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We at dotnetcurry are extremely happy to release our 7th edition today!

We would love to hear from you about how long you have been reading the magazine, what do you like/dislike, or any random thoughts that comes to your mind!

Do write to me at suprotimagarwal@dotnetcurry.com and your comments could get featured in our next edition !!!

Vikram Pendse

MICROSOFT AZURE

Building a Cloud Roadmap with Microsoft Azure

Cloud-enabled businesses are putting their efforts and investments to go "Global, Scalable and Available". Right from small startups to big enterprises, everyone has understood the importance of Cloud and some of these businesses are now taking a step ahead with Artificial Intelligence (AI) by using Intelligent services offered by Cloud providers like Microsoft Azure.

However, there are huge gaps in the following areas:

- Adoption of Azure as a cloud platform,
- Migration to Azure from on-premise or competing cloud provider,
- Lack of awareness about migration tools,
- Services offered by Azure at a large scale.

This article attempts to address these gaps and concerns, and shares some advice, best practices to educate you to make your Microsoft Azure journey meaningful and profitable.

THE MASSIVE WAVE OF "CLOUD" IS BRINGING ABOUT A TRUE "DIGITAL TRANSFORMATION" AT EVERYONE'S DOOR STEP.

Building a Cloud Roadmap with Microsoft Azure

As a case study, we'll take the fictitious **"Foo Solutions Ltd."** as a reference.

The CXO board, IT Head and the Technical and Solutions Architect group of Foo Solutions have decided to adopt Microsoft Azure as their cloud platform on the following basis:

1. They have a large .NET based application portfolio

2. Their current Datacenter contract is on the verge of expiring

3. They recently acquired a small firm who has a large Open Source Applications portfolio

4. They want to go global and reach out to their customers in different geographies

However, they don't have any Microsoft Azure experts or Architects who can guide them through the process.

So now, let us discuss a few things the team of Foo Solutions should know about and consider while migrating their existing applications to Azure, and build new Cloud First applications in their due course of adopting Microsoft Azure.

Building Migration Roadmap for Microsoft Azure

First, the decision makers should do an extensive exercise of bucketing their applications into the following categories.

1. Low business impact, sizable userbase and with no critical or sensitive data and public facing.

2. Legacy Web applications (maybe some Classic ASP apps).

3. Applications which are stable, critical, having impact on business, public facing and handles sensitive or critical data.

4. Applications which are on the verge of EOL a.k.a. end-of-life (like Silverlight apps which needs to be migrated or .NET 2.0 apps which needs to be moved to the latest .NET framework)

5. Applications which needs to be scrapped and re-written again. Potential "Cloud First" apps with minimum reusability of existing app and tending towards a new design. Applications which need to embrace Microsoft Azure Services.

There are many assessment and migration tools offered by Microsoft and 3rd Party Partners/Vendors of Microsoft. Ideally, the technical group at Foo Solutions should do a detailed analysis of the tool, accounting the challenges they might face during migration, cost impact, business risks and downtimes etc.

Accordingly, a migration roadmap can be built. To ease this activity of assessment and migration, let **us discuss a few commonly used tools which will ease your initial assessment work** and also help in the actual migration to Microsoft Azure.

Many customers are still running Classic ASP based apps live on production, running their business as usual with certain number of sizable users. If such customers are re-writing their apps and wish to continue with the legacy platform, they can leverage the Azure IaaS platform to host their applications. Note that there is no out-of-the-box tool from Microsoft Azure which will give you assurance of migration, so you may have to do some configuration changes.

Azure PaaS does not support Classis ASP/Legacy workloads.

Azure App Service Migration Assistant

Many a times, people who are aware of the differences between Azure IaaS vs Azure PaaS can't make the direct decision as what to opt for, and most importantly can't validate the approach.

It is sometimes a difficult and challenging situation if the migrations need to be performed in a short time span. Hence some quick automated assessment is required which will rule out the risk of choosing Azure IaaS or PaaS decision.

Microsoft addresses these concerns for their customers by a quick, handy and easy to use tool. In order to check whether your existing on-premise hosted or any other datacenter hosted application is suitable for moving to Azure PaaS or not, Microsoft has a **App Service Migration** tool, which helps you to do the primary assessment and gives you insights about all the technologies used and whether they can be ported on Azure as an Azure App Service (which is Azure PaaS). This is a **FREE** tool available at https://appmigration.microsoft.com/ and you can also install this on your existing on-premise environment.

