CoreAzure
AN ALTEN COMPANY

The University Cloud:
A Comprehensive Strategy for Cloud Modernisation

From start to finish - Everything you need to know about successful cloud migration

Contents

Overview

As technology continues to advance, universities are increasingly turning to cloud computing to streamline their operations and reduce costs.

This can be seen as [79% of universities use at least one form of cloud technology, although only 39% of these universities use Infrastructure as a Service (IaaS)](#).

It is feasible for higher education institutions of all sizes and industries to migrate to the cloud, with it being one of the most transformative projects a university will undertake.

This eBook aims to provide a comprehensive guide to migrating to the cloud, covering everything from the benefits and challenges of cloud computing to the steps involved in planning and executing a successful migration. Whether you are a small business owner or an IT professional, this eBook will give you the knowledge and tools you need to make the transition to the cloud with confidence.

The Need for Cloud
in Higher Education

Better Flexibility and Scalability

Migrating to the cloud enables universities to become more agile. After migrating to the cloud, it is possible to scale resources up and down as required. Whereas with on-premises infrastructure, universities need to invest in hardware powerful enough for handling peak usage, even though reaching this level is a rare occurrence.

Similarly, many institutions have on-premises applications that are not used 24/7, however, the server running them needs to be running non-stop. With cloud computing, businesses only need to pay for the time the workload is being utilised.

This makes the cloud perfect for universities, as the cloud resources can be increased during busy periods, without the need to outlay capital expenditure for on-premises hardware.

Improve Security Posture

In the past, it was a common belief that cloud services were less secure than on-premises infrastructure, but in recent years, that sentiment has changed.

Both on-premises and cloud services require security expertise, but cloud services have many security features, and all alerts can be monitored from one place. All cloud service providers are also constantly investing in securing the cloud. For example, over 3,500 security professionals are working around the clock at Microsoft to protect Azure.

With a cloud solution, there is also no risk of downtime due to fire, theft, flood, or other natural disasters as the environments can be geographically redundant.

It should be noted that if your university is looking for the highest level of control over security, an on-prem solution can sometimes be the right choice.

Move From CAPex to OPex

Many providers will state that moving to the cloud will save your institution money, but that is not always the case. Depending on your use case, it can be cheaper to continue to use legacy hardware that has already depreciated in value.

However, there are risks to sweating old hardware like this, as it will typically run slower, use more electricity, and may incur additional support costs. Whereas, moving to the cloud ensures your institution does not experience these challenges but also enables your university to move IT expenses from capital expenditure to operating expenditure.

For example, rather than your instituion having to outlay £10,000 every 5 years, your business could pay a monthly fee for the services being used on Azure, Amazon Web Services or Google Cloud Platform.

This is particularly beneficial for universities that are looking to increase cash flow and financial teams wanting to accurately forecast budgets.

For universities with older hardware, with the constantly rising cost of electricity, it can also be cheaper to move to the cloud, rather than pay the additional electricity and cooling bills associated with an on-premises solution.

Improve User Experience

A brand-new shiny server should have an exceptional and polished end-user experience, however as the years pass the server will slow down and the user experience will degrade. This can be frustrating for staff and students, and even result in lost revenue due to lower productivity

This is particularly true for institutions that attempt to reduce costs by waiting until the last possible opportunity to replace their servers in an attempt to save money.

In comparison, a cloud service will always have a top-notch user experience, as the service can dynamically adapt to the load, so even if many users are using it, they will all have the same experience.

What Workloads can be Migrated?

Data Storage and Backup
Storing data in the cloud offers universities scalability, flexibility, and cost savings compared to traditional data storage methods.
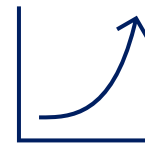
Data Analytics
Cloud-based big data platforms offer universities scalable and cost-effective solutions for processing and analysing large amounts of data.

Application Hosting
Higher education institutions can host their applications in the cloud, which provides greater flexibility and scalability than on-premises hosting.

Development Environments
Cloud-based development environments offer institutions flexibility, scalability, and cost savings by allowing developers to access resources on demand.

