NGenious Solutions
Enhancing Your Business

TECHNICAL OVERVIEW
MIGRATION TO MICROSOFT AZURE

Discover

Migrate

Migration to Microsoft Azure: A Technical Overview

Introduction

Not long ago, server virtualization changed the face of corporate IT. The technology unleashed efficiencies and capabilities not possible when applications and data were constrained by physical hardware. Now, many companies are now moving their virtualized computing environment to the public cloud, reducing the burden, expense, and risk of maintaining an on-premises-only environment.

Running services in the cloud can lower maintenance costs and provide the ability to scale on demand as well as robust disaster recovery services. But how to get started? Without a strong plan, risks can include a complex and time-consuming migration process compounded by lack of relevant skills, loss of control from moving computer resources off- premises, bandwidth issues, and unexpected costs.

To assist customers to fast track their migration to Azure, NGenious Solutions have developed an extensive set of tools and services to reduce risk and speed migration of virtual machines, applications and databases. These tools and services support a broad selection of operating systems, programming languages, frameworks and databases: Linux, VMware, Java, Oracle, and Microsoft offerings such as .NET, Hyper-V, and SQL Server. This paper will discuss migrating virtual machines along with workloads, applications and databases running on those virtual machines.

Most migration projects can be divided into three phases: discovery, migration, and optimization and modernization.

1. In the discovery phase, you take inventory of resources as a way of determining where migration should start. This process, much of which can be automated using software tools, includes identifying workloads and applications, scoring each workload's readiness for migration, mapping the current physical hardware to optimal Azure virtual machines, and forecasting the return on investment and total cost of ownership for the migration.

2. During the migration process, software tools replicate virtual machines, applications, and data on Azure. At this time, you might also decide to containerize existing applications to make them migration ready. Once targeted virtual machines, applications, and data are migrated, optimization can begin.

3. Rather than a single step, optimization is often a continuous fine-tuning, and requires tools and services to strengthen security and consolidate management and performance tuning.

This document provides some best practices on each of the three phases of the migration process: discovery, migration, and optimization.

Discovery

How Azure Migrate helps

A free service from Microsoft, Azure Migrate enables guidance, insights, and mechanisms for cloud migration. Here are a few of the capabilities:

- Discovery and assessment for on-premises virtual machines and servers.

- Built-in dependency mapping, ensuring successful migration of multi-tier applications.

- Intelligent right-sizing for Azure virtual machines.

- Compatibility reporting with guidelines for remediating potential issues.

- Seamless workload replication to Azure, to simplify migration.

- Integration with Azure Data Migration Assistant, which partners with Azure Database Migration Service for database discovery and migration.

The discovery phase of the migration process, at its highest level, can help an organization answer three questions:

- What does my environment look like across applications, workloads and data?

- Will the virtual machine, workload, or application run on Azure?

- How much will it cost to run on Azure?

In a complex environment with hundreds or thousands of virtual machines, applications, and data sources, a manual assessment effort would be nearly impossible. With Microsoft Azure and NGenious Solutions can use tools and consulting services to simplify discovery. As an example, the Azure Migrate service provides guidance, insights and mechanisms for cloud migration.

With the information provided by Azure Migrate or third-party tools, it becomes much easier to select the applications and virtual machines that are best candidates for an initial proof-of-concept migration.

Typical characteristics include:

- Few or no dependencies on other processes, authorization mechanisms, or external databases.

- Virtual machines with high CPU or memory utilization but few dependencies.

- Virtual machines approaching their storage limit.

By filtering and defining the first workloads, you achieve a higher probability that the first migrations are successful. The result: lower risk and a demonstrable return on investment.

The discovery phase typically maps the existing environment to Azure Virtual Machine series instances and sizes. This, in turn, identifies expected costs. In many cases, customers that have purchased Software Assurance on Windows Server can use offers like Azure Hybrid Use Benefit in the Azure environment to reduce their total cost of ownership.

