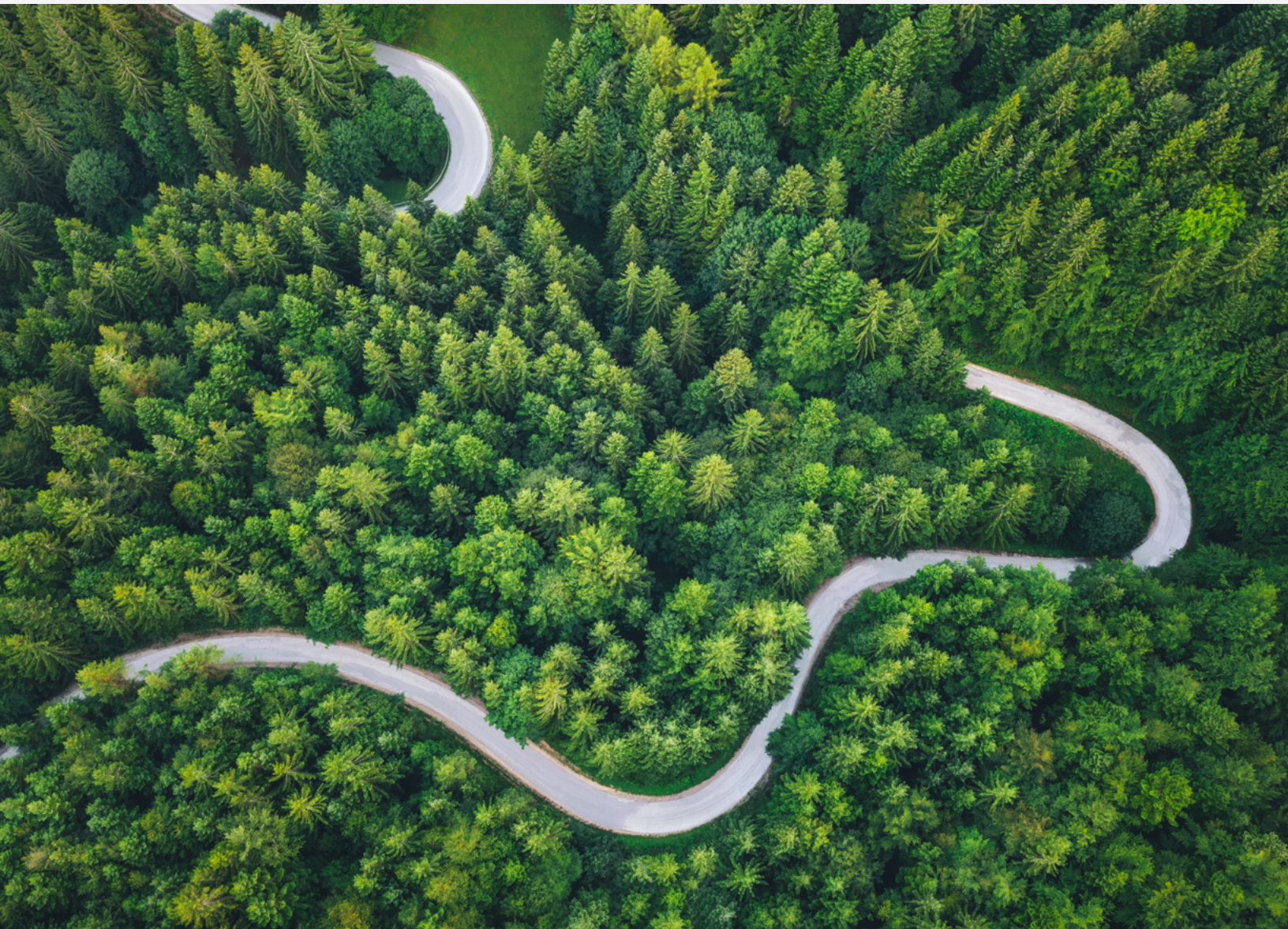Microsoft Azure

Managing Costs in Azure

An executive summary of techniques to
tame your monthly Azure infrastructure bill

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Azure Cost Governance

Efficiency is key to every modern system, including the technologies that power our applications. As we continue to move toward cloud computing, it becomes clear how flexibility and pay-per-use models are crucial to meeting the evolving needs of an organisation. Cloud efficiency comprises three key components: cost, carbon and energy. By optimising these components, organisations can create sustainable applications that are both cost-effective and environmentally responsible.