Web Hosting
Cloud web hosting services can provide universities with high-performance, scalable web hosting capabilities that can handle spikes in traffic.
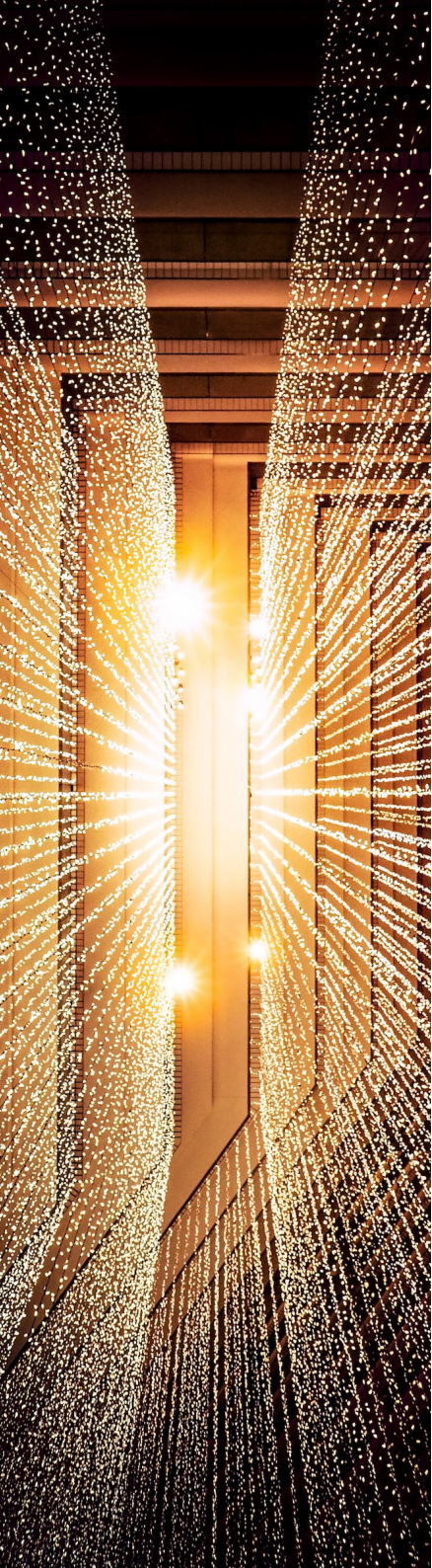
Disaster Recovery
Cloud-based disaster recovery solutions can help universities ensure the availability and continuity of their critical systems and data in the event of an outage or disaster.

The Cloud Migration Roadmap

1. Define Business Objectives

Before any Higher Education instituion undertakes a cloud migration project, they need to define their objectives.

This will guide the entire process, so it is essential this step is completed correctly. This also has the power to completely transform the way a univesity works. However, in some cases, the business objectives may be pre-decided, such as end-of-support for critical technologies

When looking at business objectives, they will fall into a variety of categories, such as:
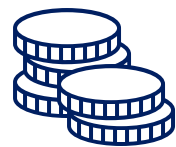
Fiscal
- Faster access to data
- Reduced IT costs
- Terminate a datacentre

Student Engagement
- Reduce development time
- Reduce time for customer support
- Increase the amount of data collected

Agility
- Reduce time-to-market
- Reduce provisioning time
- Increase efficiencies for remote work