To pave the way for data migration, Microsoft offers a tool called the Data Migration Assistant (DMA) for discovery and assessment. It scans databases running on-premises and detects migration-blocking issues as well as providing remediation advice for problems, such as partially- supported or unsupported features currently in use. DMA partners with Azure Database Migration Service (DMS) to create a migration workflow that helps the moving of database schemas, data and users, server roles, and SQL and Windows logins.

Migration

Taking advantage of Azure

While you can migrate SQL Server virtual machines to Azure, you might want to consider the exponential gains that can be achieved by migrating a database to new Azure offerings. The gains can affect budget, management, and capability. For example, Azure SQL Database Managed Instance and Azure SQL Database reduce overall costs by providing PaaS-like experiences, reducing the need for extensive management. Microsoft provides two services that work in partnership to enable seamless migration to any Azure destination for SQL Server and other database sources.

- Data Migration Assistant enables discovery and assessment of current data environment, identifies compatibility issues, and recommends performance and reliability improvements.

- Database Migration Service helps migrate existing on-premises SQL Server, Oracle, and MySQL databases to Azure SQL Database, Azure SQL Database Managed Instance or SQL Server on Azure virtual machines.

Before any migration, you will want to ensure primary systems are safe and will continue to run without issues. Any downtime disrupts users or customers, and costs time and money. Migration is not as simple as turning off the virtual machines on-premises and copying it across to Azure. Migration tools must take into account asynchronous or synchronous replication to ensure live systems can be copied to Azure with no downtime. Most of all, systems must be kept in lock-step with on-premises counterparts. You might want to test migrated resources in isolated partitions in Azure, to ensure applications work as expected.

To move virtual machines, workloads, and applications from on- premises into Azure requires tools such as Azure Site Recovery (ASR), or third-party tools such as CloudEndure, and Velostrata. Any tool usage will be based on project goals and environment specifics. For example, you could use any of the following:

- Azure Site Recovery, when you have Azure-compatible Windows Server and Linux machines migrating from any platform. Because Azure Site Recovery uses replication technology, your initial upload will be large with smaller differential uploads. This will need to be considered in moving numerous virtual machines, because the limitation for virtual machines per day will be dependent on bandwidth availability.

- CloudEndure, when you have the need for a wider range of supported virtual machines to migrate to Azure. Like ASR, CloudEndure uses replication to migrate virtual machines with no impact to the original source machine. CloudEndure is also a solid choice if you want to use an independent tool.

- Velostrata, when you require a fast-paced migration of virtual machines to Azure. Velostrata takes a different approach to migration, replicating the virtual machine's compute run-time to Azure, which is incredibly fast, and then over time replicating the virtual machine's storage. In this model, you can migrate many virtual machines daily to Azure, but it requires fast and reliable network connections, since the storage for those virtual machines will need to be accessed on-premises for a time.

As with any migration, there are multiple steps, including architecture review, capacity and network planning, preparation of Azure resources and the virtual machines being migrated, establishing replication sources and targets, testing the failover mechanism, and initiating the actual replication.

