Microsoft

Azure migration readiness

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Introduction to Azure migration readiness

Microsoft Azure provides access to a comprehensive set of cloud services that, as developers and IT professionals, you use to build, deploy, and manage applications, through a global network of datacenters. Companies are moving to the Azure to gain agility, increase performance, reliability and minimize costs. To gain these benefits, organizations must have a defined path to move from their on-premises datacenters to Azure.

The Microsoft Cloud Adoption Framework for Azure provides guidance so your organization can effectively adopt Azure. It is based upon a rich set of best practices from Microsoft employees, partners, and customers.

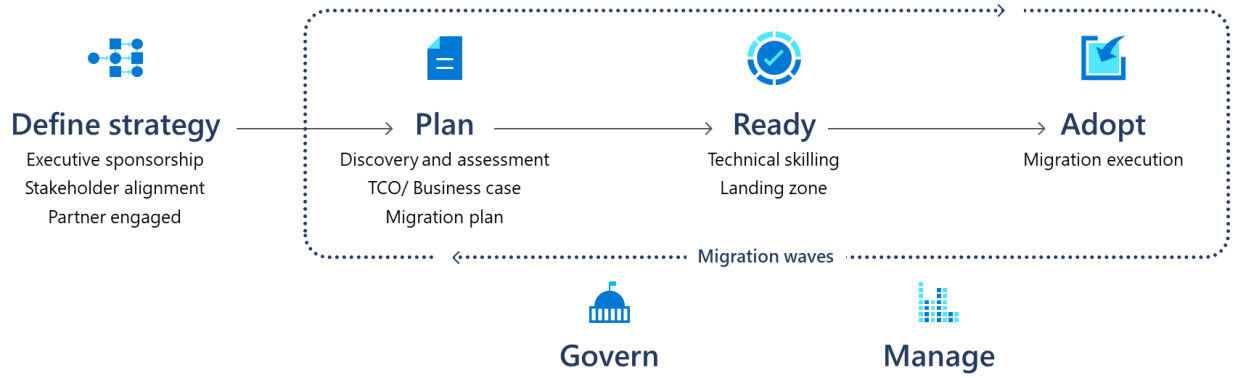

Figure 1 – Microsoft Cloud Adoption Framework for Azure

Based upon the Cloud Adoption Framework, there are ten critical dimensions every organization should address to prepare for migrations at scale. It is important to understand your current level of readiness for a migration project to be a success. These dimensions span various planning, technical and support aspects of the migration project.

Migration readiness dimensions

- Business strategy
- Partner support
- Discovery and assessment
- Business case
- Migration plan
- Technical skilling
- Landing zone
- Migration execution
- Governance
- Management

Business strategy

Defining a business strategy is a set of steps starting with initial exploration of the concept of cloud adoption and culminating in a specific business case and commitment from leadership.

It's important for you to start defining the reasons your organization should migrate to the cloud. With an understanding of your migration drivers, you can establish the root business case for the project, as well as understand the urgency and timelines to meet. It is important to distinguish between business drivers, technical drivers and timeline drivers as your approach to the migration can shift.

