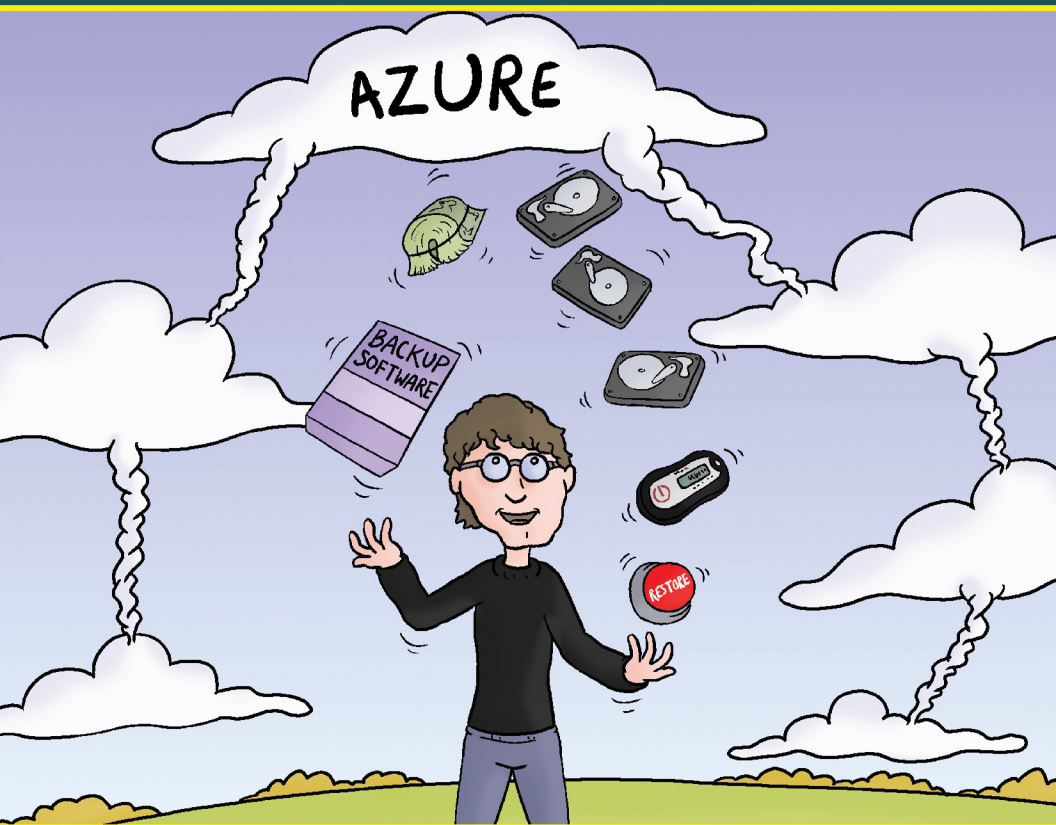


# Conversational Azure Backup Best Practices

By **Nick Cavalcia** (Microsoft MVP, Co-Founder of Conversational Geek)  
and **Brien Posey** (Microsoft MVP, Commercial Scientist Astronaut Candidate)



**In this  
book, you  
will learn:**

- Why you need to focus your efforts on backup above all
- How performance, cost, and security play a role in your backup strategy
- 10 best practices to ensure your Azure investment is protected

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# Conversational Azure Best Practices

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## Notes from the Authors

Organizations leveraging Microsoft Azure often focus on the “using the cloud” part and forget completely about the “Oops... I put my data in the cloud” part. While critical workloads tend to get more focus than, say, your data in Office 365, there is usually some question about how to best protect everything you’ve put into Azure.

This book focuses on what’s truly important – getting back to the basics of backup and using best practices to ensure the backup and data protection strategies you implement are truly effective.

We realize your use of Azure isn’t casual in nature; so the content in this book seeks to help you crystalize your backup concentration on the things that will keep those critical workloads, applications, and data recoverable should the situation arise.