Azure cost efficiency is one of the most important aspects of cloud computing, and it is imperative to understand your spending. By knowing how systems and applications work, organisations can implement design, infrastructural and architectural changes to keep costs down while maintaining their service-level agreements (SLAs). Understanding the carbon impact of cloud infrastructure, reducing costs and optimising energy can make your applications greener and more cost efficient.

Why cloud efficiency?

do more with less

More innovation
More agility
More resilience

Less complexity
Less time
Less cost

Less consumption of resources
Compute storage network

Use less hardware
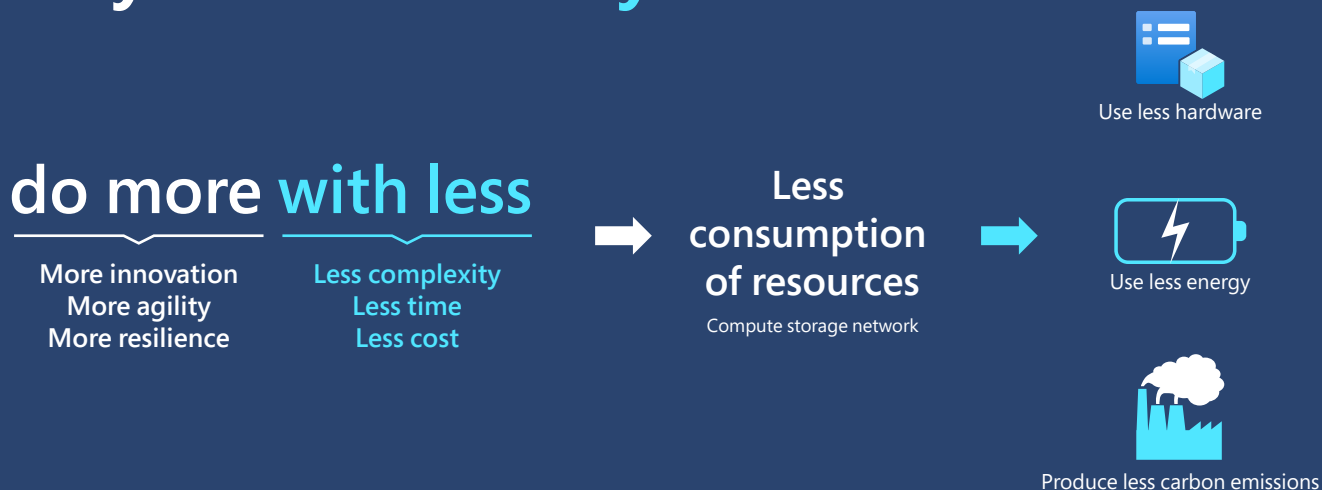
Use less energy

Produce less carbon emissions

Figure 1: Components of cloud efficiency

Migrate to Azure and reduce costs

Cloud efficiency is the ability of cloud computing systems to perform computing tasks using minimal resources, with techniques such as [virtualisation](#) and workload management. This is exactly what the Azure cloud does; infrastructure is composed of virtualised shared resources and organised by resource groups to better manage operations and costs.

Green software is a software designed to minimise its environmental impact, using less energy, generating less waste and reducing its carbon footprint. This is achieved by optimising and automating efficient cloud infrastructure, supporting old user devices and optimising energy usage. Migration to Azure is an excellent first step toward reducing costs, and cloud efficiency should be the main target for public cloud operations.

