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4 Azure Considerations To Reduce Costs

How planning, deploying, monitoring and optimizing is essential for maximizing savings

Adam Bertram

Microsoft MVP

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Modern organizations lead the way in cloud-centric deployments, often driven by an organizational mandate or technological need. Cloud computing offers the fastest route to innovation and comprehensive security for any organization needing to keep pace with an ever-increasing competitive landscape and rapidly evolving security threats. Microsoft Azure's constant product releases, broad feature set and excellent cost-management options combine to create a powerful cloud platform used by hundreds of thousands of businesses across the world.

As with any cloud provider, determining a cost-effective infrastructure is crucial to a successful Azure deployment. Ease of scalability gives way to rapidly increasing costs, both direct and indirect, if not carefully managed. Having the ability to control and predict cloud cost is key to any IT organization's cloud success. When done correctly, cloud adoption should lead to significant cost savings and increased agility.

In this guide, we discuss four steps to controlling cost with Azure, while getting the best of all the available offerings and features. For organizations newly adopting cloud and those that have had a cloud-first approach for some time, proper planning, deployment, monitoring and optimization will ensure success in utilizing Azure.

I. In-depth planning

Proper planning is critical to ensuring a successful deployment from an on-premises environment to the Azure Cloud. Whether your organization is planning to fully migrate to the cloud, utilize a hybrid cloud model or just introduce limited workloads, several steps are necessary for success. Cloud adoption frameworks provide a series of guidelines to inform a successful cloud journey:

- Comprehensive requirements gathering
- Cost estimation
- Constraint and budget thresholds
- Opportunities for shared assets
- Governance strategies

Focusing on long-term support and growth must be fully considered while planning. Not only will an eye to the future help decrease technical support needs, but this focus will allow adequate planning for cost increases. The flexibility inherent in the cloud is also one of the most difficult hurdles in planning a cloud adoption.

Comprehensive requirements gathering

Many organizations may not have in-depth documentation around business processes and how they drive the technology around them. This step is typically the most time-consuming part of planning. Learning exactly how each business process works and interacts with technological resources is critical to determining if moving a resource to the cloud makes sense and how it will be affected.

Not only does one need to consider the technical requirements, such as compute resources, disk space and networking needs, but also the compliance and regulatory considerations, resource availability and integration with other business workflows.

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Cost estimation

Once you have a comprehensive set of documentation as to the technological and business process needs of your organization, you can then start to consider what the associated costs and benefits may be to migrate that workload or even reimplement that workload in the cloud. Some of the various considerations beyond traditional compute and storage needs are:

- Backup costs, portability and space
- Bandwidth for the initial transfer of resources and ongoing needs
- Load balancers, application gateways and scale-related features
- License costs for Azure AD (if premium) and Office 365 users
- VM licenses such as Microsoft SQL and Microsoft Windows
- Development environment resources
- Continuous Integration/Continuous Deployment (CI/CD) costs

Other than maintenance agreement costs for purchased hardware on premises, most cloud resources do have a recurring use cost. When compared to the traditional capital expenditure model, cloud service operational costs may be spread over multiple years. Resources are relatively affordable when used for short periods of time, but if not carefully managed, may lead to cost overruns.

Constraint and budget thresholds

Most organizations do not have an unlimited IT budget. Azure makes it easy to deploy a resource and, correspondingly, easy to go over budget. However, Azure also makes it easy to plan for and control your cloud costs with "learn at your own pace" Azure Cost Management tools

Also, when you think budget, actual monetary amounts may come to mind, but that is not the only budget to consider. The human capital budget is important as well, as this will help you to utilize your team to its fullest with the resources available:

- Consider the budgets for each business unit and how they play into specific resources
- Determine at what point there should be budget alerts, to whom and what actions should be taken
- Resources that scale need to have constraints to avoid uncontrolled growth and cost

Different Azure services and offerings, when comparing cost versus feature value, may not be equal. To this end, it is important to strategically consider both the features available and the costs associated to choose those that offer the best value for your organization.

Opportunities for shared assets

Similar workloads are attractive targets for utilizing shared resources. If a resource does not need a dedicated instance either for security, segmentation or performance needs, then costs can be driven down by using a shared compute, storage or application instance. By identifying workloads that fit these criteria, consolidation can save on resources used.

