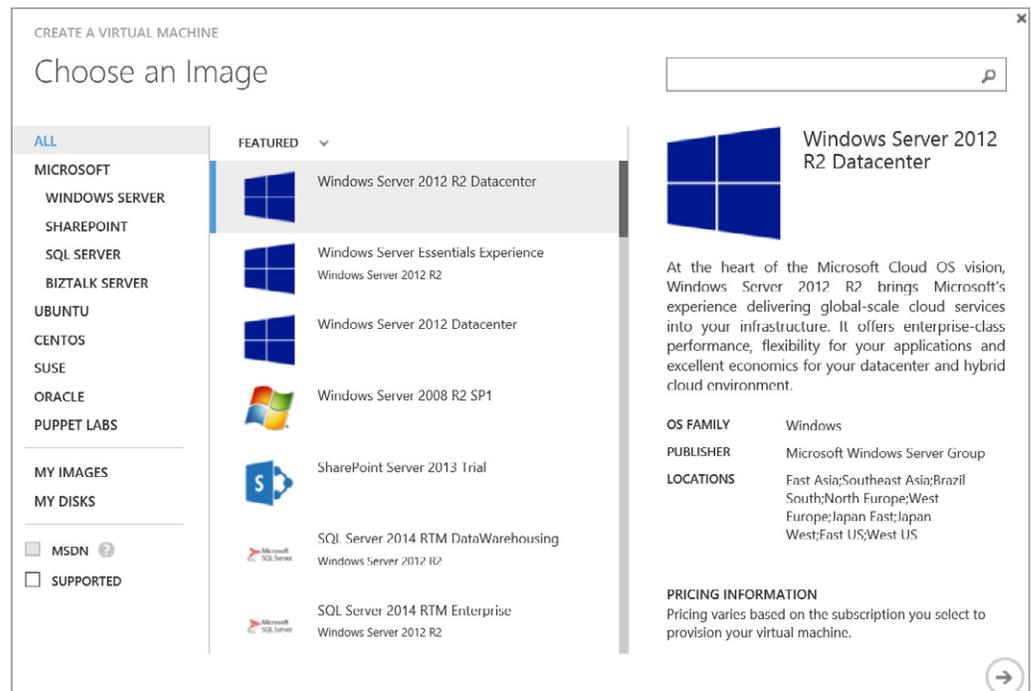
At BUILD, Microsoft announced support for Java 7 (both 32- and 64-bit) for Azure Web Sites, along with full support for Apache Tomcat 7.0.50 and Jetty 9.1.0. There's also a new SKU for Web Sites called Basic with some limitations on functionality. The Standard SKU now gives you free SSL connections (although you still have to supply the certificate).

One question that I hear frequently is whether to use Azure Web Sites to host sites or Cloud Services Web Role. After all, both fall



**Figure 1.** Creating a website is only a few clicks away, although Azure doesn't actually design the website for you.

**VMs on Azure  
are now serious  
contenders for  
your public  
cloud projects.**



**Figure 2.** Creating a VM in Azure is easy and it only takes a couple of minutes to be provisioned.

under the PaaS umbrella and seem to do the same thing. It depends on what you need your site to do. Web Sites essentially provides IIS as a platform for your Web app, hiding anything underneath that layer from you. Depending on your SKU your site might be hosted with other tenants and because it's just IIS resources, Web Sites can be provisioned and scaled extremely quickly.

Web Role on the other hand is a full VM with IIS preinstalled dedicated to you and you have full access to it, allowing you to run start-up scripts, customize IIS and open up ports in the firewall for instance, provided all of these things can be scripted or be part of your service package configuration. (Remember, this is still PaaS and Azure might take away that particular VM at any time and spin up a new one, which then will need to automatically configure itself.) You could even RDP to the server for troubleshooting purposes. Spinning up a Web Role takes a few minutes, compared to seconds for a Web Site instance.

### Virtual Machines

Although late to the IaaS party (Azure was a pure PaaS play in the first few years of its life), VMs on Azure are now serious contenders for your public cloud projects. As expected there's a gallery with

**VMs are billed per hour but a stopped VM doesn't incur charges.**

ready-made Windows and Linux VMs, including machines with SQL, Oracle, SharePoint and BizTalk server. You'll also need to define the size of your machine, as April 2, 2014 there are two tiers of VMs, Basic and Standard. Basic doesn't include load balancing or auto scaling and as such is suitable for single instance production machines, development boxes or test servers. The range of machines in Basic starts at A0 which has a shared core and 768 MB, up to A4 which has eight cores and 14 GB of memory. The Standard tier adds A5 to A7 with the latter providing 56 GB of memory.

VMs are billed per hour but a stopped VM doesn't incur charges. There's a catch: If you shut down the VM from within the OS or if you use PowerShell with `ShutdownRoleOperation` with the parameter `PostShutdownAction` set to `Stopped` you will still be billed. If you shut down the VM from the Azure portal or by using the above PowerShell cmdlet with the parameter set to `StoppedDeallocated`, you will not be billed for the stopped VM. This is shown in the portal where Status "Stopped" will still be charged, whereas "Stopped (Deallocated)" won't be.

IP address assignment for VMs can be challenging. Basically it's like DHCP in that you will get an IP address from your virtual network (more details in [part 2](#) of this series) or by the default network in Azure automatically, but this IP address will follow your VM for its lifetime even if you restart the VM. However, if you stop the VM as per above to not be billed for it, the VM may be assigned a new IP address when you start it again.