Performance
- Reduce downtime of services
- Improve speed to access data
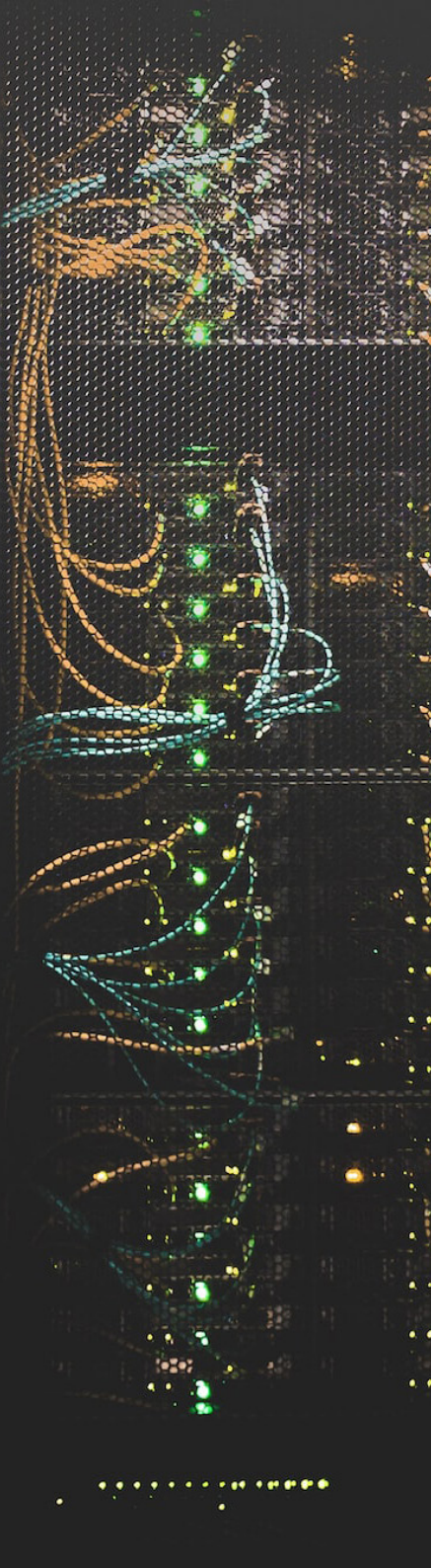- Reduce disaster recovery time

Reach
- Expand into a new market
- Personalise the student experience
- Meet compliance regulations

Sustainability
- Track and control carbon emissions
- Reduce carbon footprint
- Drive sustainable innovation

2. Evaluate the Digital Estate

Once the business objectives have been decided, it is time to evaluate the current digital estate.

The digital estate is comprised of IT assets that power business processes, this includes assets such as virtual machines, servers, applications, and data. This stage is essential as without taking inventory of the digital estate there is no way to know what deployment model or migration strategy will be most effective, and without it, this will lead to not meeting the objectives set out in the previous stage.

There are tools available to help take inventory of the digital estate that provides a scan showing all virtual machines, servers, network mappings and dependencies and the results of these scans will help define workload alignment in later stages.

In this stage, other stakeholders will have information that should also be captured, such as the service owners, the asset usage, dependency maps for workloads and the classification of data.

Once this inventory is complete, universities can use this information to define the strategy for migration.

3. Define Cloud Migration Strategy

After the previous stage, most universities will have found numerous workloads that can be migrated to the cloud to meet the objectives set in stage one. However, not all these workloads will have the same migration strategy or cloud rationalisation. The term cloud rationalisation refers to the process of evaluating assets to define the migration strategy for each asset.

There are 5 common methods of rationalisation:

Rehost   Refactor   Replace   Retire   Retain
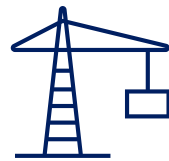
Rehost

Rehosting, also known as lift-and-shift, is a method of migration whereby the applications are migrated to the cloud without making any changes to the architecture. Therefore, the application is running in a different hardware environment with changes to the infrastructure configuration, but not to the actual architecture.

With this method of migration, universities will use an Infrastructure as a Service (IaaS) offering.

