

10 Best Practices for Reducing Spend in Azure



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INTRODUCTION

When cloud computing services were introduced in the mid-2000s with compute and storage offered for pennies on the dollar, the world of IT changed forever. While prices have come down significantly over the years, many companies learned the hard way that moving to the public cloud didn't always achieve the cost savings they expected.

In fact, organizations have frequently noticed public cloud bills that are two to three times higher than expectations. Moving to the public cloud is a mistake. The public cloud provides huge benefits in agility, responsiveness, simplified operations, and improved innovation. The mistake is assuming that migrating to the public cloud without implementing management, governance and automation will lead to cost savings.

The first step to combating rising Microsoft Azure costs is to gain visibility across your entire organization's cloud spend. Once you've identified the areas of high and/or rapidly growing costs, use these proven best practices for cost reduction and optimization to make sure you are getting the most out of your cloud investment.



(1) Gartner, Innovation Insight for Dynamic Optimization Technology for Infrastructure Resources and Cloud Services, Donna Scott and Milind Govekar, 29 February 2016 “

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DELETE UNATTACHED DISK STORAGE

It's common to see thousands of dollars in unattached Disk Storage (Page Blobs) within Azure accounts. These are volumes that are costing money but aren't being used for anything.

When a Virtual Machine (VM) is launched, Disk Storage is usually attached to act as the local block storage for the application. However, when you terminate a VM, the Disk Storage remains active, and Microsoft will continue to charge the full price of the disk, despite the fact that the data is not in use.

Because of the dynamic nature of cloud computing, it's easy for users to quickly spin up and spin down workloads, but that means the risk of leaving behind unattached storage is high. By continuously checking for unattached Disk Storage in your infrastructure, you can cut thousands of dollars from your monthly Azure bill.



PRO TIP

Delete Disk Storage when it has been unattached for two weeks, as it is unlikely the same storage will be utilized again.

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DELETE AGED SNAPSHOTS

Many organizations use Snapshots on Blob and Disk Storage to create point-in-time recovery points to use in case of data loss or disaster. However, Snapshot costs can quickly get out of control if not closely monitored. Individual Snapshots are not costly, but the cost can grow quickly when several are provisioned.

A compounding factor on this issue is that users can configure settings to automatically create subsequent snapshots on a daily basis, without scheduling older snapshots for deletion. Organizations can help get Snapshots back under control by monitoring snapshot cost and usage per VM to make sure they do not spike out of control.

One B2B SaaS company found that among its millions of snapshots, a large percentage of them were more than two years old, making them good candidates for deletion.



PRO TIP

Set a standard in your organization for how many snapshots should be retained per object. Remember that the majority of the time, a recovery will occur from the most recent snapshot.

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TERMINATE ZOMBIE ASSETS

Zombie assets are infrastructure components that are running in your cloud environment but not being used for any purpose. For example, they could be VMs that were once used for a particular purpose, but are no longer in use and have not been turned off. Zombie VMs also can occur when VMs fail during the launch process or because of errors in script that fail to deprovision VMs. Additionally, zombie assets can also come in the form of idle Load Balancers that aren't being used effectively, or an idle SQL Database.

No matter the cause, Microsoft will charge for them as long as these assets are in a running state. They must be isolated, evaluated, and immediately terminated if deemed nonessential. Take a backup of the asset before terminating or stopping it to ensure you can recover it if the asset is needed again.

One customer had a nightly process to help its engineering velocity — loading an anonymized production database into a cloud database to use for testing and verification in a safe environment. The process worked well and saved lots of time for engineers. However, while the automation was good at spinning up new environments, the customer never made a plan for cleanup. Each night a new database VM was spun up, with the attached resources, and then was abandoned, eventually leaving hundreds of zombie resources.



PRO TIP

Start your zombie hunt by identifying VMs that have a Max CPU <5% over the past 30 days. This doesn't automatically mean this VM is a zombie, but it's worth investigating further.