Combining cloud efficiency and green software helps reduce the carbon footprint of applications. Starting with the cost savings that come from resource optimisation, cloud efficiency takes cost efficiency one step further by adding carbon and energy

optimisation. Optimising infrastructure and applications for cost and carbon means not only lowering Azure spend, but also quantifying the carbon emission reduction during the cost optimisation process.

The easiest and quickest way of establishing a cloud efficiency process, is of course starting with cost governance, as the savings from resource optimisation will fund carbon optimisation sprints. Over the past years, all the efforts and guidelines over cost optimisation converged into financial operations (FinOps), a set of practices and principles that help organisations manage and optimise their cloud spending by bringing together finance, operations and engineering teams to collaborate on cloud cost management.

There are four pillars of a successful cost governance process: right-sizing, clean-up, reservations/savings plans and database/ application tuning.

Let's take a look at each of these pillars and see how they can be embedded in a recurring cost governance process.
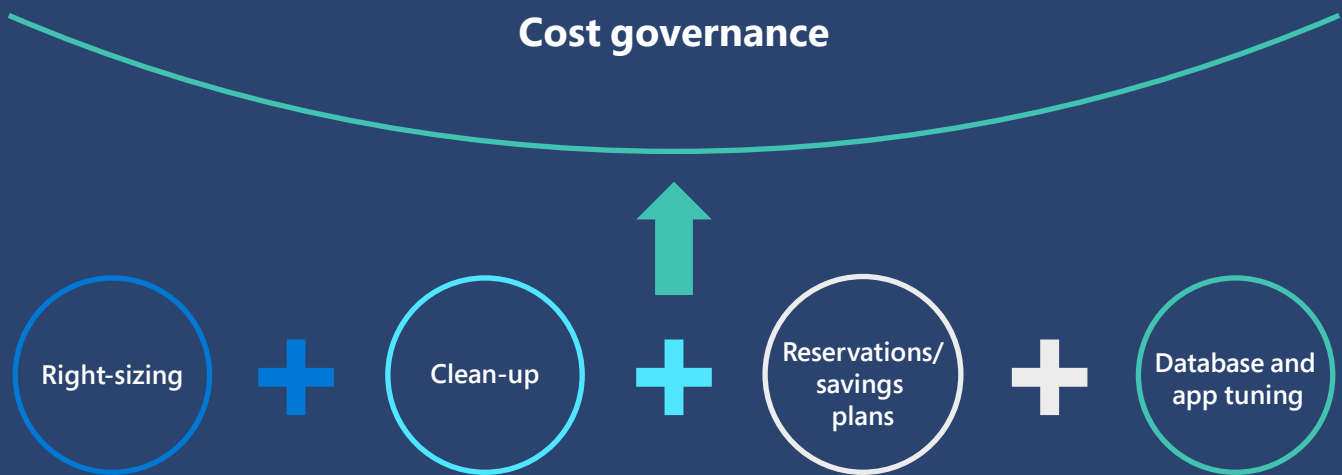
Cost governance

Figure 2: Pillars of a successful cost governance process

Right-sizing

In cloud computing, resources are provisioned in a variety of sizes and tiers to match the specific needs of each application. The pay-as-you-go model is a key element of cost governance and the opposite of how on-premises data centres were sized and paid for. In Azure, the flexibility offered allows organisations to add and remove resources when needed. This is the first step in the cost governance process; the process balances performance and spending, helping organisations save money and meet their internal SLAs efficiently.

Clean-up

Clean-up operations are an important part of cloud cost saving. While dealing with heavy workloads and complex projects, resources are created as a transitional step and often forgotten about, but still paid for. Cleaning up unused items once is a short-term, quick-win technique for saving costs. Making clean-up a recurring process not only lets organisations periodically uncover unassigned or unutilised resources, but it also helps discover gaps in operational processes that have a wider impact than just costs. Planning for periodic assessments rids infrastructure of ghost resources and improves overall technical debt management operations.

Azure reservations/Azure savings plan for compute

Azure savings plan for compute is a flexible pricing model that unlocks significant savings when you commit to spend a fixed hourly amount on select compute services for one or three years. Microsoft recommends using savings plan for dynamic workloads and **reservations** for stable workloads and when organisations have a clear idea of their future requirements.