In theory, this is the faster and most inexpensive way of moving to the cloud, with the least disruption. However, it is rarely recommended as the ongoing cost of operation is going to be significantly higher, and the higher education institutiopn will not leverage the full array of benefits possible through cloud technology.
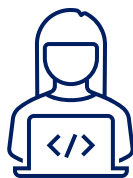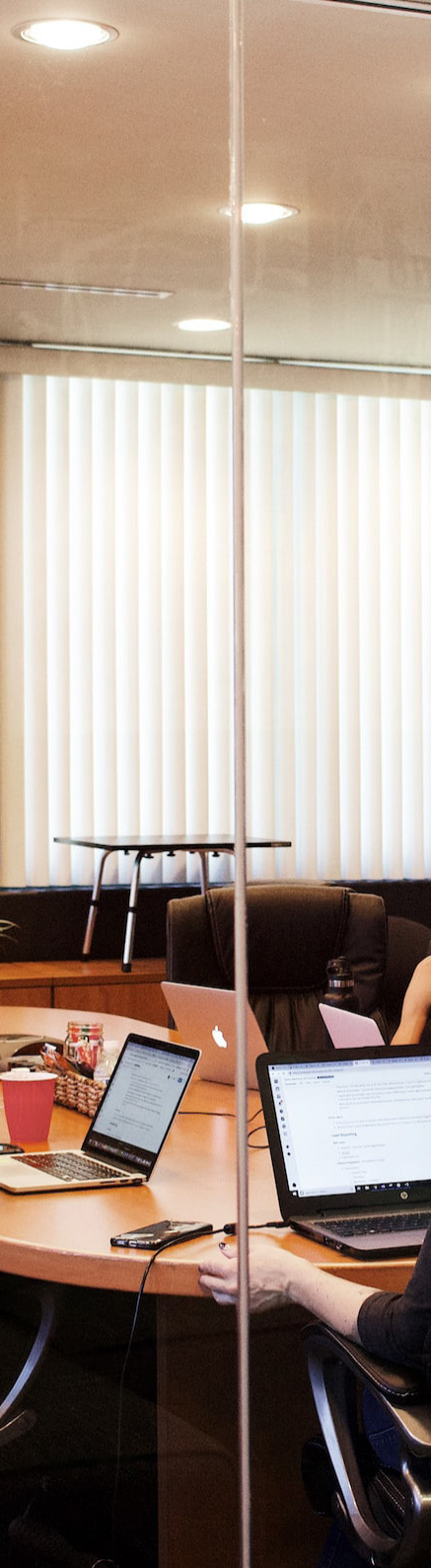
Refactor

For universities looking to reduce the operational costs associated with the cloud, it is common to refactor the application or workload to suit a Platform as a Service model.

This is where your institutions' workloads are running on the cloud provider's infrastructure. It sets the workload up for scalability and ensures objectives are more likely to be met.

It is typically a more complex migration process that will take longer and cost more than rehosting. However, some workloads only require minor refactoring to take full advantage of the cloud.
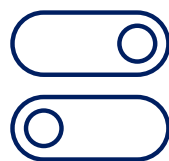
Replace

During the cloud migration process, some universities find that the workloads or applications they are using have SaaS (Software as a Service) equivalents that meet business requirements and will enable them to achieve their objectives.

This approach has many benefits, but it also means that the institution is locked into that vendor, and there will still be a migration process.
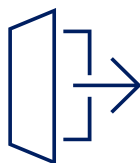
Retire

Often when completing the evaluation of the digital estate, universities may discover they are hosting legacy workloads that are no longer required.

If this is the case, the workload can be retired, with any data being retained in necessary.
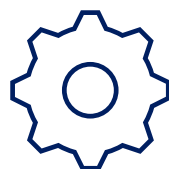
Retain

Finally, there are certain cases where workloads or applications are not ready or should not be migrated to the cloud.
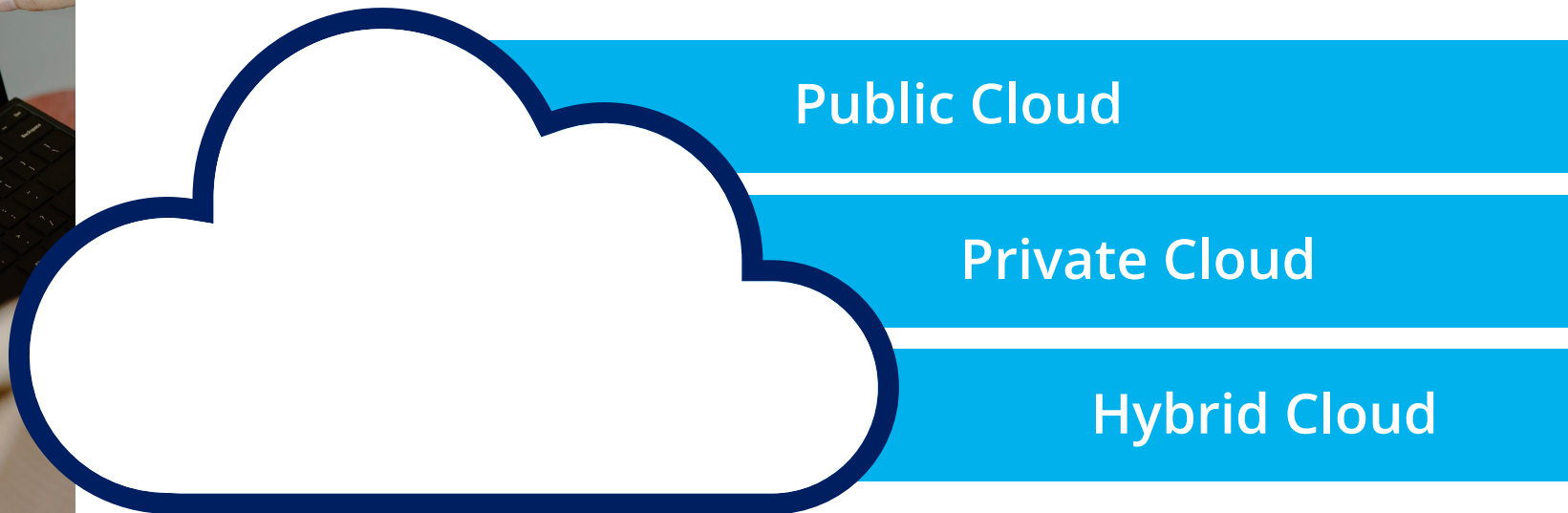
In this case, a hybrid cloud model is used, and the strategy will be reviewed regularly.