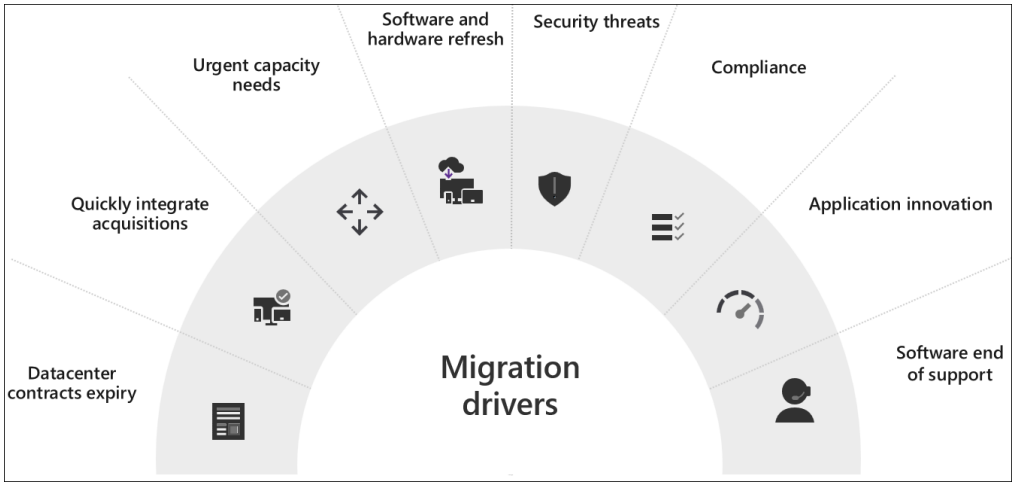

Figure 1 - Azure migration drivers

Partner support

When planning your migration to Azure, the organization must consider the type of partner support required during and after the migration project. During the project, external help from a Microsoft partner is recommended, so migrations can proceed quickly and with expert help. These expert partners have met Microsoft's highest standards. They're ready to help you plan and migrate to the cloud, and aid in optimizing and securing your environment.

After the project is complete, the organization needs to consider whether they want ongoing help from a partner to continue managing their Azure cloud environment(s). To achieve your digital transformation goals with minimal disruption, turn to our Azure Expert Managed Services Providers. They have deep cloud technical know-how, consistently deliver customer success, and validate the high standards of their services each year with an independent auditor.

Discovery & assessment

Before migrating workloads to Azure, you first need to understand the current infrastructure and define what the migrated workloads will look like. With simple steps, you can comprehensively discover and assess your on-premises resources to figure out how they'll run in the Azure cloud.

Discovery

To start any migration, you need to compile an inventory of the physical and virtual servers in your environment. While your current management tools may provide a good representation of the

hundreds—maybe thousands—of applications your organization is running, you need an inventory mechanism that can feed data into subsequent migration steps.

With cloud migration assessment tools like Azure Migrate or from our partners such as Cloudamize, Turbonomic, or Movere you'll have a complete inventory of servers with metadata for each—including profile information and performance metrics—allowing you to build your cloud migration plan.

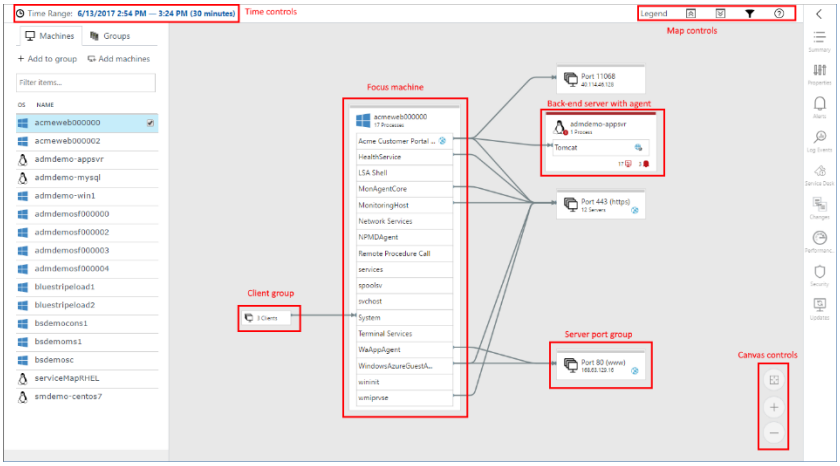

Figure 2 - Azure Migrate Service Map

Using this information, map your servers to represent your on-premises applications. This will help identify dependencies or communication between servers so you can include all necessary application components in your cloud migration plan—helping reduce risks and ensure a smooth migration.

Assessment

Now that you have discovered and grouped your servers logically to represent the applications it is time to perform the assessment. Your migration team including both technical and business stakeholders will need to select the best cloud migration strategy for each application based on its requirements and migration objectives.

Selecting an Application Migration Strategy

When looking at a cloud migration, there are four widely-adopted strategies: **Rehost, Refactor, Rearchitect, or Rebuild**. Each of these strategies can be leveraged by organizations depending on their business drivers and goals for moving to the cloud.