Brien Posey



Nick Cavalancia



## Backups: What Are We Really Talking About Here?



*“So, how am I supposed to back THAT up?”*

The IT industry, perhaps even more so than any other industry, seems to love using buzz words. Sadly, the backup industry is by no means immune from this trend.

The problem with the way that buzzwords and technical jargon get thrown around is that they can cause terms to become ambiguous, or to lose their original meaning. Take the term *Disaster Recovery* for example. In some circles, disaster recovery is synonymous with backup and restoration. For others, disaster recovery refers to having the ability to failover a workload to the

cloud in the event that an organization's data center becomes incapacitated.

In an effort to cut through the ambiguity, we want to say up front that this book focuses squarely on backing up resources that are being hosted in the Azure cloud. There might be brief mentions of other clouds, assets that reside on-premises, or some of the more exotic protective mechanisms, but backup and restoration are really at the heart of this book. In fact, our goal is to take a back-to-basics approach and have a very frank discussion of backup best practices and shortcomings as they relate to the Azure cloud.



Several years back, IBM poked fun at the IT industry's pervasive use of buzz words when they made a commercial featuring a group of conference attendees playing Buzzword Bingo (<https://youtu.be/Zlxcxfl5jas>).

## The One Buzzword that Matters

Even though we have tried to stay away from using meaningless buzzwords as much as we can, there is one that we have to talk about. That buzzword, or buzz phrase rather, is “location agnostic”.

For years, public cloud providers were engaged in an all-out marketing assault in an effort to get their customers to move anything and everything to the cloud. The marketing message was simple: “Cloud good, data center bad”. We even once heard a speaker at a conference say that if by now you are not operating 100% in the cloud, then you are a dinosaur.

Thankfully, cloud providers have backed off, at least somewhat, and seem to have accepted the idea that their customers are going to be operating hybrid environments. Some workloads are best suited for the cloud, while others are probably a better fit for on-premises data centers. This is where the phrase “location agnostic” comes into play.

Location agnostic means that a workload could be running practically anywhere. Its geographic location is becoming increasingly irrelevant.

The reason why the concept of location agnostics is so important is that it makes it possible to begin once again managing our resources in a cohesive way. Back when everything existed on-premises, there were universally accepted best practices pertaining to how those resources should be managed and protected.

However, as the public cloud started to gain mainstream acceptance, people quickly realized that they had to adopt two different ways of doing things. One set of best practices – and tools – applied to resources that were running on-premises, and an entirely different set applied to cloud resources. Now the industry is starting to get back to the point where a common set of best practices can be applied regardless of where an organization’s IT resources physically reside.

The one big caveat to this, however, is that these best practices aren’t necessarily the same as those that were previously used. Remember, they were intended for an either/or situation. Either a workload was running in the cloud, or it was running on-premises.

# 10 Best Practices for Backing Up Resources Residing in Microsoft Azure

Because the best practices for backup and restoration have evolved significantly in recent years, we wanted to talk about some of these, especially as they relate to protecting resources that are stored in the Azure cloud.

## 1. Actually Back Up Your Data

This one might sound like a bit of a no-brainer, but it's incredibly important. You need to back up your data. Yes, seriously. This is the number one best practice.

So why on Earth are we telling you to be sure to back up your data? After all, the simple fact that you're reading this book means that you probably already know that backups are important.

The reason why we're including the need for data backups among the other best practices is because it directly ties into a couple of the things that we have already talked about. Namely, the cloud providers marketing efforts, and the concept of location agnostics. Let us explain.

If you were to ask most people what message the big cloud provider's marketing teams were trying to convey 10 years ago, they would probably tell you that the message was that the cloud makes everything cheaper and easier.

In conveying this message, the cloud providers would often stress the idea that operating in the public cloud is far more convenient than running workloads on-premises. This was due to the fact that the cloud provider handles all of those maintenance tasks that you, as an administrator, don't want to be bothered with.

Depending on the type of workload, these maintenance tasks might include things like keeping the hardware running, planning

for the organization's future capacity requirements, or installing security updates.