VMs use VHD files (not VHDX yet) as their virtual storage; hence, it's possible to download VMs from Azure and run them on Hyper-V in your datacenter. Conversely, you can sysprep a standard corporate image VHD on premises and then upload it to Azure and create VMs from it.

Many users seem not to be aware of the Availability set feature (as over 90 percent of customers haven't defined them), which splits VMs across racks and ensures minimal downtime when Azure needs to perform infrastructure updates.

Recently added is an optional VM agent that adds support for management frameworks such as [Puppet](#) or [Chef](#) for automated IT.

**The ability to have a service automatically scale based on load is a great benefit of using Azure.**



These tie in with a very important mindset that I think all IT pros should acquire—automation. Whether it's PowerShell, [SMA](#), Azure Automation (again, see [part 2](#)) or the above frameworks, the skill and mindset to automate repetitive tasks is going to be vital in the future.

### **Autoscaling**

This feature is available for Web Sites, Cloud Services and Virtual Machines as well as for the backend of Mobile Services. In the preview period it only supported scaling based on CPU load. Now that it's generally available (or GA, which is the Azure equivalent of RTM), it also supports scaling based on HTTP queue length. The ability to have a service automatically scale based on load (or manually by dragging a slider) is a great benefit of using Azure that otherwise would require a fair bit of work to automate in your own IT infrastructure.

We've covered quite a bit of ground for now. When we continue this series next time, I'll cover PowerShell, Azure Automation, Cloud Services, Mobile Services, Diagnostics, Virtual Networks, Express Route, Traffic Manager and SQL Server/Service. [VR](#)

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*Paul Schnackenburg, MCSE, MCT, MCTS and MCITP, started in IT in the days of DOS and 286 computers. He runs IT consultancy Expert IT Solutions, which is focused on Windows, Hyper-V and Exchange Server solutions.*

# Rethinking IT, Part 2: Azure, Automated and Cloud-Ready

This time, we look at automation, cloud and mobile services and a few other things that will have IT pros redefining the roles they play in the organization. **By Paul Schnackenburg**

**With Azure, IT pros will still find some familiar administration processes.**



**M**icrosoft Azure won't completely redefine the role of IT, but the changes are coming incrementally. That's true not just of the nature of working with Azure, but working with any cloud solution these days. With Azure, IT pros will still find some familiar administration processes that are familiar even as those processes are moved from on-premise environments to the cloud.

In this second of three articles, we look at PowerShell, Azure Automation, Cloud Services, Mobile Services, Diagnostics, Virtual Networks, Express Route, Traffic Manager and SQL Server / Service.

(To read part 1, go [here](#).)

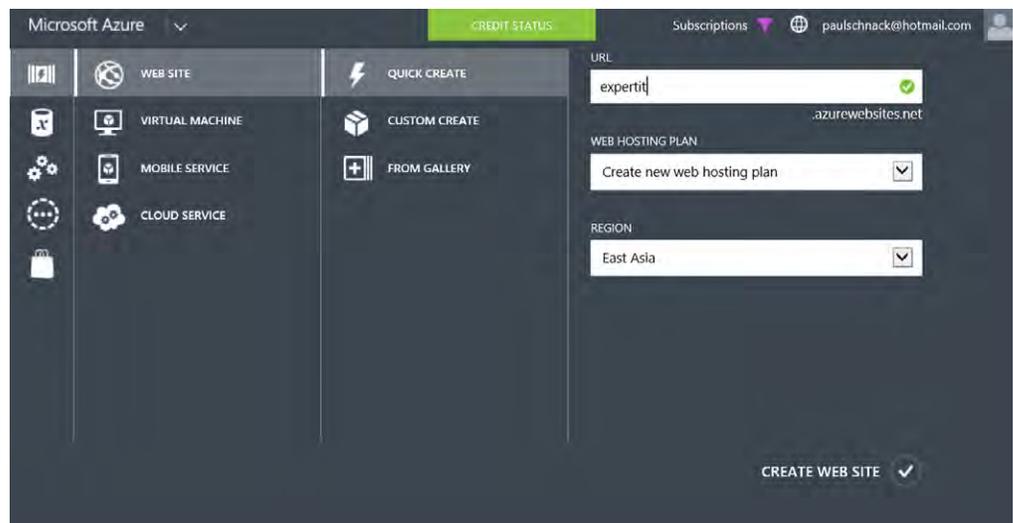
## PowerShell

The key to successful cloud implementations (private, hybrid or public) is automation and given the PowerShell “high” Microsoft has been on since 2006, it should come as no surprise that every aspect of your Azure resources can be controlled from the command line. There are a few steps to set this up. First, head to the Downloads page on Azure and click the Install link which will launch the Web Platform installer that lists all the items you need.

**The key to successful cloud implementations is automation.**

There are two ways to authenticate to your Azure subscription, either with a certificate or a login via Azure AD. The former is suitable for long-running automation jobs, as it’ll always work (as long as the certificate is valid) but harder to share among several administrators, whereas the latter is easier to get started with, but the credentials provided expire after 12 hours, requiring logging in again. More details [here](#).

If you have multiple subscriptions under one account make sure you use `Select-AzureSubscription` to set the correct one that you want to work with. You can also set a default subscription using the cmdlet in **Figure 1**.