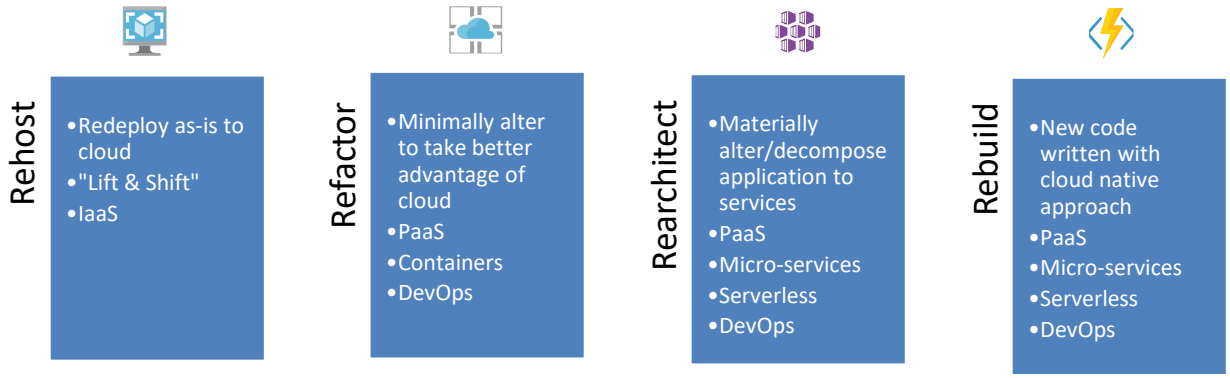

Figure 3 - Azure migration strategies

For example, you could choose to **Rehost** or "lift and shift," less-strategic apps with no code changes, and then **Rearchitect** others which are more business-critical, decomposing them into microservices.

It is best for your migration team to adopt a simple migration decision tree. This will drive your decision based on the company's priorities and requirements.

The decision tree starts with a simple question: ***will your organization continue to invest in "Future Development", of the application?***

If you are going to continue to invest in an application then it would be best to **Refactor, Rearchitect or Rebuild** the application for the cloud using Platform as a Service (PaaS). If it will stay static in its current form, then you should select **Rehost** and move it to Infrastructure as a Service (IaaS).

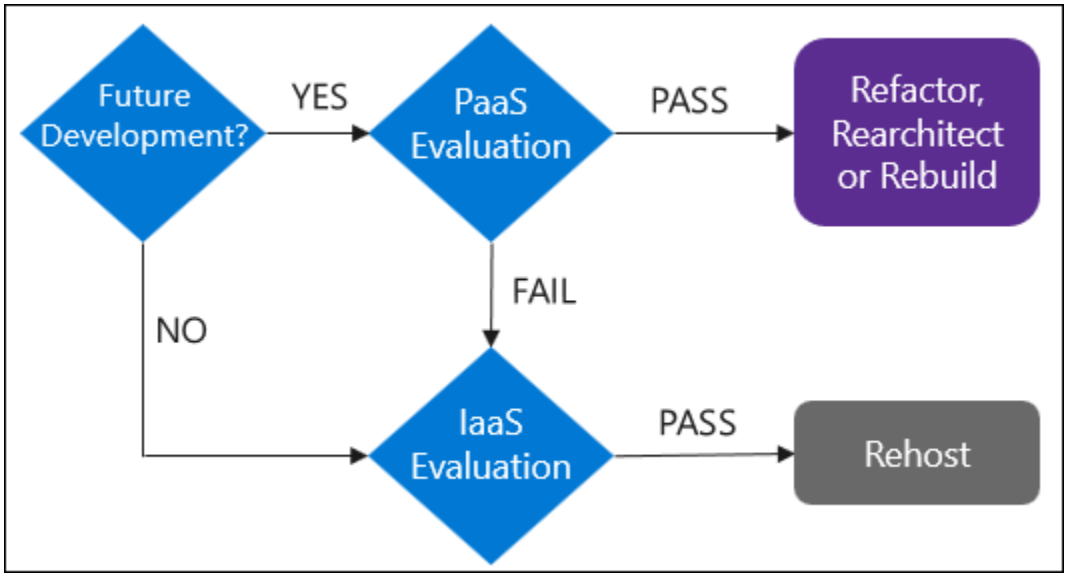

Figure 4 - Migration strategy decision tree

There should then be an evaluation phase of the applications to ensure that each will in fact run in the cloud. Once you have proven the technology, then you can move forward with a migration of the application.