Consolidation by sharing virtual machines is not the only way to reduce cost. When considering container-based deployments, you may find that a dedicated management platform, such as Azure Kubernetes Service, will optimize placement and utilization, allowing you to maximize your investment.

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Governance strategies

With the flexibility afforded to IT workers, cloud can quickly become the wild west. With a proper governance plan and strategy put into place in advance, you can control the unconstrained spread while still allowing the freedom to innovate and control costs at the same time. Azure Policies allow an organization to control what resource types, sizes and features are available to an IT worker. Additionally, utilizing resource tagging lets those resources be grouped and associated with various teams, resource types and projects to report and control costs. Not all resources can be tagged, and tags are not inherited, so it is important to ensure that a proper tagging strategy is implemented.

II. Implementation and deployment

With a proper plan in place, the next step is the deployment of the necessary resources. Whether your organization is focused on fully moving to the cloud or simply starting small, there are considerations for pricing and flexibility that will make a big difference further down the road. There are several different options available for compute, disk and databases that can drastically reduce costs.

Compute resources

Cloud-based virtual machines are one of the most commonly used cloud resources and likely one of the first things considered by many IT professionals. If it's necessary to deploy VMs, Azure offers a few cost-saving measures:

- Reserved Virtual Machine Instances — By purchasing a set number of years for a given resource ahead of time, an organization can take advantage of a lower cost.
- Spot Pricing — Certain machines do not need to exist all the time, and if that's the case, spot pricing can be used to purchase unused compute capacity at significant discounts. Your application will need to be resilient to potential shut-offs, but if this is true, large cost savings can be achieved.
- Dev-Test Pricing — For organizations that have a robust development and testing environment, utilizing discounted rates for those environments helps to keep costs down as these machines are typically short-lived and under-utilized.

Containers and Platforms as a Service (PaaS) are also becoming very popular for their flexibility and ease of use. Azure Kubernetes Service (AKS) is a go-to for container orchestration, and, by moving workloads to containers, organizations find cost savings by packing resources more tightly together and leveraging modern microservice architectures. PaaS offerings, such as App Services, mean that the traditional management burden of a web server is lessened. Organizations that migrate existing websites to App Services will not utilize a traditional VM and potentially will save on both management time and cost itself.

Leverage Azure Storage Tiers

Underpinning a cloud environment's computing capability is the need to store large amounts of data. You may not always require the fastest disks or solid-state drives, therefore spending time to plan the appropriate storage types needed can save money. This is especially apparent as an organization's data storage needs grow and you find that certain types of data fit on specific storage tiers best.

A few features of Azure Storage make this an attractive option for secure transfer and storage of data. With private endpoints, you can securely allow a client to access the storage data over a private link. This limits exposure from the public internet and enhances control of the storage access.

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Azure Storage pricing

There are several types of storage available in Azure, but two types that typically meet most needs are Managed Disks and Blobs.

Managed Disks are a traditional storage medium, equivalent to an additional hard drive installed on a physical server. These expandable disks come in several different tiers. Depending on what type of disk speed you need, you can choose from several tiers:

- Premium SSD
- Standard SSD
- Standard HDD
- Ultra Disk

When talking about disk speed, we typically mean IOPS, the number of input or output operations performed per second. The different tiers of managed disks come with different guaranteed IOPS and can directly impact application performance. Premium SSD sizes smaller than P30 offer burstable IOPS and bandwidth, which can significantly improve VM boot times and application performance. This type of bursting is independently available at the VM level and at the disk level. If you have one enabled, the other is not necessary. Both use an accumulating bucket of IOPS credits to use throughout a given day. Once that bucket has been exhausted, the performance reverts to that of the base disk type and will need to accumulate again before use, which could negatively impact the performance of an application or a VM.

Azure Blob may make more sense when you have large amounts of data to be stored. This data may not need to be accessed all the time, or it may need to be easily shared across multiple resources. Backups are a typical use case for Blob storage. This type of storage is equivalent to an AWS S3-type object and metadata storage file system. Blob storage comes in several tiers as well that will affect the pricing and speed of access:

- Premium
- Hot
- Cool
- Archive

Azure Blob storage cost is determined by the average daily amount of data stored, in gigabytes (GB), over a monthly period. For example, if you were to use 20 GB of storage for the first half of a month, but none for the second, you would be billed for the averaged 10 GB of usage. If you delete from the Cool and Archive tiers after 45 days, then you will be charged an early deletion fee for 135 (180 minus 45) days of storage, so plan accordingly.