**Figure 1.** PowerShell provides powerful automation and scripting capabilities when interacting with Azure.

If PowerShell isn't your thing there's also a Cross-Platform Command-Line Interface (xplat-cli) that's open source (Apache 2.0 license), built on Node.js. For more information see [here](#).

### Azure Automation

Recently announced in preview, this service builds on **Service Management Automation (SMA)** in System Center 2012 R2 and lets you build runbooks and workflows to manage your resources in Azure.

### Cloud Services

If you have developers that write code to run on Azure (using any number of languages), you will then use Cloud Services to run it—the client-facing side on Web Role VMs and the backend processing on Worker Role VMs.

Each role can have one or several instances as defined in the cloud service configuration file (.csdef) which defines the service model for the application. The cloud service configuration file (.cscfg) specifies configuration settings for the cloud service and its individual roles, including the number of role instances. The service package (.cspkg) contains the actual application code along with the service definition file.

Each cloud service comes with a staging and a production slot and once you have updated your app, and tested it sufficiently when accessed through the testing URL, the process of upgrading the production code is simply a VIP (Virtual IP) address swap. If anything goes wrong you can simply swap back to the previous version.

### Mobile Services

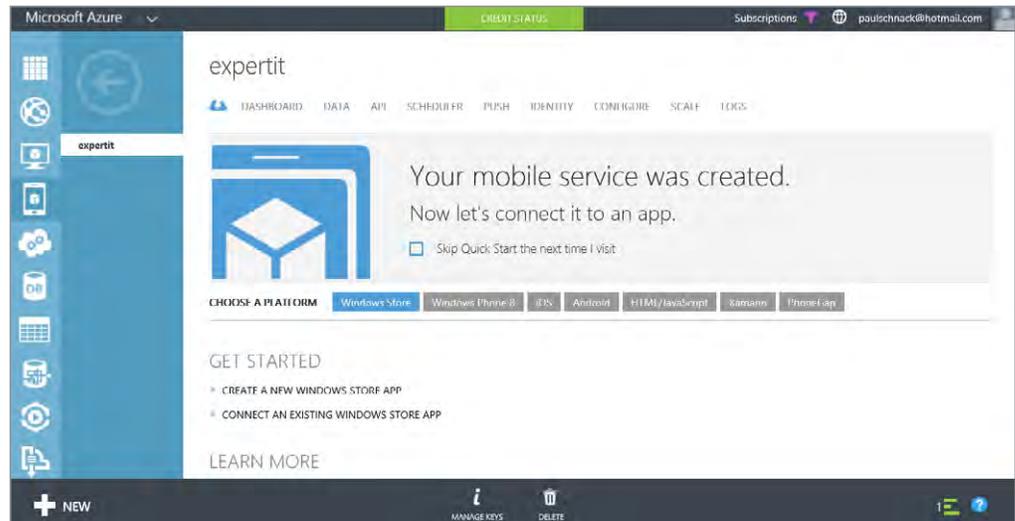
This is a service for the back-end storage and processing, user authentication and push notification for Windows Store/Windows Phone, iOS, Android and HTML/JavaScript apps (see **Figure 2**, page 10). In fact the scripts you use for the backend processing are all JavaScript. For sending out notifications to a large population of devices you can use the Notification Hub service.

### Diagnostics

Perhaps one of the hardest things to come to terms with as an IT pro is losing control. After all when it's your own infrastructure you

**If you have developers that write code to run on Azure, you will then use Cloud Services to run it.**

**If you are already using System Center Operations Manager for your monitoring, you can import the Azure Management Pack and thus monitor your resources in the cloud.**



**Figure 2.** While Microsoft clearly would prefer if you used Windows 8 and Phone 8 for your apps, they provide a first class experience for building apps and their backend for all the other platforms.

have total control (and responsibility), whereas in a public cloud, some or even a lot of that control is taken away. One such area is diagnostics, the places to look when things go wrong.

Azure offers the umbrella of Windows Azure Diagnostics, WAD (is that going to be MAD, now that it's Microsoft Azure?); which can collect data from IIS logs on a Web Role, Windows event logs, Performance counters, crash dumps and Azure logs. It's best to set up a separate storage account to store incoming log data.

If you are already using System Center Operations Manager for your monitoring, you can import the Azure Management Pack and thus monitor your resources in the cloud; there's also a Management Pack for AWS.

### Virtual Networks

By default all VMs or Web/Worker roles within a Cloud Service can communicate with each other, but by adding a Virtual Network they can communicate across Cloud Services. Moreover a Virtual Network can be used to extend your on-premises network to Azure through a secure link between the two.

There are two flavors of this: point to site, which links a single machine to your Azure network (using SSTP), suitable for testing and

development work; and site to site (S2S). The latter is useful when you want a permanent VPN link between your datacenter and Azure.

A couple of things to keep in mind is that each Virtual Network can only have one S2S link so you'll need to plan your Virtual Networks and VMs/Cloud Services accordingly, you'll also need to define DNS servers for this hybrid scenario (see **Figure 3**). If you want VMs in the cloud to be able to participate in your network you'll need to point them to your on-premises DNS servers. The built in DNS that Azure offers only supports name resolution and not SRV records for AD connections.

**A multitude of VPN devices are supported for S2S.**

A multitude of VPN devices are supported for S2S, including Routing and Remote Access in Windows Server 2012; there are configuration scripts available for download from the link above.