Keep in the mind that you might **Rehost** the application on a short-term basis to move it to the cloud with the full intention of using a different strategy for the application's future. This is a very common and valid practice as you will have moved the application to the cloud and can move forward with development in the cloud.

Migrating applications to the cloud using **Rehost** will get you to the cloud. Optimizing costs and reducing overprovisioned resources will begin to save you money. However, these activities are just the start. To realize the full benefits of the cloud over time, you will need to start looking at **Refactor** and **Rearchitect,** so your applications make better use of Microsoft Azure capabilities and cost savings that PaaS services offer above that of IaaS.

Refactoring allows you to change the way the applications are hosted to start making use of PaaS services; like App Service, SQL Database, Cosmos DB, and others. **Rearchitecting** allows you to fundamentally change the applications to make use of Microsoft Azure cloud capabilities by optimizing the application design and architecture to become cloud-native.

If you are going to start from scratch to become cloud-native, then selecting **Rebuild** from the outset makes sense, but this is usually reserved from the most important business applications and the effort will be much greater. Few applications will be migrated in this manner at the outset of an Azure migration project.

Understanding each of these strategies is critical to planning for your migration. It will help you make your assessment and then build a plan for moving to Azure.

Strategy	Definition	When to use	Azure Services
Rehost	Often referred to as "lift and shift" migration, this no-code option lets you migrate your existing applications to Azure quickly. Each application is migrated as-is, which provides the benefits of the cloud without the risks or costs of making code changes.	You need to move applications from your datacenter to the cloud quickly, with no code changes. Your business requires the applications, but doesn't need to change their capabilities right away. You need to run secure applications across VMware environments and Microsoft Azure with a common operating framework. Rapidly build Dev/Test environments, moving from weeks of waiting to ready to work in minutes. Deploy and scale virtualized Windows desktops and apps on Azure, supporting Remote Desktop Services.	• Azure Virtual Machines • Azure VMware Solutions • Azure SQL Database Managed Instance • Azure DevTest Labs • Windows Virtual Desktop

Strategy	Definition	When to use	Azure Services
Refactor	Refactoring, often referred to as "repackaging," is a cloud migration approach that lets you minimally alter application code or apply configuration changes necessary to connect the application to Azure PaaS and take better advantage of the cloud.	You need to use an existing code base and development skills, and code portability is a concern. Your application can be easily repackaged to work in Azure. You want to apply innovative DevOps practices provided by Azure.	• Azure App Service • Azure SQL Database Managed Instance • Azure Database for MySQL • Azure Database for PostgreSQL • Azure DevOps
Rearchitect	Modify or extend an existing application's code base to optimize the application architecture for cloud scale. For example, decompose a monolithic application into microservices that work together and readily scale.	Your application needs a major revision to incorporate new capabilities or to work more effectively on a cloud platform. You want to make use of existing application investments. You want to meet scalability requirements in a cost-effective way. You want to minimize use of virtual machines. Your IT team is investing in DevOps using a container	• Azure Kubernetes Service • Azure SQL Database • Azure Database for MySQL • Azure Database for PostgreSQL • Azure DevOps
Rebuild	Rebuild an application from scratch using cloud-native technologies from Azure.	You want rapid development, and the existing application is limited in functionality and lifespan. You're ready to build new applications using cloud-native technologies. You want to build innovative apps taking advantage of advancements in AI, blockchain, and IoT. You want to expedite your business innovation. You want to apply innovative DevOps practices provided by Azure.	• Azure Kubernetes Service • Azure AI • Azure Functions • Azure API Management • Azure Logic Apps • Azure SQL Database • Azure CosmosDB • Azure DevOps

Table 1 - Cloud migration strategies

Business case

Evaluate the potential cost savings of migrating to Azure by calculating and comparing your TCO for Azure with that of a comparable on-premises deployment. Use the Azure TCO calculator to build a customized cloud business case to support an Azure migration.