This may not always be possible; some organisations embark on long migration projects. In those cases, to make the most of reservations and savings plans:

- Normalise the reserved resources as much as possible.
- Use the most consistent workloads as a base figure.
- Track all workloads daily.
- Add reservation and savings plans when workloads have been identified as stable or dynamic.

> ⓘ
> Users can save even more when they apply their existing Windows or SQL Server licences to an Azure resource, like a virtual machine (VM) or a SQL database, using **Azure Hybrid Benefit**.

Database and application tuning

Optimising databases to make applications leaner and faster can reduce costs by downsizing the original infrastructure.

Application modernisation leads to optimisation of an application's database. In turn, this optimises the application, allowing downsizing of the resources the application needs. With that time and money saved, organisations can begin the process of modernisation again. As shown in Figure 3, this process is continuous, and it optimises costs, innovation and modernisation efforts.
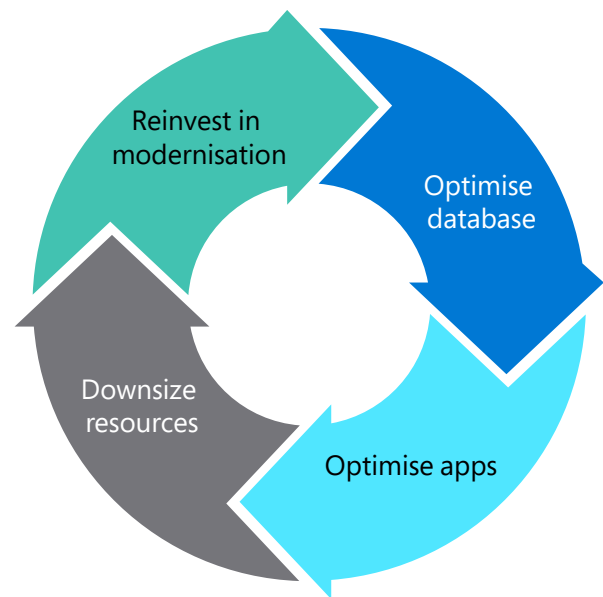

Figure 3: Application optimisation process

Techniques for reducing costs in Azure

There are several techniques organisations can implement to optimise their Azure costs and reduce bills while maintaining the quality of their services:

- Use Microsoft Cost Management tools such as **budgets**, **tags**, **alerts**, **exports**, **on/off policies**, **autoscaling** and **cost allocation**.
- Access **Cost analysis**, using filters and grouping, to understand resource spending.
- Identify unattached objects and enforce snooze/delete policies.
- Work with **Azure Advisor** to periodically check on VM usage and gradually modify the desired usage.
- Use **policies** to enforce allowed/non-allowed stock-keeping units (SKUs).
- Check whether you can swap storage tiers to cold storage for your low performing data.
- Ensure reservations and savings plan usage is close to 100%.
- Check backups and delete old versions or move them to cold storage tiers.
- For a **BCDR** policy, check the region-to-region communication for duplicates or wasted resources.
- Define **purge policies for logs**, to avoid accumulating useless data.

Competitive benefits

To optimise cloud costs, implement practices that prioritise efficient resource usage:

Automation

Use Azure automation tools and processes to manage and optimise your cloud resources, including automated scaling, resource scheduling, cost alerts and budgets.

Monitoring

Continuously monitor resource usage with the intent of keeping it right-sized to match the requirements and avoid overprovisioning and wasted resources.

Serverless/microservices

Use serverless architectures to eliminate provisioning and managing servers and infrastructure, which can significantly reduce costs and improve scalability and efficiency.

Cloud-native

Cloud-native architectures and design principles, such as microservices and containers, allow greater flexibility, scalability and efficiency.

This improves the performance and operational efficiency of applications and establishes a cost-awareness culture in teams, leading to sustained cost savings in the long term.

When using cloud resources, use monitoring tools to recognise and track sudden usage spikes that can result in additional costs.