The problem with this is somewhere along the line, people started getting the perception that cloud providers handle all of the maintenance for you. Since backups can be thought of as a maintenance task, it probably seemed only natural to assume that the cloud providers were handling backups on their customer's behalf. As it turned out though, they weren't.

Most cloud providers, including Microsoft, don't back up their customer's data on their behalf. Microsoft uses a shared responsibility model. This model essentially states that Microsoft is responsible for ensuring the wellbeing of the Azure infrastructure, but customers are responsible for protecting their own data.

The bottom line is that the need for backups doesn't go away just because a resource resides in the cloud. Data loss can, and certainly still does happen in cloud environments.

This all ties back to the concept of location agnostics. Your data needs to be backed up, regardless of where that data resides.

## **2. Use the Right Tool for the Job**

A second best practice is to make sure that you are using the right tool for the job. Your backup software needs to be aligned with your backup requirements.

We will be the first to admit that this seems like yet another odd thing to include in a list of best practices. At best, it seems a little bit over simplistic. At worst, it sounds like a pitch designed to sell backup software. In reality though, there are three very important reasons why we are including the concept of using the right tool for the job among our list of best practices for backing up resources in Azure.

The first reason why it is so important to use the right tool for the job is that backup software that was designed for on-premises use might not do such a good job backing up resources in the cloud. That isn't to say that a legacy backup product can't back up resources in Azure. We have seen it done. What we are saying though is that trying to repurpose an on-premises backup product for use in the cloud can be problematic. In some cases, the software may work, but fail to provide an optimal experience. In other situations, the software might partially work, but leave you with gaps in your coverage.



It's important to be completely confident that your backup solution is going to work when needed. There is no worse feeling than thinking that your backup solution was doing its job, only to discover during a crisis that your data wasn't actually being backed up properly.

A second reason why it is so important to use the right tool for the job is that a lot of the legacy backup products require the use of agents. As IT pros, we all know that agents can be a pain. They can be difficult to deploy and manage, and sometimes they seem to stop working for no reason. We have even seen situations in which someone re-imaged a computer and forgot to reinstall the backup agent when they were done, leaving that machine unprotected.

Even if you put all of these potential annoyances aside, there is a more important reason for staying away from the use of an agent-based approach. Backup agents are often designed to communicate across an obscure TCP or UDP port. That might not be a problem if you are using that agent exclusively on-premises,

but there is a good chance that the agent's port requirements may keep it from functioning across cloud boundaries.

Finally, reason number three has to do with support. As a general rule, software vendors support their software only when it is used in accordance with their recommendations. If a backup vendor designed a particular piece of software to be used on-premises, then they probably don't support using that software to protect Azure resources, even if the software seems to work with Azure.

As a matter of self-preservation, you never want to put yourself in a situation where you might one day end up having to explain to your boss that you can't recover the organization's data because you were using backup software in an unsupported manner.



Using backup software that was designed for on-premises use to protect Azure resources may in fact be a violation of the software's licensing agreement.

The lesson here is to use a backup product that avoids the use of agents, and that is specifically designed for use with Azure.

### **3. Use Automation to Work Smarter, Not Harder**

The third best practice for protecting your resources within the Azure cloud is to use backup automation whenever you can.

Earlier, we brought up the idea that one of the things that initially made public clouds like Azure so appealing was that the cloud providers handle many of the maintenance tasks that IT pros would have otherwise had to do themselves. While it is true



that there are still some maintenance tasks that are left to the IT professional, it is possible to narrow the gap by leveraging automation.

Automation is actually a really good fit for backup related tasks. In fact, it's one of those things that has been used in one way or another for what seems like forever. Consider for example, that the backup software used in the 90s was capable of running a backup job at a scheduled time. This was a form of automation.

But job scheduling isn't the only way that automation can be used to assist with the backup process. Modern cloud backup applications make it possible to automate things like VM snapshot creation, and backup lifecycle management that is based around the organizations retention policies.

Admittedly, it is tempting to think of backup automation as a convenience feature. Some may consider it to be one of those things that is nice to have, but not necessarily essential. However, backup automation can help to improve backup reliability by making sure that backups are created and maintained in a predictable – and compliant – way.