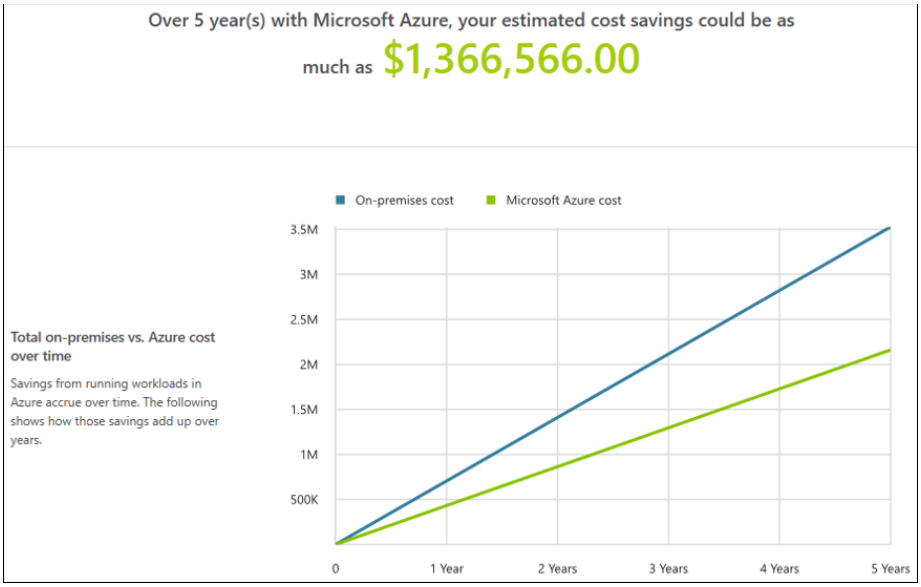

Figure 5 - Example Azure TCO

Be sure to include all your hardware, software, facilities and the cost of the team that currently supports your on-premises environment. Additionally, an estimate for the migration project will also be needed including professional services, development and training for your team.

This TCO estimate and business case should be treated as a starting point in which assumptions will be made, and you can always refine later as the team works through the migration process.

For more information on Building a Business case see the Cloud Adoption Framework.

Migration plan

Migrating to the cloud is a digital transformation for most businesses that requires broad organizational change and support. Reach out to key people throughout the organization, and make sure to include representation from both IT and the business stakeholders. Getting everyone's engagement and support before you migrate will lead to a smoother, faster cloud migration process that meets everyone's goals.

Assembling a migration team and the high-level scope for the project should be identified. One important early decision for the team is to determine if this will be a companywide strategy, or whether to pilot with a select business unit or subset of applications.

The migration plan should include a high-level inventory of applications, (e.g. from a CMDB, Service Catalog or from Azure Migrate), to migrate, along with identifying all the roles who will work together on the project. This is important as the migration project will likely span multiple months or even years' worth of effort to complete.

Some high-level categorization of the applications to be migrated should be completed during this phase. Each application listed should be assigned values that allow for a decision-making process regarding which applications and in scope for the migration and the assigned order in which applications will migrate. The priority should be the final value set based on the other values assigned by the team.

Category	Assigned Value
Proof of Concept?	Yes/No
Technical Complexity	1-5
Business Risk	1-5
Priority	1-3

Table 2 - High-level application evaluation

Start with proof of concept (POC) applications which are representative of your applications, but aren't mission critical. It is important for the business to minimize risk and allows the migration team to gain confidence with quick wins on their cloud journey. These applications should be less complex, but representative of the typical applications in your environment.

With an inventory of the categorized applications, a project plan with assumptions on the number of applications migrated per month (along with the order of those migrations), should be published for feedback from all stakeholders. Revisiting the costs could be in order if any of your assumptions need to be adjusted based on the plan you have created.