For unlisted VPN devices, it's generally not hard to figure out the right settings based on the configuration scripts. The tunnel is either an IKE v1 (static routing) or IKE v2 (dynamic routing) and like any infrastructure-altering project, planning is required. Microsoft provides guidance through several articles and this excellent blog post.

CREATE A VIRTUAL NETWORK

Virtual Network Address Spaces

ADDRESS SPACE	STARTING IP	CIDR (ADDRESS COUNT)	USABLE ADDRESS RANGE
10.0.1.0/24	10.0.1.0	/24 (256)	10.0.1.0 - 10.0.1.255
<b>SUBNETS</b>			
Subnet-1	10.0.1.0	/27 (32)	10.0.1.0 - 10.0.1.31
Gateway	10.0.1.32	/29 (8)	10.0.1.32 - 10.0.1.39

add subnet    add gateway subnet

add address space

NETWORK PREVIEW

The network preview diagram shows a 'cloud' box on the left connected to a 'GATEWAY' box. The 'GATEWAY' box is connected to a 'VPN' box, which is in turn connected to two boxes: 'cloud' (with a location pin icon) and 'Clients' (with a group of people icon). To the right of these boxes is a 'DNS Servers' box. Navigation arrows are visible at the bottom right of the wizard.

**Figure 3.** Creating a Virtual Network and setting up a link to your datacenter is only a few steps in a wizard.

The main issue to take into account is latency. Within a datacenter it's generally within a few milliseconds, whereas the roundtrip to an Azure datacenter could be in the order of 50 milliseconds or (much) more. Until recently there was no way around this issue but a new preview feature (February 2014) called Express Route promises hybrid cloud nirvana.

### Express Route

This feature is currently in preview and provides security (as it doesn't go over the public Internet), predictable performance (very low latency) with high throughput and comes in two flavors. You can either connect via an Ethernet exchange (max 10 Gbps) or use a WAN provider's MPLS network (max 1 Gbps) to connect Azure as a "branch office" in your network. Current providers for the Ethernet connectivity are Level 3 and Equinix and for the WAN option AT&T and Level 3.

**A new preview feature called Express Route promises hybrid cloud nirvana.**

During the preview period there are only two connectivity points (Washington D.C. and Silicon Valley, CA). It uses BGP for routing and there are two dedicated circuits, one for accessing Virtual Networks in Azure and one for connecting to Azure services that are accessed through public IP addresses. Properly configured the service will mean that no Azure-related traffic will be routed through your Internet connection (where you generally pay for download amounts).

Cost for a 1 Gbps Ethernet connection with 15 TB included egress traffic (uploading to Azure is always free) is \$600 per month, and a 10 Gbps Ethernet connection with 250 TB included traffic is \$10,000 per month. For more information see [this talk](#) from Build 2014; at the time of this writing, general availability was expected in May 2014.

### Traffic manager

This service lets you set up a Website or a Cloud Service in a U.S. region, a European region and an Asian region for instance (with the same content). Traffic Manager will then direct traffic to the nearest datacenter based on the client's location.

You can choose between three different load-balancing methods: Performance, Round Robin or Failover. The latter two are useful if

**An area where Microsoft shines is the linking of on-premises products to the cloud services.**

you're load balancing between services in the same datacenter. Note that data doesn't actually flow through Traffic Manager; rather, that's the role of the DNS redirection feature. There's also a simple health probe built in that'll check if a web site is down for instance and transparently redirect traffic to another site if it is.

### SQL Server versus Azure SQL

Many services and apps require database support. Similar to the choice you have between Web Sites and Web Cloud Service roles, you can either stand up IaaS VMs with SQL Server preinstalled or use Azure SQL as service. The IaaS approach works well if you need full access to all capabilities of SQL server and have the necessary DBA skills in-house. On the other hand you could select the SQL database service which relieves you of the responsibility for patching the OS or managing the SQL server itself.

There are some limitations as to features that are supported as well as size limitations with the service. The Web Edition database can be a maximum of 5 GB, whereas the Business Edition can grow to 150 GB per database. You can have 150 databases per server (although this can be increased to 500 with a call to support).

An area where Microsoft shines is the linking of their on-premises products to the cloud services. As an example you can use SQL 2012 SP1 CU2 or later to easily set up Azure as destination for a SQL Server native backup which is then triple replicated in the destination data-center (default for all Azure-stored data) as well as (optionally) geo replicate that data to another datacenter.

We've covered quite a bit of ground this time out. Next time, I'll dive into Storage, HDInsight, Azure Backup, Recovery Manager, Media Services, Azure Active Directory, Service Bus, BizTalk Services and the new portal. **VR**

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*Paul Schnackenburg, MCSE, MCT, MCTS and MCITP, started in IT in the days of DOS and 286 computers. He runs IT consultancy Expert IT Solutions, which is focused on Windows, Hyper-V and Exchange Server solutions.*

# Virtual Machine Security Ramped up for Microsoft Azure

“Real-time protection” against malware is promised for the cloud platform. **By Kurt Mackie**

**Microsoft released a new antimalware solution for its various Azure services.**

**V**irtual Machines (VMs) are often more difficult to secure than typical servers, given their transient nature. And fewer tools exist to secure them, as well.

That situation was eased a bit when Microsoft released a new antimalware solution for its various Azure services, including VMs, recently.