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UPGRADE VMs TO THE LATEST GENERATION

In 2014, Microsoft introduced the next generation of Azure deployment, called Azure Resource Manager (ARM), or sometimes v2. This update gives you access to additional functionality like resource grouping, advanced tagging, role-based access control, and templates. While the prices for ARM and Azure Classic (Azure v1) are the same, the management improvements can drive significant time savings.

For example, using ARM, you can easily batch deploy new VMs from a JSON template, rather than deploying them one at a time. You can tag assets to more easily view them by line of business.

In addition to upgrading to ARM for improved management, for some VM types there is the option to upgrade to the latest version. While the new versions of Azure VMs have the same price points, they come with performance improvements that may enable you to run fewer VMs.

For example, upgrading a D-series VM gives you 35% faster processing and greater scalability for the same price point.



PRO TIP

Migrating from Azure Classic to ARM is a win-win for most customers. It not only provides performance advantages, but also access to additional features and better manageability. The process does not need to be a “big bang.” Since both Classic and ARM assets can now be managed in the same console, you can migrate workloads at your own pace.

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RIGHTSIZE VIRTUAL MACHINES

Rightsizing an Infrastructure as a Service (IaaS) offering such as VMs is the cost reduction initiative with the potential for the biggest impact. It's common for developers to spin up new VMs that are substantially larger than necessary.

This may be intentional, to give themselves extra headroom, or accidental since they don't know the performance requirements of the new workload yet. Over-provisioning a VM can lead to exponentially higher costs. Without performance monitoring or cloud management tools, it's hard to tell when assets are over- or under-provisioned.

It's important to consider CPU, memory, disk, and network in/out utilization. Reviewing these trended metrics overtime, you can make decisions around reducing the size of the VM without hurting the performance of the applications on the VM. Because it's common for VMs to be underutilized, you can reduce costs by assuring that all VMs are the right size.



PRO TIP

A good starting place for rightsizing is to look for VMs that have an Avg CPU < 5% and Max CPU < 20% for 30 days. VMs that fit this criteria are viable candidates for rightsizing or termination.

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RIGHTSIZE DISK STORAGE

Similar to VMs, Disk Storage can also be rightsized. Instead of looking at the dimension of CPU, memory, disk and network, the critical factors to consider with Disk Storage are capacity, IOPS, and throughput. As discussed earlier, removing unattached disks is one way to reduce the cost associated with Disk Storage.

Another approach is to evaluate which disks are over-provisioned and can be modified for potential cost savings.

Microsoft offers two types of storage that VMs can leverage: a standard storage performance tier, which can be purchased in three different levels of redundancy, and a premium storage performance tier, which is offered in three different sizes. The price difference between standard and premium disks can be as high as 3x, so it behooves you to pick the right storage for each workload.



PRO TIP

A good starting place for rightsizing is to look for VMs that have an Avg CPU < 5% and Max CPU < 20% for 30 days. VMs that fit this criteria are viable candidates for rightsizing or termination.

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RIGHTSIZE SQL DATABASES

Similar to rightsizing your IaaS, Azure customers also need to rightsize their platform-as-a-service (PaaS). Azure SQL Database is a PaaS offering that is used by many developers to manage their applications.

It's important to evaluate how well your SQL Databases are being utilized in terms of the workloads you are running on them. The critical factors to take into consideration are Database Transaction Units (DTU), Database Size, and Capacity.

SQL Databases are purchased through a DTU-based model, which is a blend of compute, memory, and IO resources. There are three service tiers, Basic, Standard, and Premium. The Basic tier is used primarily for development and testing. The Standard tier is suitable for applications that service more than one user at a time. The Premium tier is for applications with a high-performance level and many simultaneous requests. Naturally, there is a price difference within the three tiers, and the database sizes within those tiers.

As a best practice, you should rightsize to the lowest cost SQL Database that meets your performance requirements.



PRO TIP

Commonly you will not need to rightsize Basic SQL Databases because they are already offered at a low price and are mainly used for development or testing.