Automation also helps IT pros to be more effective than might otherwise be possible. We all know that this age of ever-shrinking IT budgets has resulted in staffing resources being stretched thin. Automating mundane tasks such as those related to data protection helps to decrease the administrative workload, thereby giving IT professionals a bit more free time that they can use to work on other things.

#### **4. Be Aware of Cloud Costs**

Early on, public cloud providers relentlessly marketed themselves as being the cheap alternative to running business workloads on-premises. Over time though, many of us have learned the hard lesson that operating in the cloud can be just as expensive (if not more so) as keeping workloads running in-house. This isn't to say that you can't save money by hosting a

workload in the cloud. Under the right circumstances, migrating a workload to Microsoft Azure can yield a significant cost saving.

The key to realizing actual cost savings by running a workload in the cloud is to understand that cloud providers such as Microsoft, Amazon, and others are not running a charity. Like any other business, their goal is to make money. Not surprisingly, it can be quite expensive to host a workload in the cloud.

If you want to avoid being surprised by the costs you'll incur, then you will need to spend a little bit of time learning how Microsoft bills its Azure customers.

A deep dive into Azure billing is well beyond the scope of this book, but we do want to take a moment and talk about data egress fees. These fees can have an enormous impact on the cost of your Azure backups.

Simply put, data egress fees are charges for data that leaves the cloud. These fees are not unique to Microsoft. Although the data egress fee amounts vary from one cloud provider to the next, most cloud providers do charge their customers a fee any time that data leaves *their* cloud. Presumably these fees were put into place as a way of discouraging customers from moving their cloud workloads to another provider, or moving those workloads back on-premises. Regardless of intent though, data egress fees can come into play when an organization creates or restores a backup.

Designing your environment with backups as a consideration can help avoid data egress fees. Utilizing of direct connect networks, keeping data within a region, etc. – in essence, staying within one cloud provider will lower the risk of incurring egress fees.

In case you're wondering, data egress fees vary widely based on the provider and on the volume of outbound data. As of the time that this book was written, Microsoft allows up to 5 GB of outbound data per month before any Azure data egress fees kick in. Once the 5 GB threshold is exceeded, the price for outbound

data is \$0.087 per gigabyte for the first 10 TB of data each month (Microsoft offers a discount for transfers larger than 10 TB). The pricing structure is documented at:

<https://azure.microsoft.com/en-us/pricing/details/bandwidth/>

Admittedly, \$0.087 per gigabyte doesn't sound like all that much money, but let's do some math. Suppose for a moment that you needed to restore 1 TB of data from Azure to an on premises VM. One terabyte is equal to 1024 gigabytes. Just to make things fair, let's assume that five gigabytes of data are going to be restored for free. This means that you would be billed for transferring 1019 GB of data. At \$0.087 per gigabyte, that works out to \$88.65.

While an \$88.65 charge probably isn't going to deplete your entire IT budget, remember that this figure is based on restoring a single terabyte of data. A large-scale data restoration operation can cost considerably more. Never mind the fact that there may be other charges related to the operation, such as fees related to storage IOPS.

As you plan for backing up your Azure data, it is important to either budget for data egress fees, or to structure your backups in a way that avoids these fees. Many organizations come up with several possible backup architectures, and then assess the cost of each one based on Microsoft's published billing rates.

## **5. Use Storage Tiers Effectively**

There are costs tied to the use of Azure storage. If you are going to be storing your backup data in the Azure cloud, then it is important to factor those costs into your backup strategy.

Aside from the previously discussed data egress fees, there are two main costs that you need to be aware of. First, there are capacity related costs. When you store data in the Azure cloud, you aren't purchasing storage, you're renting it. As such, Microsoft charges a fee each month for every gigabyte of storage that is in use. Suppose for example, that you were to

write a 100 GB file to the Azure cloud. You would be charged for 100 GB of storage each month, for as long as the file remains in the cloud.