Technical skilling

Before moving through the process of a migration project, you need to ensure the team has the skills and training to perform the migration successfully. This will lay the foundation for success in Azure.

Put together a plan for retooling and maintaining your team's cloud skills. This will involve understanding which skills are needed and practical ways of training your team to close the skills gap and foster team growth. This prescribed training path for the organization will need to be established and added to the overall migration plan.

A mix of online and instructor-led training options to learn new skills may better prepare your company for the migration project. The training plan should consist these competency areas:

Training	Details
Azure Foundations	Microsoft Azure, Infrastructure, Networking, Data, DevOps and Cloud Development methodologies
Migration Skills	Specific process, software, and migration techniques
Role specific training	Training for specific roles in the organization in support of the migration, ongoing maintenance, and development on the new platform

Table 1 - Training plan areas

Training Courses

Microsoft offers a range of Azure training courses, certifications and exams with different levels and specializations. These programs align with the roles of team members that will make up the migration team. These can help you build skills in your team as well as to identify suitable candidates when hiring. Team members will see the commitment to both them and your move to the cloud by engaging them in training and certification.

	Foundational	Migration-specific			Advanced role-based		
Training Course	Azure Fundamentals (AZ-900)	Migrate Windows and Linux Server Workloads to Azure (WS-050)	Migrate SQL Workloads to Azure (DP-050)	Migrate Open Source Data Workloads to Azure (DP-070)	Azure Administrator (AZ-103)	Azure Developer (AZ-203)	Azure Solution Architect (AZ-300)
Duration (days)	1	2	2	1	4	5	5

Table 2 – Azure training courses

The follow roles and their responsibilities align with the Azure training and certification program:

Role	Responsibilities
Administrator	Azure Administrators who manage cloud services that span storage, security, networking, and compute cloud capabilities.
Developer	Azure Developers who design and build cloud solutions such as applications and services. They participate in all phases of development, from solution design, to development and deployment, to testing and maintenance.
Architect	Azure Solution Architects who advise stakeholders and translates business requirements into secure, scalable, and reliable solutions.
Security	Azure security engineers who implement security controls, maintain the security posture, manages identity and access, and protects data, applications, and networks.
DevOps Engineer	DevOps professionals who combine people, process, and technologies to continuously deliver valuable products and services that meet end user needs and business objectives.

Table 3 - Role specific training

Learning and becoming proficient in Azure will allow staff to demonstrate their skills and boost their careers. To achieve certification, your team will need to pass one or more Microsoft certification exams. The exams needed vary depending on the certification sought, and a range of options is typically available for each certification. To explore further, and to review which exams are required for each certification, see the Microsoft Azure Certification Overview.

Azure Center of Excellence (COE)

Establishing a central team, a Cloud Center of Excellence (COE), will be important for oversight of the staff readiness aspect of the project. For larger organizations, this will generally be a team of people,

where in a smaller organization this could be a single person in this role. This team will be the go-to group in your organization to execute on the Azure migration.

Landing zone

The landing zone is the provisioned and prepared environment in Azure that will be used to host the migrated workloads. A well-designed landing zone is essential to put in place at the onset of a migration project. We can liken it to needing a foundation before you start building your house.

As you plan and design for migration, in addition to the migration itself, a few of the most critical steps is the design and implementation of Azure networking, identity, security and governance. The most important of these is networking. The networking design and implementation will define the security and connectivity of the migrated workloads and services hosted in Azure. An additional consideration is the application communication with hybrid-cloud or other on-premises resources.