By following these steps organizations can minimize production downtime during migration with zero application-data loss.
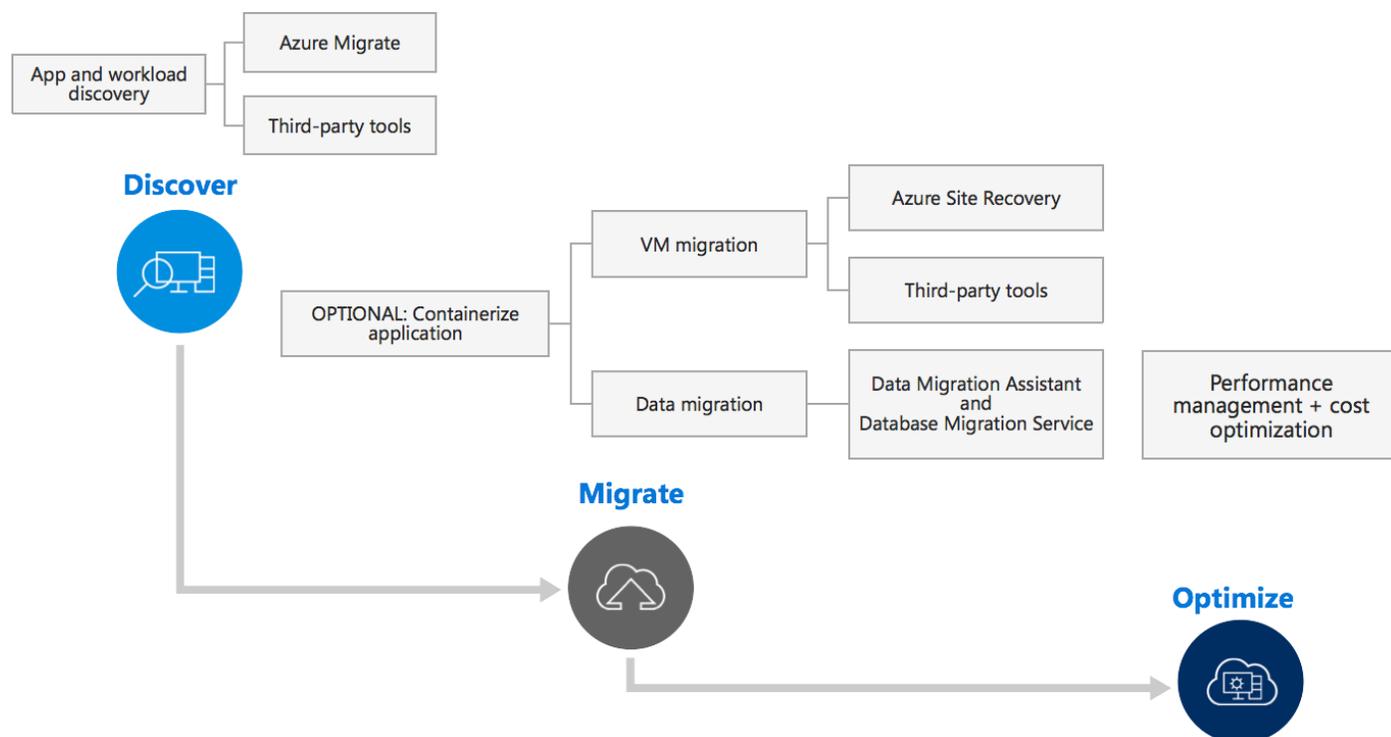
NGenious Solutions offer a full suite of tools for shifting workloads and data to Azure, from discovery to migration, to optimization.

Optimize and modernize

- Protect precious data from corruption with built-in backup.

- Monitor and pro-activity react to any issue with advanced insights and analytics.

- Ensure your security foundation is strong and environment protected with Azure Security Center.

Any migration project does not end after the migration itself. Once the virtual machines and workloads are migrated, you want to ensure peak performance, availability, and cost optimization. By exposing the virtual machines and workloads to Azure, you can start to move closer to immediate and longer-term goals, which might include reducing cost, optimizing availability and performance, and improving management and security.

Cloudyn, a recent addition to Microsoft's portfolio, provides granular, real-time visibility into cloud consumption, cost, and performance.
Through its reporting interface, organizations can monitor costs split across websites, virtual machines, storage, applications, databases, and networks. Cloudyn will ensure migrated virtual machines continue to deliver targeted resource utilization and best cost by recommending changes in series types, as needed, to ensure this ratio remains advantageous to the organization.

You will want to ensure a secured and well-managed virtual machine environment. Through built-in Azure security and management services, all migrated virtual machines can be maintained and monitored through a vast variety of solutions.

Next steps

This paper recommends starting with simple applications and databases. Once you understand the tools and processes and build migration skills, you can apply the skills to more complex parts of the computing environment. By understanding the costs, performance trade-offs, and management requirements for running workloads on-premises versus in the cloud, an organization can make better decisions about how to proceed—when hardware is being pushed to its limit or demand for computer resources contracts or expands.

Learn more about our services that support migration to Azure at
https://ngenioussolutions.com/services/cloud/microsoft-azure.html