These spikes can mean unexpected traffic, misconfigured services or scaling, issues with one or more resources or unoptimised code. **Cost Analysis** is the starting point; it can analyse an organisation's daily spend and immediately alert any new trends. Once the spikes have been identified, the next step is to drill down and discover the cause and act immediately to mitigate them.
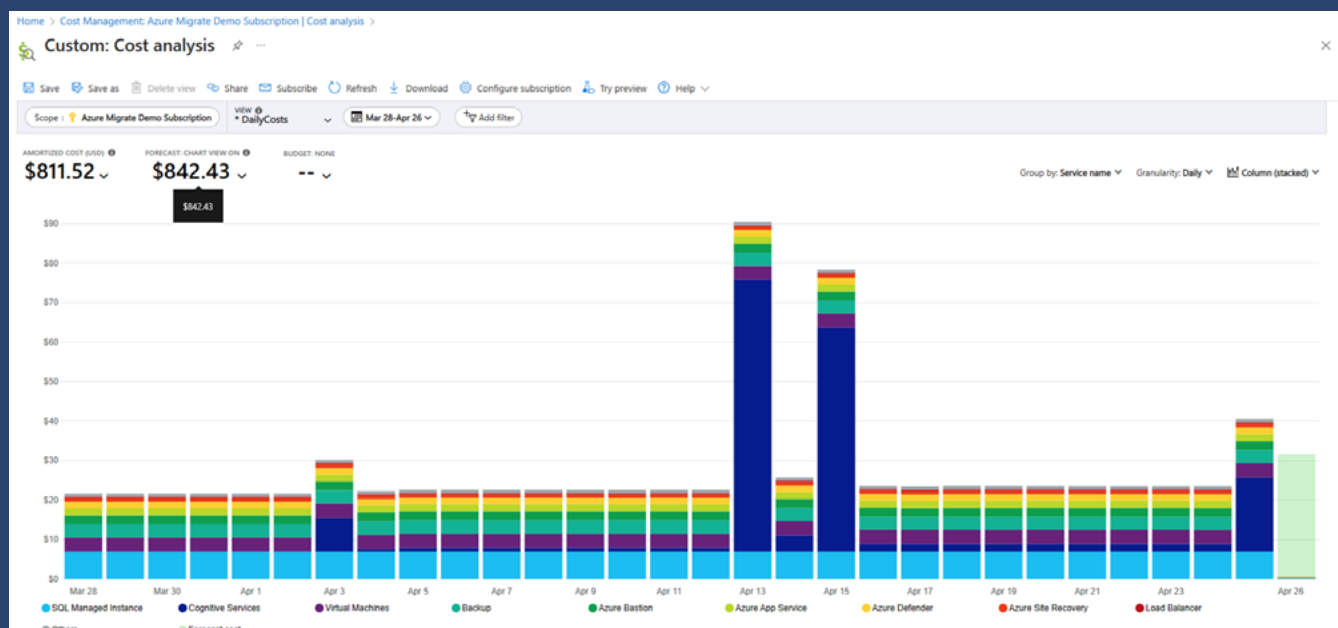

Figure 4: Cost analysis

Cloud cost management and carbon opti-misation overlap in many ways. Minimising application costs involves reducing unnecessary energy consumption, which lowers carbon footprint. By saving on public cloud resources that are shared, organisations can make an informed decision and wisely use exactly the services they need, without any waste. They can choose Azure cloud regions where the energy and power usage effectiveness (PUE) are cleaner and greener. They can also run your workloads more efficiently; choosing whether to run one less efficient application or five efficient applications using the same green resources to get most out of the cloud migration.