For both File Storage and Block Blob storage, you have options regarding redundancy. Whether you choose locally redundant storage (LRS) or geo-redundant storage (GRS) can dramatically impact cost, often double or triple the cost. You gain increased protection and uptime with GRS, but at a higher cost. You have the ability to change between available replication settings at any time, but there is a cost going from LRS to any other type of replication with egress bandwidth charges.

A non-obvious cost to account for is the Blob storage application programming interface (API) costs. For read, write, list and create operations, there is a cost per 10,000 transactions. With a high volume of object operations, this may be an unexpected cost to plan for. If Blob storage is used strictly for infrequently accessed data with large single objects, you may find that the API cost is negligible.

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Keep in mind that if you retrieve data from Cool or Archive tiers in less than 30 and 180 days respectively, you can incur additional charges. These storage locations are intended to be longer-term and cheaper storage.

SQL Elastic Pools

SQL Servers can quickly become expensive. The traditional model of one server per production database can explode in cost, especially with licensing requirements. A scalable solution exists that can dramatically save in costs, SQL Elastic Pools, which are shared compute and storage resources between contained databases that will efficiently use all of the provisioned resources.

By imposing resource usage limits, you can further optimize and restrict databases from abusing resources and negatively impacting other databases. The price of the pool is based on the amount of configured resources and independent of the database counts. This type of setup is also ideal for hosting customer databases instead of the one server per database approach.

As an example, consider that we have 30 customers, each with a database instance. Purchasing the cheapest 5 DTU plan at about $4.8971/month will end up costing about $147 to contain the customer databases. Moving to Elastic Pools, you can get a 50 DTU plan for $73, which can handle up to 100 databases. This will save roughly half the cost, and you can limit the resources used by any individual database to restrict negative impacts across the entire pool.

Serverless with Azure Functions

Many organizations are taking advantage of new "serverless" abilities. The ability to run code or applications without an organization needing to manage the underlying infrastructure leads to quicker adoption and development. Azure Functions offers the ability to write code in C#, Java, JavaScript, Python and PowerShell and to run code on-demand or on a schedule.

Utilizing a pay-per-use pricing model, you only need to pay for the time spent running the code. With 400,000 GB/s (gigabyte seconds based on memory usage) and a million executions free, the consumption plans offer a way to get started with minimal cost.

Optimize backup solutions

As noted in the section about storage tiers, using Blob storage for backups can cut down on costs, especially when using Cool and Archive tiers. This type of storage is not usually used for full-VM snapshots that need to be restored quickly in the event of a failure. Microsoft Azure does offer a backup service that will assist in making sure that each VM has a proper snapshot taken. This is based on a fixed cost per VM plus the cost in storage consumed.

To ease the cost of backups, which are a critical necessity in any business environment, third-party solutions like Veeam® Backup *for Microsoft Azure* can be used to save on the cost of backing up a large number of VMs or when data needs to be retained for lengthy periods. For example, Veeam offers 10 VMs for free via a cloud-native backup process built for Azure. You can even proactively see how much the backup policies you're creating are going to cost before you implement them, thanks to the built-in cost calculator.

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Additionally, Veeam uses a cloud-agnostic file format that allows for data portability. One non-obvious benefit to this backup process is that you can leverage Veeam to automatically move on-premises machine backups into the cloud. In the event of your on-premises site suddenly becoming inaccessible, with the data portability and cloud-native solutions, you can utilize Veeam backups to quickly spin up your environment via your previously created backups!

You may not think about the backup needs of containers as much due to their ephemeral nature, but there are often stateful containers in a Kubernetes cluster and associated configurations and metadata. Comprehensively backing up all of the components together to be able to quickly restore the entire environment is difficult. Kasten K10 by Veeam, as an example, offers the ability to back up every aspect of your Kubernetes cluster. Additionally, defining appropriate policies and resource discovery ensures proper governance and that no resource is missed.