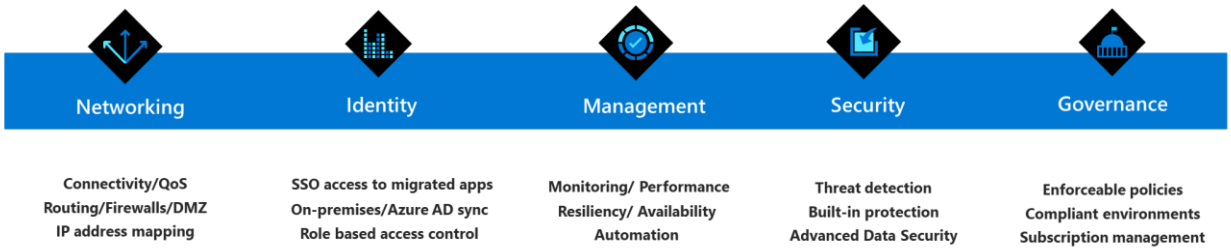

Figure 6 - Azure landing zone

The landing zone will include a defined set of cloud services, capabilities, and best practices to be used for the applications being migrated. Here are the components along with some landing zone considerations to consider:

- **Networking** – Select the hybrid networking services and architecture to support your organization's applications, governance, and connectivity requirements. Use Azure ExpressRoute to create private connections between Azure datacenters and infrastructure on your premises or in a colocation environment.
- **Identity** – Extend your users' credentials to the cloud with Azure Active Directory (Azure AD). This enterprise identity service provides single sign-on and multi-factor authentication to help protect your users from cybersecurity attacks.
- **Management** – Azure Monitor helps you maximize performance and availability of your applications and proactively identify problems in seconds. Collect, analyze, and act on telemetry data from your newly migrated Azure workloads.
- **Security** – Enable Azure Security Center to quickly assess your security posture with Secure Score.
- **Governance design** – Use Azure Blueprints to establish a methodology for governing the new environment. Simplify you Azure deployments by packaging key environment artifacts, such as Azure Resource Manager templates, role-based access controls, and policies, in a single blueprint definition.

Migration execution

The work done in Discovery and Assessment should now be augmented so that each application is put into a migration wave. A migration wave is the organization of migrating an application or workload using a phased approach. Migration is often discussed as a single process, however, it's really a collection of many smaller migrations that all need to be managed and performed in a coordinated effort to achieve a successful migration process.

Before beginning any migration steps, a set of migration waves will need to be defined as part of the migration plan. The first migration wave will be the "pilot" wave in which the first applications will be migrated. This should include the simplest applications to migrate such as web applications, low complexity applications in terms of high availability and disaster recovery requirements (HA/DR), and/or other non-business critical applications. This "pilot" wave will also allow you to prove the landing zone and other infrastructure is configured as needed before other more complex or business critical applications are migrated. This will be the wave used for the applications that were categorized as proof of concept (POC).

Successive migration waves should be defined with increasing levels of complexity. This will provide a somewhat gradual migration approach that will help with easing the organization to being more comfortable with migration as they progress through the project and finally complete later waves that include more complex applications to migrate.

Some customers may choose to also introduce phased deployment process for the applications in using testing, staging, and production environments. This allows you to fully test and validate each migration wave before moving on to the next wave.

Governance

Once all migration waves are complete and applications are successfully migrated into Azure, you still need to optimize them to retain and improve access, flexibility and security. There are many aspects that need continuous management once workloads have been migrated. To do this, several different Azure services can be used to perform operations such as security and cost optimization of the applications running in Azure.

Cost management is critical for all cloud infrastructure because you pay for what your services use and the pricing tiers that are provisioned. If resources are overprovisioned, then you will be overpaying unnecessarily. Azure Cost Management is a service used to gain visibility into organizational cost and usage patterns with advanced analytics. It also includes cost recommendations to clearly show how your expenses are organized and how you might reduce costs.

Resource use optimization or "right-sizing" is an important aspect to optimizing the architecture of applications in the cloud to improve costs over time. There are a few techniques and features within Azure to ensure you aren't overprovisioning while optimizing for cost; use features include Auto Shutdown and Autoscaling of Virtual Machines. Another option of conserving cost is to take advantage of Reserved VM Instances (RIs), to pre-purchase virtual machine resources for one or three-year terms to save on cost for resources you know you will be consuming.

A critical component for all application architectures is security and compliance to protect your organization. Both security and compliance are cross cutting requirements for all steps of a cloud migration. It is important to create a secure design and migration strategy from the beginning and to carry that through into post migration management of the migrated applications.