The other type of charge to be aware of is a usage charge. Microsoft bills its customers for storage IOPS related to reading or writing data. Hence, the more frequently a piece of data is accessed, the higher the cost of keeping that data in the Azure cloud.

One thing to keep in mind is that Microsoft Azure storage is not one size fits all. There are actually several different types of Azure storage. Azure block blob storage, for example, is classified into tiers that include the Premium Performance tier, Hot tier, Cool tier, and Archive tier. Each of these tiers has its own unique performance characteristics, and its own pricing structure. The general rule is the “colder” the storage, the lower the cost/GB and the slower the restore time. Even so, it’s much less expensive than maintaining on-premises storage arrays. The best way to keep your cloud storage costs in check is to make effective use of the various storage tiers, balancing cost and performance.

## **6. Isolate Your Backup Data**

One of the most important things that you should do with regard to your Azure backups is to keep your backup data completely isolated from everything else. This is the only way to guarantee the integrity of your backups.

Early on, ransomware infections tended to target the Windows library folders (Documents, Pictures, etc.) for encryption. Over time though, ransomware evolved into something much more damaging. Modern ransomware variants still encrypt the Windows libraries, but they usually also encrypt the data found on network shares. There are even a few types of ransomware that are specifically designed to attack backups.

The one saving grace is that ransomware cannot encrypt data that it cannot access. That's great news if an end user happens to trigger a ransomware attack. However, if an administrator were to accidentally trigger a ransomware attack then the damage could be massive. After all, the ransomware will have access to everything that the administrator has access to.

That's why it is so incredibly important to keep your backups isolated. Backups often represent the only viable tool for recovering from a ransomware attack, short of paying the ransom. If the backup were to become a casualty of the attack, then the organization may be left with no choice but to pay the ransom.



There are no guarantees that you will be able to recover from a ransomware attack by paying the ransom. There have been many stories of people who have paid a ransom but were not able to decrypt their data. There are also stories of secondary attacks occurring days or even hours after a ransom is paid. The attacker knows that the victim has already paid the ransom once, and therefore encrypts their data a second time in an effort to extort additional money.

The trick to keeping your backups safe is to make sure that the backup data is not accessible from any of your standard user accounts. Instead, create purpose-built accounts that are used only for backup and restoration tasks. These should be the only accounts that have access to the data.

## 7. Utilize Multifactor Authentication

While we are on the subject of keeping your backups secure, be sure to take advantage of multifactor authentication. Even if you

don't want to require multifactor authentication on an organization-wide basis, you should enable it for any accounts that have access to your backup data. This will keep an attacker from being able to gain access to your backup data by performing a brute force attack against an account that has access to the data.

## **8. Use a Single Backup Solution**

Throughout this book, we have stressed the concept of location agnostics. Location agnostics is extremely important when it comes to backup applications. If a backup application is truly location agnostic, then it will be able to back up your data regardless of where it physically resides. There are massive benefits to having a location agnostic solution.

The most obvious of these benefits are that using a single solution to back up all of your data, regardless of its location, reduces costs and complexity. It's always going to be less expensive to manage a single solution than to juggle an entire collection of disparate backup applications.

What is more important however, is that having a backup application that is truly location agnostic gives you the flexibility to run business workloads in the location that makes the most sense. You might for example, have some workloads running on-premises in a VMware environment, other workloads running in a Nutanix environment at a secondary datacenter, and still other workloads running in Azure or another public cloud. Having a single cohesive backup solution that can work both on-premises and in the cloud, regardless of geographic location, hypervisor or cloud means that you can run your workloads where it makes the most sense to do so, without having to worry about how you are going to back them up.

Another way that such a solution helps organizations to be flexible is because it also greatly simplifies workload portability. You can restore or move on-premises workloads to the cloud or

bring cloud workloads back on-premises. Having this ability gives you a degree of future proofing, because you are no longer locked into using a specific cloud or platform. You can be agile and flexible enough to move workloads as your business needs dictate.