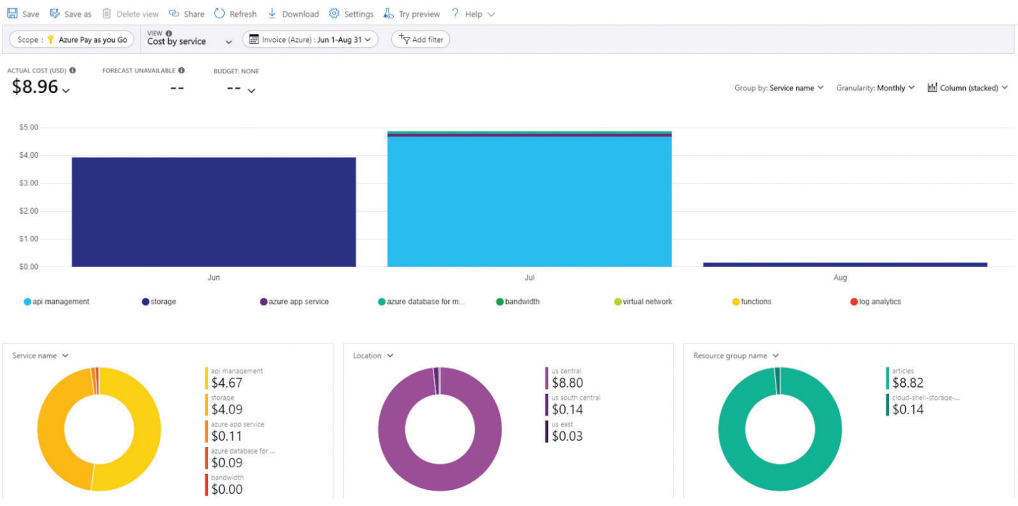
III. Monitoring the environment, costs and trends

Now that your environment is up and running successfully, an organization needs to make sure that every resource is monitored and accounted for and cost trends are identified. Azure offers several different solutions to view and report on the cost of resources.

Pay attention to Azure Cost Management dashboard

Ultimately, the only way to truly understand where and how you are using resources and their associated costs is to use a dashboard to visualize where the most money is being spent. Azure Cost Management provides a comprehensive look at your organization and its resource usage patterns. This includes costs both by Azure services and also by third-party Marketplace products.

Since there are so many ways to calculate cost within Azure, having a cost accounting solution that takes into account reservations and Azure Hybrid Benefit discounts will help you make smart decisions regarding the resources in use.



Azure Cost Management dashboard

Also, you can easily export data as CSV into other accounting and budgeting systems. However, you may not need to with the built-in advisor recommendations, budgeting and cost alert functions that can be set up to prevent and anticipate cost overruns.

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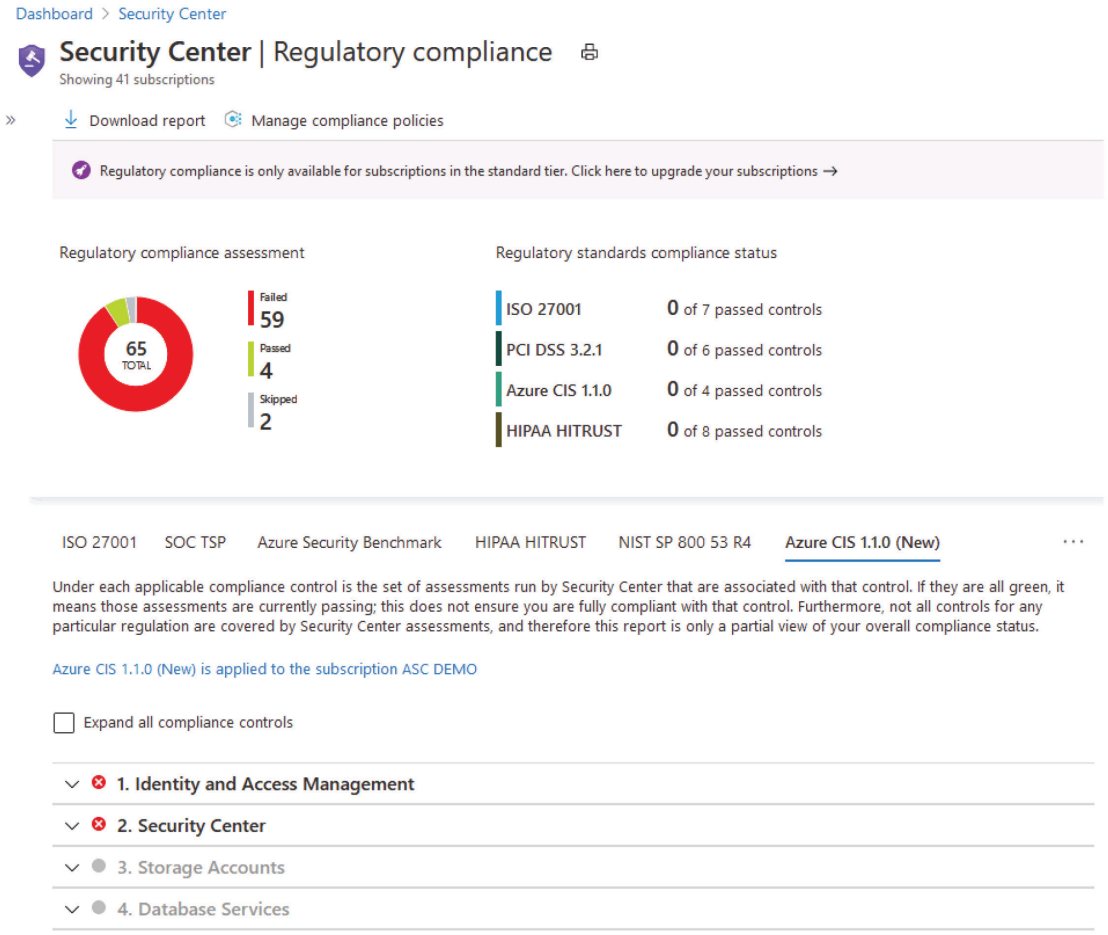
Regulatory and compliance monitoring