The single-agent solution, which protects Microsoft’s cloud-based services from viruses and malware, is based on Microsoft Security Essentials, System Center Endpoint Protection and Forefront Endpoint Protection, among other technologies. This “general availability” release, described [here](#), arrived with a bunch of [Microsoft cloud announcements this week](#) as part of Microsoft’s TechEd Europe event.

There’s also a white paper ([PDF](#)) available that describes configuration and installation details. The service, called “Microsoft

**Microsoft promises that the service offers “real-time protection” against malware.**

Antimalware for Azure Cloud Services and Virtual Machines,” can be set up through the Azure Preview Portal, Visual Studio or via PowerShell commands.

Microsoft promises that the service offers “real-time protection” against malware, including automatic deletion and quarantine of suspected files. It’s also possible to set exclusion paths to certain files that organizations don’t want scanned. The service automatically updates its platform, antimalware engine and virus definitions.

The service comes at no cost to organizations with active Microsoft Azure accounts. It optionally allows IT pros to collect event information regarding the antimalware service’s activities, which can be aggregated for later analysis using Azure Diagnostics. Using this anti-malware event collection process requires having an Azure Storage account, which likely would entail an added cost, but it’s an optional feature. The data even can be sent for further analysis to Microsoft’s HDInsight “Big Data” service or to an event management system.

Microsoft Antimalware for Azure Cloud Services and Virtual Machines has some software requirements. It’s currently supported on “Windows Server 2008 R2, Windows Server 2012, and Windows Server 2012 R2,” according to Microsoft’s announcement. It’s not supported on Windows Server 2008, or on the Windows Server technical preview beta, although Microsoft does plan to support it with its next Windows Server release.

Microsoft does not turn on the service automatically; it must be enabled through configuration settings. The bits are there by default to be enabled for Azure services, but IT pros have to install the bits for the Microsoft Antimalware Client and Service to use the service on Azure Virtual Machines.

Microsoft offers a default configuration of the service that’s optimized for its Azure cloud. It’s also possible for admins to customize the configuration for Azure services or for Azure Virtual Machines. [VR](#)

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*Kurt Mackie is senior news producer for the 1105 Enterprise Computing Group.*

# Easy VM Conversions with Microsoft Virtual Machine Converter

The latest version of MVMC supports Windows PowerShell.

By James Brown

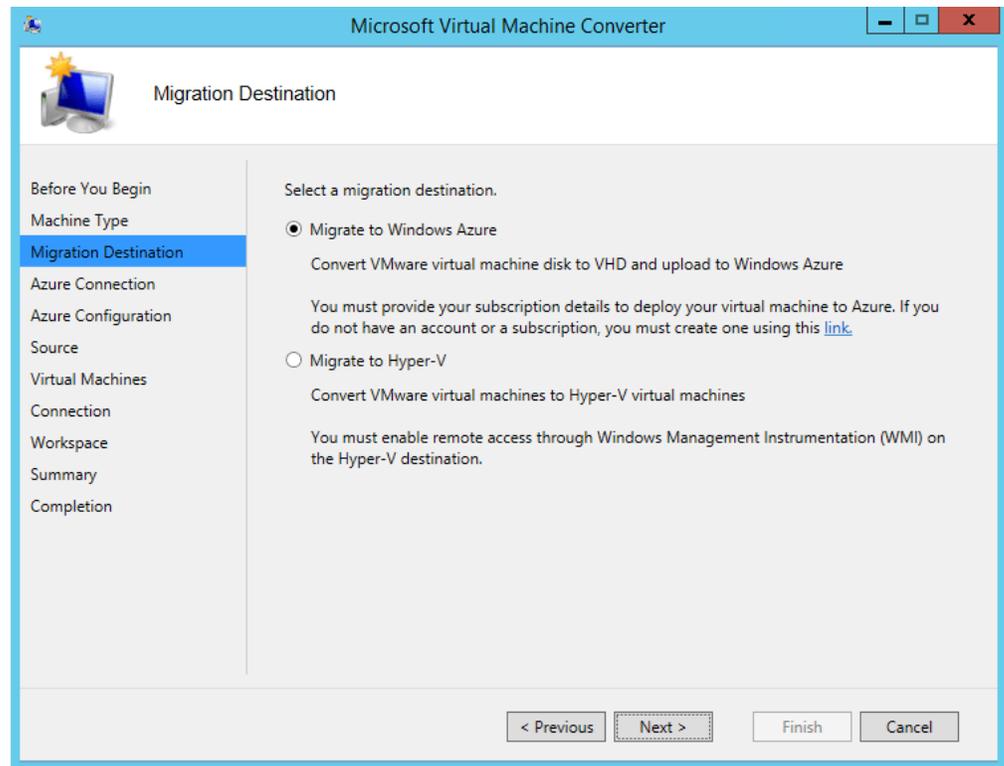
**VMware has a very solid converter for converting its VMs to Hyper-V VMs.**

**M**any of you are hosting and administering several types of hypervisors within your virtualization infrastructures. Having one type of hypervisor within a private or public cloud isn't the norm anymore, owing to different projects, applications and a change in operational budgets.

Because of that, many of you might need to convert VMware virtual machines (VMs) to Hyper-V VMs or vice versa. VMware has a very solid and free standalone converter for converting its VMs to Hyper-V VMs. The converter also converts VMs within its family of virtualization platforms, including physical machine conversions.