4. Decide on Cloud Deployment Model

After the cloud migration strategy is defined, higher education institutions can decide on the right cloud deployment model for them.
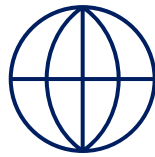
For on-premises applications and workloads, there are three primary cloud deployment options:

Public Cloud

Private Cloud

Hybrid Cloud

Public Cloud

A public cloud-based deployment is the most common cloud computing deployment model. With this model, the resources and hardware are owned and operated by a third-party service provider and used over the internet. All the cloud services are owned and managed by a provider, such as Microsoft Azure.

With this model, you are sharing the same resources and hardware with other organisations. You are doing this through a provider or operator who will manage the system on behalf of the organisations operating from it.

This option reduces costs, enables scalability and is extremely reliable.

Private Cloud

Private cloud deployment is the opposite of a public cloud deployment. Instead of being based on a public server, a private cloud system is based upon hardware that is used exclusively by one organisation. This system can either be on-premises or hosted by a third-party service.

The major difference here is that the hardware used for private cloud infrastructure is yours and is suited to your needs specifically. This is like an on-prem infrastructure but comes with the added scalability and benefits of a cloud-based system.

Typically, this option is only used for businesses that require extreme flexibility and control, such as in organisations with high compliance needs.

Hybrid Cloud

A hybrid cloud platform is a mix of both public and on-prem infrastructure. This infrastructure combines the best elements of the public cloud whilst maintaining on-prem workloads if necessary. Hybrid cloud can also be running cloud applications on on-premises hardware, with solutions such as Azure Stack.

One use case for this is if some applications or workloads are too expensive to migrate to the cloud but are necessary for the business.

This is also used in universities with data sovereignty requirements, as all the data can remain on-premises.

5. The Migration

Now that your university has decided on what workloads will be migrated, and where to, you can then create a migration plan.

Every migration is different, but it should always be an incremental approach, where one workload is migrated at a time. This will take more planning and time, but it reduces technical risk as with each workload your cloud adoption team will become better at migrating workloads.

Within Azure, there are a plethora of tools designed to make migration easier, however, the process does require technical expertise and experience to ensure success.

6. Secure the Cloud Environment

One of the reasons why universities move to the cloud is to improve their security posture. However, you need to create processes and implement controls to ensure their cloud environments are secure. It is predicted that in recent years, 95% of cloud security failures are the customer's fault, rather than the cloud providers.

For this reason, it is important to note that after the migration, there are several processes, including security which will be an ongoing process as technologies and cybersecurity threats evolve.

Some of the areas of security that higher education institutions need to consider are:

Access Control

This includes who can access the workloads and backend of the workload, and how their identity is verified. Universities should aim for Zero Trust, using identity and network controls.

All accounts should also have Multi-Factor Authentication enabled.

Security Operations

Azure is packed full of features that enable businesses to detect, respond and recover from attacks. Microsoft Defender for Cloud includes threat hunting which will constantly search cloud environments for poor security practices or intrusion from bad actors.

Microsoft Defender for Cloud also has alerts for any signs of intrusion, which can be actioned by a Security Operations team.
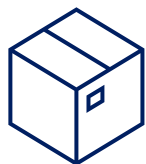
Asset Protection

All cloud workloads deal with some amount of data, and often this data is sensitive and in the wrong hands could be disastrous for a business.