Optimising the cloud improves not only your bottom line, but also every other metric:

Efficiency

Response time

Performance

User experience

Scalability
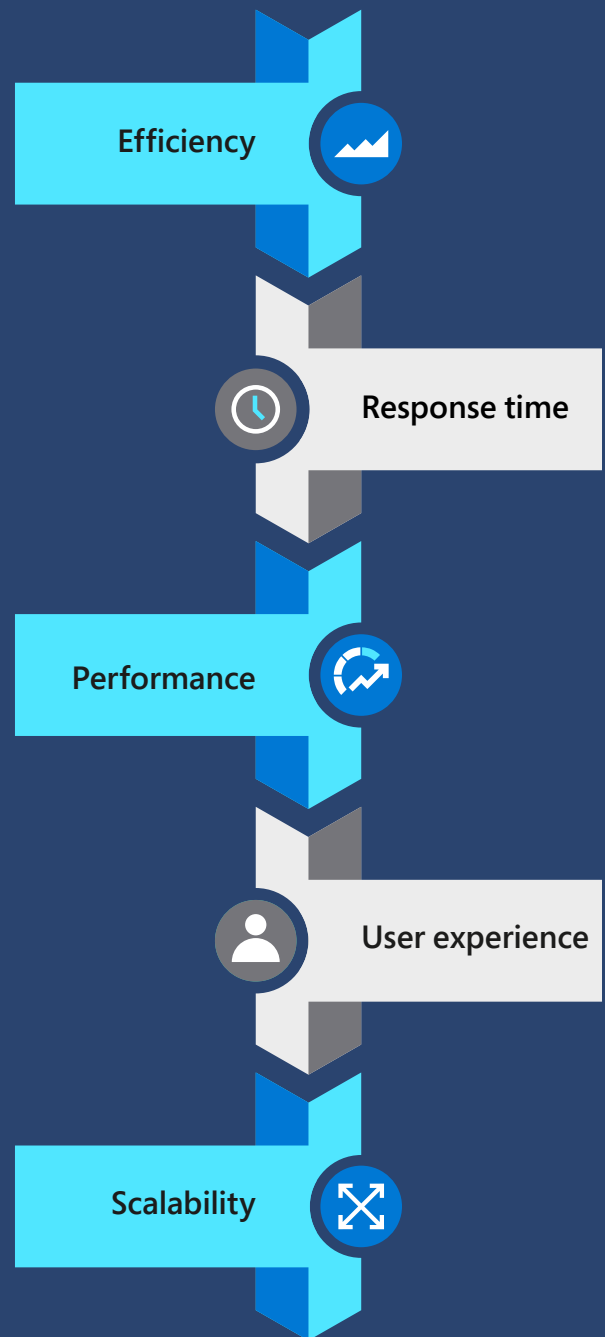
Customer story 1

40% reduction in costs for a large energy company

To reduce infrastructure costs, a European gas company chose to migrate their on-premises data centre to Azure. Due to the mission-critical nature of the applications and the large quantity of stratified legacy databases, once the migration was completed, the Azure bill was higher than expected. This prompted the CIO to enforce a tight and programmatic cost governance policy with weekly updates. This process involved:

- Defining a spending baseline as a target
- Relentlessly enforcing policies and spending rules
- Cleaning up the migration by-products
- Right-sizing all the workloads that were over-allocated
- Optimising the legacy databases

This brought the Azure bill back to the agreed baseline, with an overall saving of over 40% of the initial bill. Along with saving money, the team understood how optimising applications can lead to better performance and operations and decided to invest in refactoring old applications to benefit from cloud-native patterns.

Customer story 2

Measuring costs and carbon savings for a global ISV

A global independent software vendor (ISV) wanted to prove the advantages of migrating to Azure in terms of not only costs, but also carbon emissions. Once the migration perimeter was defined, they tracked their current carbon footprint within the on-premises data centre and measured the emissions savings of the migration.