Microsoft VM converters have also been around for a while, but with limitations. Conversion tools such as System Center Virtual Machine Manager or Hyper-V Server 2012 can convert VMware VMs to Hyper-V VMs, but are mainly for large-scale use.

## Microsoft Virtual Machine Converter solved the problem for the smaller scale VMware VM-to-Hyper-V VM conversions.



**Figure 1.** The Microsoft Virtual Machine Converter provides the option to migrate your VMware virtual machines directly into Microsoft Azure.

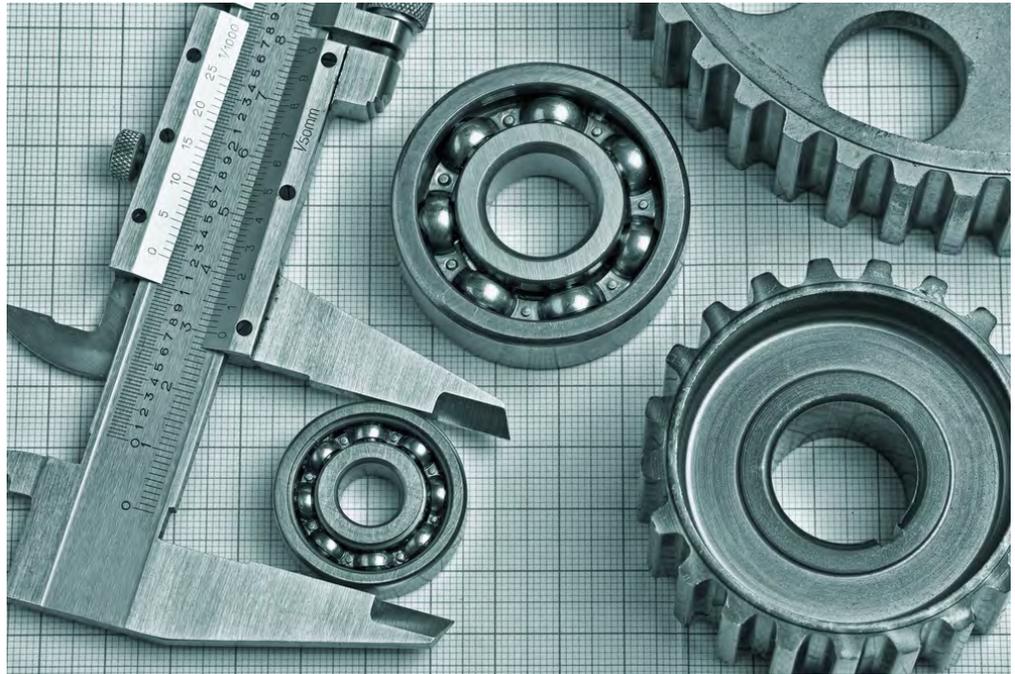
Microsoft Virtual Machine Converter (MVMC) solved the problem for the smaller scale VMware VM-to-Hyper-V VM conversions. The current version is MVMC 3.0. It's easy to download, supported by Microsoft and—best of all—is free. Here's a quick tutorial on using it.

### Taking MVMC for a Spin

I test drove MVMC 3.0 and found it to be easy to obtain, deploy and implement. Once you have the MSI downloaded, it's easy to get set up. Make a note to check the [download page](#) for prerequisites you might need before installing the converter. You must also use a local administrator account on the machine where MVMC 3.0 is installed. In addition, MVMC provides an option for you to migrate directly to Microsoft Azure, as shown in **Figure 1**.

One feature I found really helpful was that MVMC 3.0 has support for [Windows PowerShell scripting](#), allowing you to automate conversion workflows from VMware VMs and physical machines to Hyper-V VMs. The automation process will also save you a lot of time during your conversion projects.