Just as important as managing cost is managing any regulatory and compliance needs that your organization may have. Contained within Azure Security Center is the regulatory compliance dashboard that will help you to identify and assess compliance with standards such as ISO 27001, PCI DSS 3.2.1, Azure CIS 1.1.0 or HIPAA HITRUST.

Proactively monitoring compliance with critical regulatory standards ensures that the proper security measures are in place and can save on costly headaches and compliance work in future audits.



Azure Compliance Center. Source: https://docs.microsoft.com/en-us/azure/security-center/security-center-compliance-dashboard

IV. Optimizing the environment and cost

With the fluid nature of many cloud environments, it's important to continuously evaluate the needs, performance and utilization of your environment. Once opportunities for scaling have been identified, you can

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take further action. Depending on the types of resources in use, different classes of resources or shifts to PaaS may be warranted.

In larger environments, there are often many workloads in use. With so many VMs, it can be difficult to know if there are opportunities to consolidate or decommission resources. One tool that can be useful for discovering services that are not heavily used is the Monitor Service. Utilizing the Virtual Machines Insight section, you can find aggregated data on VM utilization and discover VMs that use the most resources or the least.

With the right monitoring strategies in place, you may find that you can take further steps, such as resizing VMs, or that certain applications that traditionally have been placed on a virtual machine should be containerized and costs further reduced.

Similarly, to locate storage account savings, the Monitor Storage Accounts Insights section provides an analysis of the transaction amounts and used capacities over a specified period to highlight saving opportunities. This tool assists in locating which accounts are no longer needed and which accounts can be consolidated.

An often overlooked approach to managing resources is an effective tagging scheme. By smartly tagging in-use resources, it can be easy to locate those resources that may be targeted for decommissioning. Additionally, with tagging, reports can be built to manage resource life cycles.

Using Azure to control cloud cost

Despite its simplicity and benefits, cloud services can quickly add up in cost if not closely watched. By going over the steps contained within this guide and utilizing tools such as the Azure Cost Management portal, you can maximize your use of Azure resources while simultaneously reducing costs. By deploying resources wisely, you can leverage the innovation and agility cloud has to offer, while saving costs when compared to traditional environments.

With the proliferation of services and increasing functionality available to cloud service users, it is often tempting to use every available service. With this ease of use comes added cost. With the right tools and smart management, you can quickly take control of your environment and make cost-efficient decisions!

When it comes to cost, compliance and risk, data protection and mobility is a key part to any cloud strategy.

Learn more
www.veeam.com/microsoft-cloud-solutions.html

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About the Author

Adam Bertram is a 20+ year veteran of IT and an experienced online business professional. He's a consultant, Microsoft MVP, blogger, trainer, published author and content marketer for multiple technology companies. Catch up on Adam's articles at adamtheautomator.com, connect on LinkedIn, or follow him on Twitter at @adbertram.

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