Thankfully, within Microsoft Defender for Cloud, there is an asset inventory tool which shows the security posture of any resources connected. It also provides recommendations for ways to improve security and protect assets.
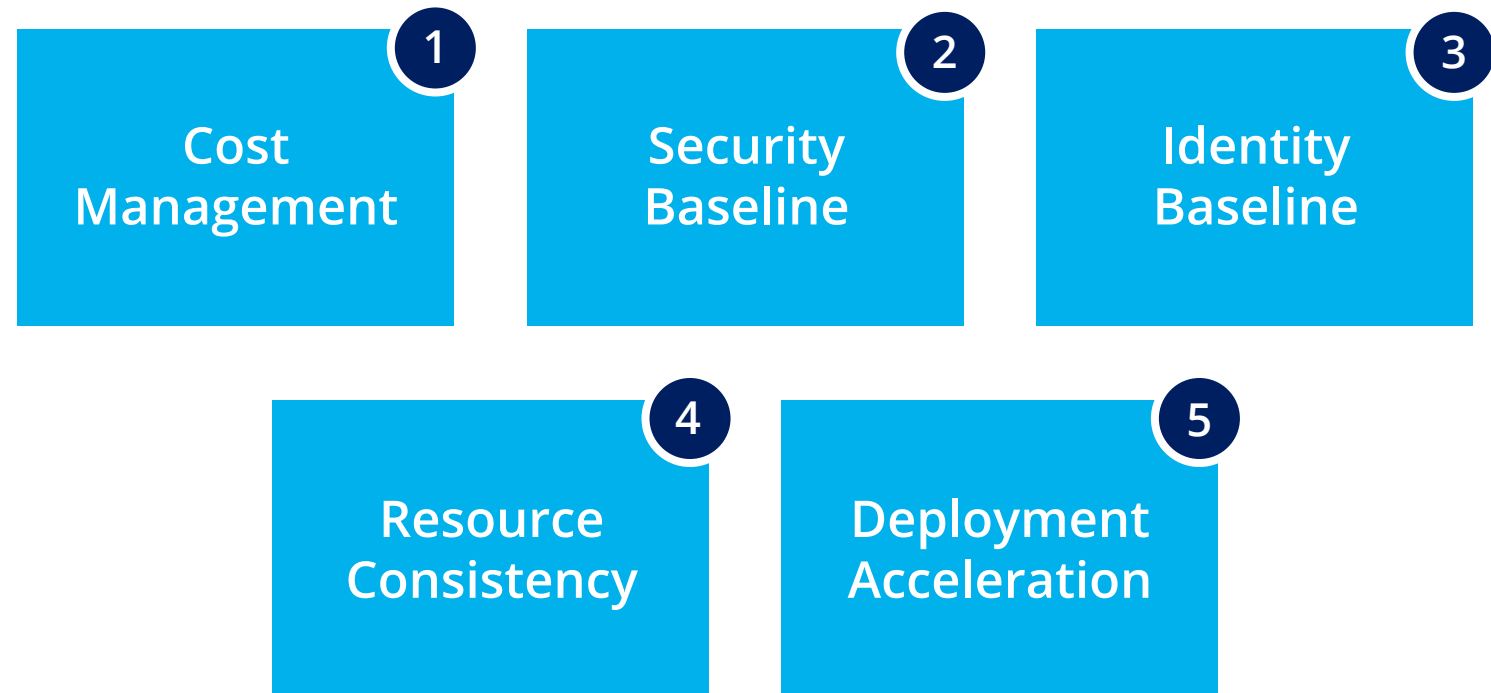
7. Establish Governance Plans

As with many elements of ongoing cloud maintenance, governance is an iterative process, and every university will have its own compliance and governance requirements.

Some common governance and compliance regulations include GDPR, HIPAA, PCI-DSS, GLBA and ISO 27001. These regulations will outline what governance measures your cloud environment will need.

However, most insitutions will create a minimum viable product for governance, followed by iterations of governance maturity to address risks.

During this stage, there are 5 common disciplines of cloud governance to consider.