## **9. Avoid Complexity Wherever You Can**

The entire concept of data backups is really straightforward. You are creating a duplicate copy of a protected resource so that you have a way of getting your data back following some sort of catastrophe.

It really doesn't get much simpler than that. Even so, there are some extraordinarily complex backup solutions on the market today. While such solutions presumably work, it is usually better to go with a less complicated solution.

One reason for this is that a simple backup solution can be implemented far more quickly than a complex backup that requires extensive architectural planning. The reason why this matters is that the simple solution allows you to begin protecting your data right away, while a more complex solution may leave your data unprotected for a period of time during the implementation process.

A second reason why it is better to go with a simpler backup solution if at all possible is that excessive complexity is often the root cause of administrative mistakes. When it comes to something as important as your backup, you really don't want to be making configuration errors. The simpler a backup product is, the less chance there is that you will make a mistake when setting it up or using it.

## **10. Having the Ability to Restore Matters**

Obviously, the entire point of backing up your data is so that you can get that data back if something bad should happen. Not every data loss event is the same. Your backup solution needs to

be able to restore data in a way that aligns with the problem that you are trying to recover from. Imagine for instance that a user accidentally deletes a file from a file server. You shouldn't have to restore the entire file server just to get that one file back.

Make sure that your backup solution has granular restoration capabilities so that you can restore the minimum amount of data required to recover from the situation at hand. Ideally, you should be able to perform a restore job targeted at the following levels:

- Host Server (if operating on premises)
- Virtual Machine
- Application
- Infrastructure Component (such as the Active Directory)
- File

While the idea that there are different types of restorations may seem really obvious, some of the backup and data recovery tools that are available today force you into performing one specific type of recovery. Unless you have a backup solution in place that offers granular restoration capabilities, you may end up having to restore an entire system just to recover a file or an application.



## The Big Takeaways

With a market share estimated at just under 18%, and revenues of over \$5 billion (plus the fact that you've read this book), it's probably safe to say that your organization has some portion of its' operations in Azure and needs to protect it with backups.

The use of Azure, while likely maintaining some form of on-premises environment, can look like it will complicate the issue of backups. But, by getting back to the basics and looking past the buzzword-worthy data protection hype, there are some very concrete and, in some cases, rudimentary backup truths that can serve as useful best practices.

By putting the 10 backup best practices we've outlined into use, you'll be able to develop an effectual, cost-effective, and secure means of protecting your Azure investment.

## Vendor Sponsor Chapter – Veeam Backup for Microsoft Azure



Organizations dependent on Microsoft Azure for their operational needs must take steps to protect the data, applications, and virtual systems hosted there. But, doing this should align with all of the best practices outlined in this book to achieve expected levels of efficiency, cost-effectiveness, and

productivity you've come to expect from your on-premises backups.

So, the solution used needs to be designed with the cloud specifically in mind so that it can take advantage of all that Microsoft Azure has to offer. It also must simultaneously augment features in innovative ways to ensure the highest levels of data protection of everything important you maintain in Azure. You've no doubt seen the following grid outlining the shared responsibility model every cloud provider promotes today.



Source: Microsoft

Microsoft Azure fits the model in the SaaS, PaaS, or IaaS categories, depending on the service being used. But when thinking about this from a data protection perspective, regardless of the service Azure provides, the “information and data” are *always* your responsibility.

This is where Veeam Backup *for Microsoft Azure* comes into play.

## Veeam Backup *for Microsoft Azure*

This Azure-native solution provides organizations with the ability to use Azure VM snapshots for frequent recovery points

and reliable recovery of everything from a single file to an entire VM.



Veeam supports the backups of over 365,000 customers globally today.

This product touts some impressive Azure-centric features to deliver fast recovery, no matter the data loss.

## Azure-Native

It makes sense that since your organization is operating in the cloud, your backups of that environment should equally be both hosted and designed for the cloud.