Security is a shared responsibility between both you and Microsoft. Microsoft has made substantial investments in the overall security of Microsoft Azure. These include physical, logical, operational, networking, and software security measures. With all these security measures built into the core of Microsoft Azure and its services, you are still responsible for ensuring your own applications and infrastructure are secure using a wide range of features and tools.

There are several security processes to setup as part of your migration and management strategy:

- Incident response
- Malware protection
- Disaster recovery / business continuity planning
- Patch management
- Access control and user provisioning
- Firewall management
- Password management

The following services and capabilities can be used to solve several governance concerns for the various applications and infrastructure being migrated:

Concern	Capabilities
Cost Management	Azure Cost Management Azure Reserved VM Instances Auto-Shutdown Autoscaling Right-sizing to prevent overprovisioning
Apply policies for compliant environments	Azure Policy Azure Blueprints
Identity & access management	Azure Active Directory (Azure AD) Multi-Factor Authentication Role-Based Access Control (RBAC) Azure AD Identity Protection
App and Data protection	Encryption (Disks, Storage, SQL) Azure Key Vault Confidential computing
Network security	VNet, NSG, Peering, VPN Application Gateway (WAF), Azure Firewall DDoS Protection Standard Azure ExpressRoute
Threat protection & security management	Azure Security Center Azure Sentinel Microsoft Antimalware for Azure Azure Log Analytics
Compliance	Azure Compliance in the Trust Center

Table 6 - Azure governance services

Management

Ensuring the ongoing performance and resiliency of your Azure workloads is critical so your business can rely on your new Azure-based workloads. Start by understanding the criticality and business value of each workload and document expected service levels. The design of a resilient architecture should be commensurate with the business's determined level of criticality by application. Several Azure services are available to help design such architectures.

Monitoring the performance and usage of migrated applications provides analytics on the overall health and optimization of cloud usage. Monitoring and logging can be done using Azure services like Azure Monitor, which includes Azure Log Analytics and Azure Application Insights.

Backing up critical application data protects you from external threats like ransomware or human errors. Azure provides an easy-to-use backup solution in Azure Backup. It allows you to backup virtual machines, SQL workloads and even on-premises VMware machines and is available right in the Azure Portal.

Concern	What to use
Monitoring	Azure Monitor Azure Application Insights Azure Log Analytics
Virtual Machine Management	Azure Backup / disaster recovery architectures OS Patching
Configuration Management	Azure Subscription(s) • Azure service limits • Subscription Security Boundary • Billing / chargeback Resource organization via Resource Groups Role-Based Access Control (RBAC)
DevOps & Automation	Infrastructure as Code (IaC) • ARM Templates • Scripting (CLI and/or PowerShell) • Azure DevOps Pipelines
Operational Processes & Runbooks	Azure Automation

Table 7 - Azure management services

Conclusion

These readiness dimensions are important to enable your successful scale migration to Azure. However, being completely ready is a progression and we encourage you to ask for help. The first step is to commit to doing your migration project and defining your Business Strategy. After that point, Microsoft has a program designed to assist you.

The Azure Migration Program (AMP) helps accelerate your migration journey. It includes prescriptive guidance and tools customers need for a path to the cloud from start to finish. Using proven cloud adoption methodologies, tools, resources, and best practices, AMP will enable your move to the cloud, working hand in hand with Microsoft experts and specialized migration partners.

It includes:

- **Curated, step-by-step guidance** from Microsoft experts and specialized migration partners based on the proven Microsoft Cloud Adoption Framework for Azure.
- **Technical skill building** with foundational and role-specific courses to develop new Azure skills and long-term organizational readiness.
- **Free Azure migration tools**, including Azure Migrate to assess and migrate workloads, and free Azure Cost Management to optimize costs.
- **Offers to reduce migration costs**, including Azure Hybrid Benefit and free Extended Security Updates for Windows Server and SQL Server 2008.

Begin your migration journey by submitting an application to join the program.