**I've found MVMC 3.0 to be an invaluable tool for converting VMware VMs and physical machines to Hyper-V VMs.**



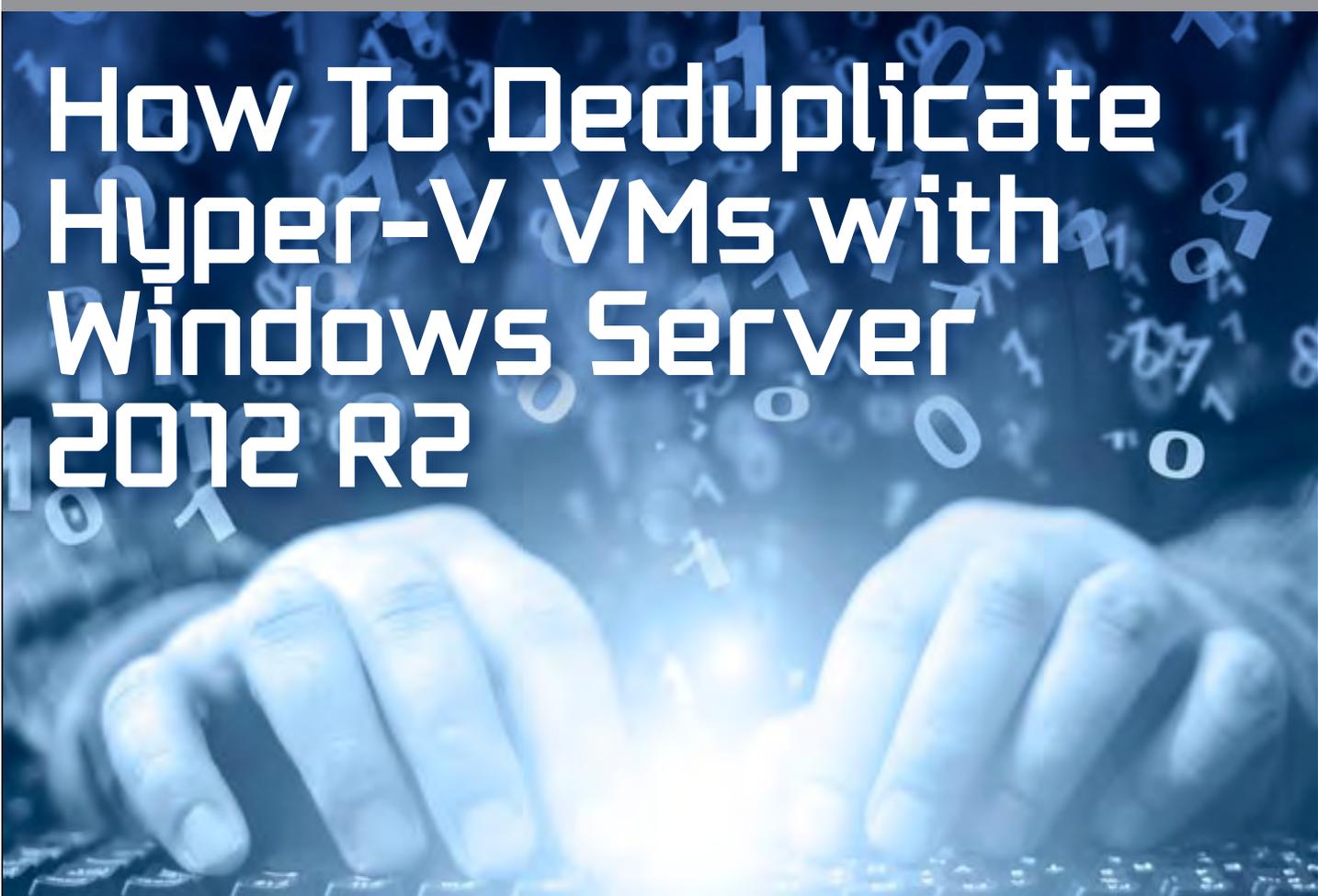
Be aware that the MVMC 3.0 uninstalls VMware tools to allow for a clean VMware VM to Hyper-V VM conversion. You'll find that the automatic removal of the VMware tools prior to the conversions will spare you a lot of frustration and downtime.

I've found MVMC 3.0 to be an invaluable tool for converting VMware VMs and physical machines to Hyper-V VMs, and think you will, too. [VR](#)

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*James Brown, vExpert, VCP, MCSE, is a senior virtualization engineer and CEO of Virtuxperts and VMware Users Group Leader in Las Vegas, NV. James' area of expertise includes virtualization, infrastructure and Windows systems.*

# How To Deduplicate Hyper-V VMs with Windows Server 2012 R2



**Some handy tips to save space and keep Hyper-V VMs from bogging down the rest of your systems. By Rick Vanover**

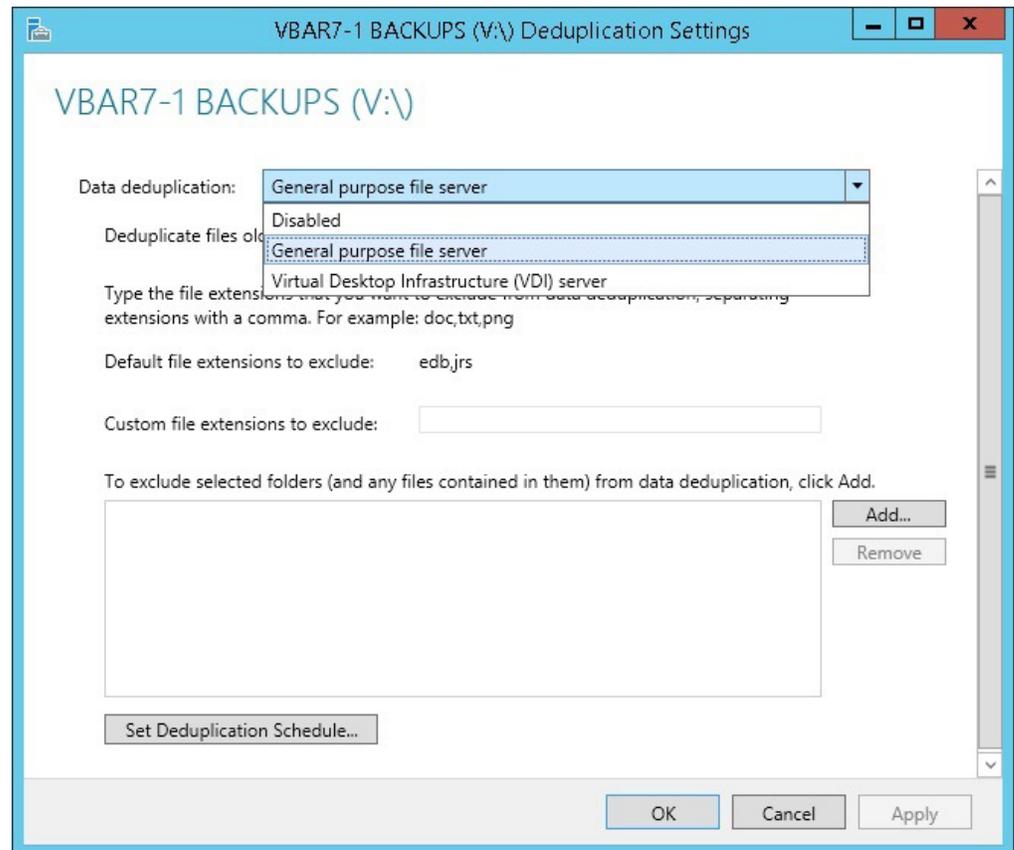
**One feature I've spent a lot of time working on is the Windows Server 2012 deduplication feature.**

**I**'ve been working a lot on Hyper-V recently, and I've been happy to find that there are plenty of good community resources on Hyper-V that can help people get started with it.