1 Cost Management

2 Security Baseline

3 Identity Baseline

4 Resource Consistency

5 Deployment Acceleration
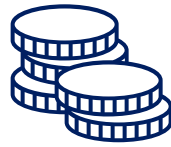
Cost Management

Cost is a primary driver for cloud migration.

Therefore, it is important to establish guidelines for managing costs for all cloud platforms.

Security Baseline

Addressing security concerns can be a complicated matter, and each organisation's security needs vary. Once security requirements have been identified, it is necessary to implement cloud governance policies and measures to ensure that those requirements are met consistently across all aspects of the network, data, and asset configurations.

Identity Baseline

Failure to apply identity requirements consistently can increase the risk of security breaches. The Identity Baseline discipline centres on guaranteeing that identity controls are implemented uniformly throughout all initiatives related to adopting cloud adoption.
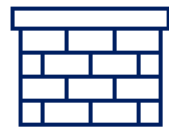
Resource Consistency

The smooth operation of cloud systems is reliant on maintaining uniformity in resource configuration. Governance tools can aid in achieving a consistent configuration of resources, thereby minimising risks related to onboarding, drift, discoverability, and recovery.

Deployment Acceleration

Incorporating centralisation, standardisation, and consistency into the deployment and configuration process can enhance governance practices. When deployed through cloud-based governance tools, these factors can expedite deployment activities and facilitate cloud management.

8. Manage Cloud Costs

Whilst cost savings are a common driver for cloud migration, if universities do not implement cost controls and manage their cloud costs, they may receive an unexpectedly large bill.

Thankfully, there are many tools built into Microsoft Azure and other cloud providers that make it simple to manage and optimise cloud costs.

On a basic level, businesses can view their cloud spend by service or resource and set a daily or monthly budget. Azure Cost Management also has a built-in forecasting tool, so businesses can see if they are going to exceed their budget and take steps to mitigate this.

For higher education institutions looking to optimise their cloud costs, there are several methods to do so.

Retire Services: This is not an optimisation strategy for when businesses initially move to the cloud, but over time if there are any resources that are not being used they should be removed.

Azure Advisor: Azure Advisor is a service that finds virtual machines with low usage. With this information, businesses can resize the machine, or even shut them down.

Right-Sizing VMs: Ideally, all VMs are running at high utilisation rates to optimise costs. VM size should be reviewed regularly to ensure your business is not wasting money on under-utilised resources.

Auto-Scaling: It is possible to automatically scale the number of virtual machine instances that run a workload. This auto-scaling can not only save your business money but also create a better experience for users.

Reserved Instances: For workloads that require a consistent computing capacity, it is possible to pre-pay for 1 or 3 years of usage and receive a discount for doing so. This discount can be up to 72% compared to the standard pay-as-you-go pricing.

Azure Hybrid Benefit: If your university already has Windows Server or SQL Server licenses for on-premises infrastructure, you can save money with the Azure Hybrid Benefit. With this, you do not need to pay for the license for the cloud resource.

The Real First Step –
Work with a Trusted Advisor

Migrating to the cloud can be a complex process and it requires experience and expertise. Whilst many in-house IT departments may have the expertise, they will have less experience with migrations when compared to a managed service provider (MSP).

Working with a trusted advisor, or managed service provider will also reduce the risk associated with migration, such as loss of data or downtime, as the MSP can help your higher education institution avoid common antipatterns.

Outsourcing migration also ensures that your in-house IT team can continue to work as normal, without taking on additional workload, which could cause issues in the wider business.

Therefore, in most cases, it is more cost-effective and efficient to work with a third party for cloud migration and involving them as early in the project as possible increases the likelihood that your objectives will be met.

Many universities also outsource the security and cost management of cloud workloads to the same MSP, which reduces your chance of falling victim to a cyberattack and keeps your bills down, as they will review the controls in stage 8 regularly.

How We Can Help

Migrating to the cloud can transform the way your university operates and enable you to gain a competitive advantage, whilst future-proofing your growth. However, a poorly planned and executed migration can cause ongoing problems, increased spending, and a poor user experience for students and staff.

We can help you with all stages of cloud migration, as well as the ongoing support and management of your cloud resources. If you want to find out more about the services we offer, contact us today.

CoreAzure

AN ALTEN COMPANY

✉ enquiries@coreazure.com

📞 0788 400 1241

🖱 www.coreazure.com