Veeam Backup *for Microsoft Azure* meets this need by offering:

- **Rapid cloud-based deployment** – Veeam Backup *for Microsoft Azure* can be subscribed to and launched directly from within the Azure Marketplace. Data protection of your Azure VMs, applications, and data can begin in, literally, minutes.
- **Agentless** – We start with native Azure VM snapshots to allow for fast and frequent restore points and even faster recoveries. These snapshots can also be tiered off to Azure Blob for longer-term retention.
- **Automated efficiency** – Azure VM snapshot, backup and retention policies can be automatically configured and managed to ensure more reliable backups.

- **Fast and flexible recovery** – Sometimes you need an entire VM and sometimes you just need certain files. Veeam Backup *for Microsoft Azure* offers flexible full- and file-level restore options, allowing the organization to get back to work quickly.

## Cost-Effective

Storage in any cloud – even Azure – can get expensive if your use isn't managed. Microsoft Azure offers a number of storage tiers, each with lowered cost/GB tied with reduced response times and recovery speed. But, because some backups are needed for long-term retention while others are needed for instant recovery, cost-effective backups are only achieved when you can efficiently manage your storage use.

To assist, Veeam Backup *for Microsoft Azure* offers:

- **Optimized cloud costs** – Azure costs can be controlled while still optimizing your data protection with an industry-first built-in backup cost estimation tool. This helps avoid unexpected costs before they're incurred and ultimately lowers your bill.
- **Low-cost retention** - Azure VM snapshots can be easily backed up to Azure Blob object storage for lower cost, longer term retention.

## Secure

Backup data is still at risk of data theft, deletion, and ransomware encryption, so it's imperative that your backups in Azure are still secure.

Veeam Backup for Microsoft Azure ensures your backups are secure with the following features:

- **Isolated backups** – Isolate and secure backup data from production with support for cross-subscription and cross-region configurations.
- **Layered defense** – Protect backup data from security breaches and cyberattacks with support for multifactor authentication.

## Hybrid-Ready

- **Two-step portability** – The recovery or migration of any on-premises or private cloud workload into Azure is a simple two-step process with Veeam Backup & Replication, which can then continue to be protected through *Veeam Backup for Microsoft Azure*
- **Instant recovery anywhere** – *Veeam Backup for Microsoft Azure* gives you the flexibility to restore Azure VMs just about anywhere you desire; in-place, cross-region, or cross-subscription within Azure; as an on-prem VM within your data center; or into another cloud provider.

## Protect Your Investment in Azure with Veeam

Organizations today face the need to ensure their operations in Azure remain available and secure. Having an ability to quickly, flexibly, and cost-efficiently backup and recover Azure VMs and their data is an absolute necessity.

*Veeam Backup for Microsoft Azure* takes the native snapshot toolset offered by Microsoft and layers automation and multiple backup options to ensure data is reliably protected. Added intelligence like cost management and recovery flexibility enables organizations to achieve the highest levels of recoverability at the lowest total cost of ownership.

# Veeam Backup *for Microsoft Azure*

Native Azure backup and recovery to overcome  
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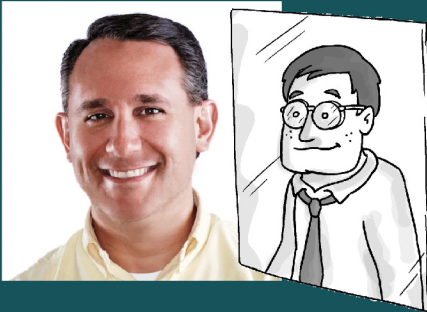
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# Quickly become conversational about Microsoft Azure backups.

It's probably safe to say that your organization's investment in Azure is backup-worthy, right? Microsoft offers native functionality to backup Azure VMs, but what's the best way to ensure you truly are protecting your Azure environment? We'll discuss ten backup best practices to help point you in the right direction.



## About Nick Cavalancia

Nick Cavalancia is a Microsoft MVP, a Technical Evangelist by trade, and is a 25+ year IT veteran who regularly speaks and writes for some of today's most recognizable companies.



## About Brien Posey

Brien Posey is a 14-time Microsoft MVP, a published author and conference speaker with 20+ years of IT experience, and a Commercial Scientist Astronaut candidate.



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