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STOP AND START VMS ON A SCHEDULE

As previously highlighted, Azure will bill for a VM as long as a VM is running. Inversely, if a VM is in a stopped state, there is no charge associated to that VM. For VMs that are running 24/7, Microsoft will bill for 672 to 744 hours per VM, depending on the month. If a VM is turned off between 5pm and 9am on weekdays and stopped weekends and holidays, then total billable hours per month would range from 152 to 184 hours per VM, saving you 488 to 592 VM hours per month.

This is an extreme example, as having flexible workweeks and global teams means that you can't just power down VMs outside normal working hours. However, outside of production, you'll likely find many VMs that do not need to truly run 24/7/365.

The most cost-efficient environments dynamically stop and start VMs based on a set schedule. Each cluster of VMs can be treated a different way.



PRO TIP

Set a target for weekly hours that non-production systems should run. One large publishing company set that target at less than 80 hours per week, which is saving them thousands of dollars a month.

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BUY RESERVED VIRTUAL MACHINE INSTANCES AND OPTIMIZE

Purchasing Microsoft's Azure Reserved Virtual Machine (VM) Instances is an extremely effective cost saving technique.

Azure Reserved VM Instances allow you to make a 1 or 3 year upfront commitment to Microsoft to utilize specific virtual machine instance types. In return, you get a discount on your compute costs and prioritized capacity. Reservations can save you up to 72% compared to pay-as-you-go pricing, so they're a no-brainer for any company with sustained virtual machine usage.

One common misconception around RIs is that they cannot be modified. This is not true! Microsoft allows customers to modify reservations in the following ways:

- Changing the Scope from Single Subscription to Shared, or vice versa.
- Exchanging Reserved VM Instances across any region and series.
- Cancelling your Reserved VM Instances at any time for an adjusted refund.

It's critical to not only purchase reservations but also continuously modify them to get the most value. If a reservation is idle or underutilized, modification means the Reserved VM Instance can cover on-demand usage to a greater degree. This ensures that the reservations are operating as efficiently as possible and that savings opportunities are being maximized.



PROTIP

Microsoft allows you to achieve a greater cost savings (up to 82%) by leveraging Reserved VM Instances combined with the Azure Hybrid Benefit. The Azure Hybrid Benefit covers the cost of the Windows OS on up to two virtual machines per licence, so you only have to pay for the base compute costs.

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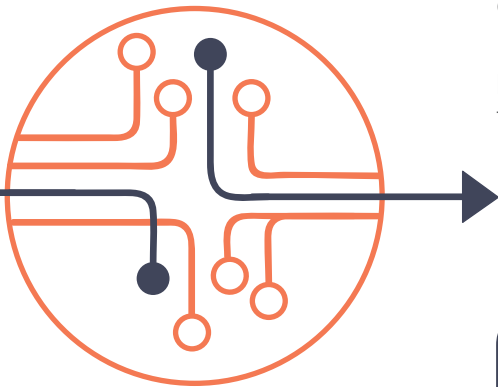
MOVE OBJECT DATA TO LOWER-COST TIERS

Microsoft offers several tiers of Storage at different price points and performance levels.

The best practice is to move data between the tiers of storage depending on its usage. There are two dials you can adjust when it comes to Azure storage: redundancy (how many copies are stored across how many locations), and access tier (how often data is accessed).

Microsoft allows customers to mix and match across four redundancy options and three access tier options to create the right solution. For example, Cold Locally Redundant Storage (LRS) is ideal for long term storage, backups, and disaster recovery content, while Cold Geographically Redundant Storage (GRS) is best suited for archival.

A best practice is that any objects residing in a Hot tier that are older than 30 days should be converted to a Cool tier. Depending on redundancy levels, the Hot tier is based on the amount of content stored starting at \$0.0184 per GB per month, the Cool tier prices are a flat price of \$0.01 per GB per month, and the Archive tier is available at an even lower price of \$0.002 per GB per month.



PRO TIP

A best practice is that any objects residing in a Hot tier that are older than 30 days should be converted to a Cool tier.

CONCLUSION

It's important to remember that these best practices are not meant to be one time activities, but ongoing processes. Because of the dynamic and ever changing nature of the cloud, cost optimization activities should ideally take place continuously.

Learn more about how you can help you automate the continuous optimization by visiting www.vastITservices.com

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