One feature I've spent a lot of time working on is the Windows Server 2012 deduplication feature. This feature was introduced with the base release of Windows Server 2012 and was targeted to file shares and "unstructured" data profiles. What this means is, don't run Exchange or SQL Server on it!

Windows Server 2012 R2 introduced an additional flavor of deduplication aimed at Hyper-V VMs. The new iteration is aimed at VDI VMs, but that doesn't necessarily exclude regular VMs. Further, Clustered Shared Volumes are supported (but not required) for running deduplication on Hyper-V VMs. **Figure 1**, page 20, shows a volume being enabled for deduplication.

**Virtual machines,  
done well,  
are excellent  
candidates for  
deduplication.**

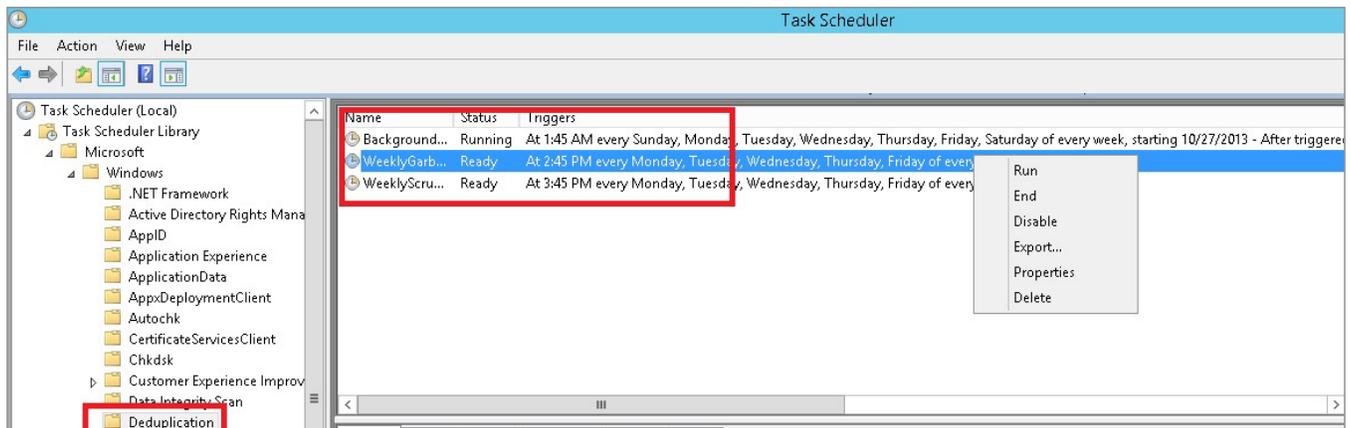


**Figure 1.** The deduplication role can do both general purpose files and virtual machines in Windows Server 2012 R2.

Virtual machines, done well, are excellent candidates for deduplication. Enabling this role can save some space (in many cases, a lot of disk space) allocated to VMs. This is in particular applicable to C:\ drive VHDs and VHDXs of VMs that come from the same libraries.

Here are a few tips on using Windows Server 2012 R2 deduplication. First of all, don't put your Hyper-V VMs VHDs and VHDXs on the C:\ drive of the Hyper-V hosts, deduplication isn't supported there. Make a designated drive letter and run deduplication there.

The next tip is to set the scheduler to run at an appropriate time. There can be as much as 25 to 50 percent CPU assigned to Windows Server 2012 deduplication to traverse terabytes of data. Make sure that's done at a time that the hosts can take the CPU hit. There's also multipathing hit as well. Configure the deduplication schedule in the File and Storage Services section of Server Manager and additionally in Task Scheduler (see **Figure 2**, page 21).



**Figure 2.** The deduplication role has three scheduler entries in the task scheduler.

The additional tip is to look in at the task scheduler over time to make sure it is finishing in requisite time and that you are getting substantial savings on your Hyper-V hosts. If you don't like what you see, you can turn off the deduplication role or do selective expansion tasks with the `Expand-DedupFile` PowerShell cmdlet.

**Look in at the task scheduler to make sure that you are getting substantial savings on your Hyper-V hosts.**

Also, I want to (virtually) introduce you to Dave Kawula. He's based in Canada and a Hyper-V MVP and has got me hooked on a number of Hyper-V things! I encourage you follow him on Twitter at [@DaveKawula](https://twitter.com/DaveKawula) and his blog is <http://www.nitandgritofit.com/>.

I've been using Windows Server 2012 deduplication extensively since it has been available—and hopefully you can give it a look in your environment. Have you considered it? If you've used it, what did you think of the new feature? Comments welcome and encouraged. **VR**

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