The ISV customer saved money with the migration and also reduced their overall emissions as one of the main benefits of moving to the cloud.
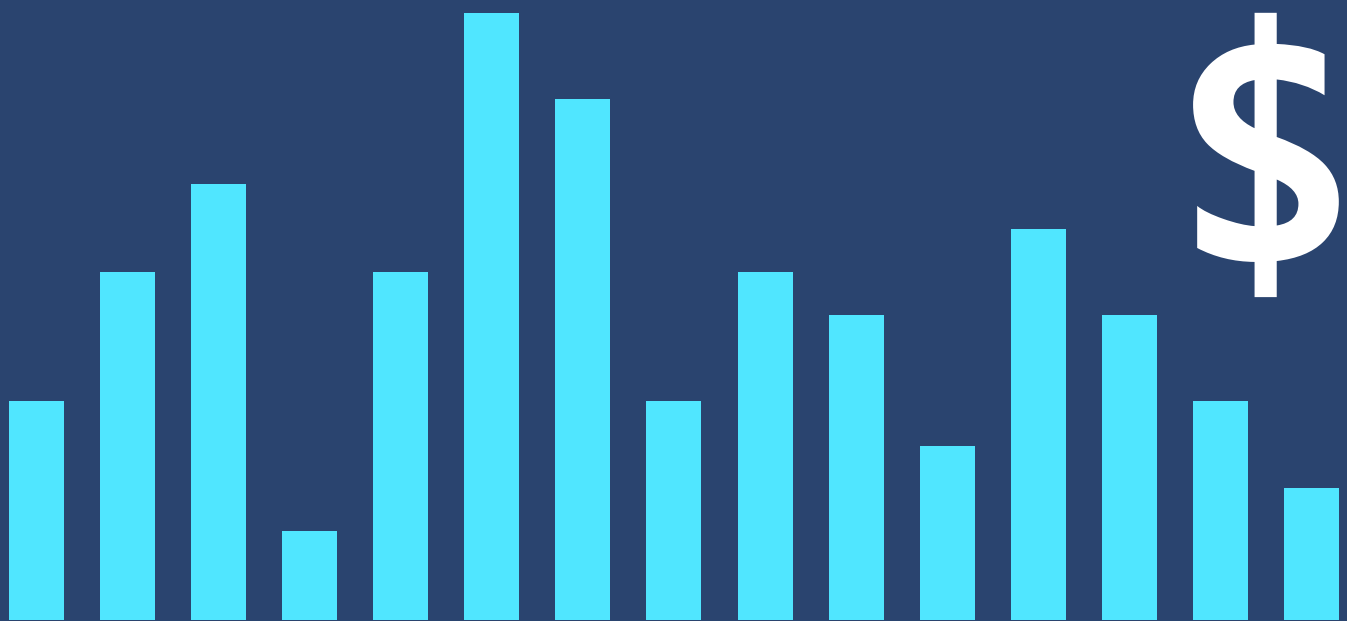
Framework for optimisation

A cost governance framework can provide greater visibility and control over cloud costs, and reduce overspending and waste while improving operational efficiency and innovation.

> ⓘ
>
> Overview of the cost optimisation pillar – Microsoft Azure Well-Architected Framework
>
> Eight ways to optimise costs | Micro-soft Azure

A cloud efficiency model can also help manage costs. It involves defining a cloud cost team empowered to establish policies, processes and tools, with the goals of optimising resource usage, monitoring cost trends and enforcing cost controls.

A typical cloud cost governance model involves the following steps:

- ✓ **Establishing cost targets**
- ✓ **Defining internal cost policies**
- ✓ **Monitoring and reporting**
- ✓ **Cost optimisation**
- ✓ **Enforcing controls**
- ✓ **Review and optimisation**

Cost is a key element of cloud architecture design because it directly impacts infrastructure and service choices. Cloud architecture design should always consider the cost of infrastructure, Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS) resources to ensure that it is sustainable and efficient.

By combining these tools with the governance process, organisations can drive success by establishing a framework that saves money, increases efficiency and unlocks innovation.

Next steps

Start your cost governance process now:

- Schedule a weekly stand-up meeting, get help from your accounts team and connect with your **Azure billing specialist**.

- Modernise on your terms, migrate or innovate, operate and optimise your workloads, while always keeping costs under control.

- Guarantee the best performance-to-cost ratio for your applications, while optimising performance, reliability and cost-effectiveness for your mission-critical applications.

- To learn more about Azure Cost Governance, check out the full book **here**.