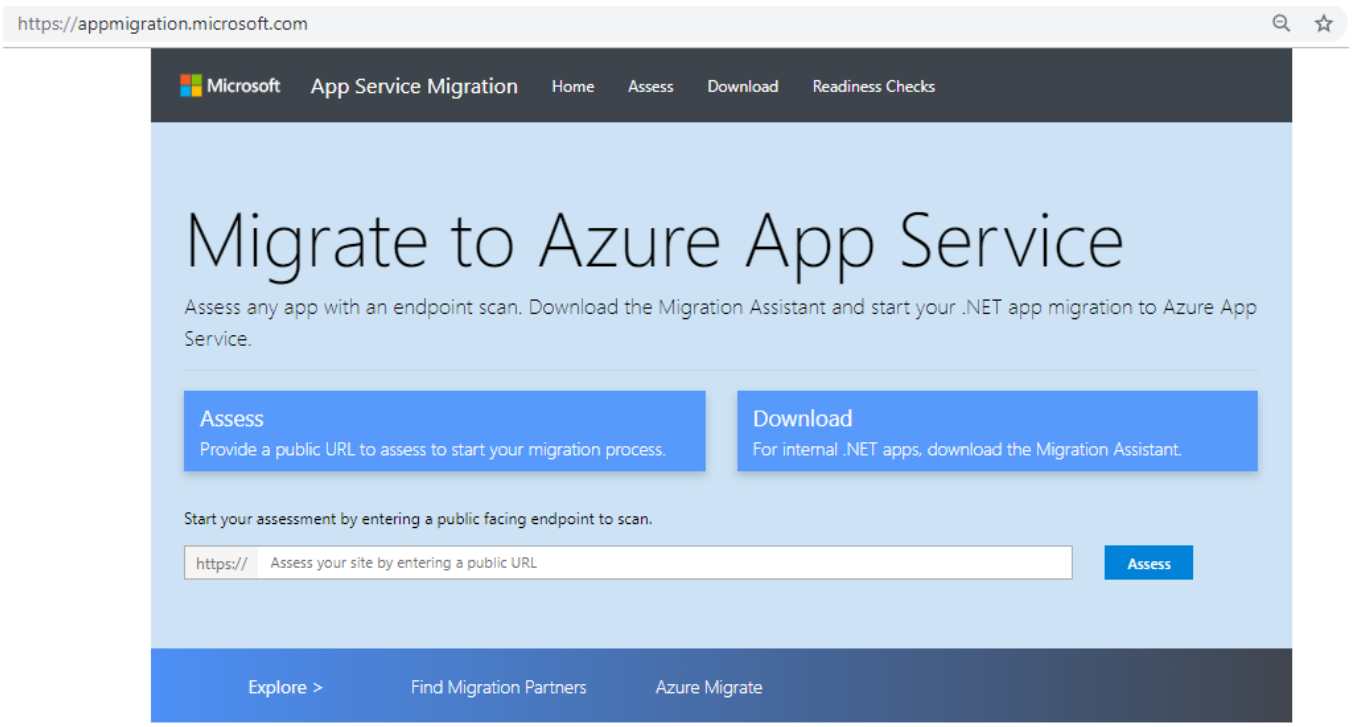

Figure 1: Azure App Service Migration Tool

It will scan your end point (URL of your application or in case if you install, then your on-premise

Migrate your SQL database to Microsoft Azure with Microsoft Data Migration Assistant

This is one of the popular tools (also known as "DMA Tool") to migrate your on-premise SQL database instance to Azure SQL Server or SQL instance on Azure VM, accessible from an on-premise network.

Like the App Service Migration Tool mentioned earlier, this tool also does an assessment and gives details of blocking issues and enlists the unsupported features. It also accounts for breaking changes and deprecated features.

In order to run this tool, you need to have the sysadmin role assigned to you. This is also a **FREE Tool** and can be downloaded from here - https://www.microsoft.com/en-us/download/details.aspx?id=53595.

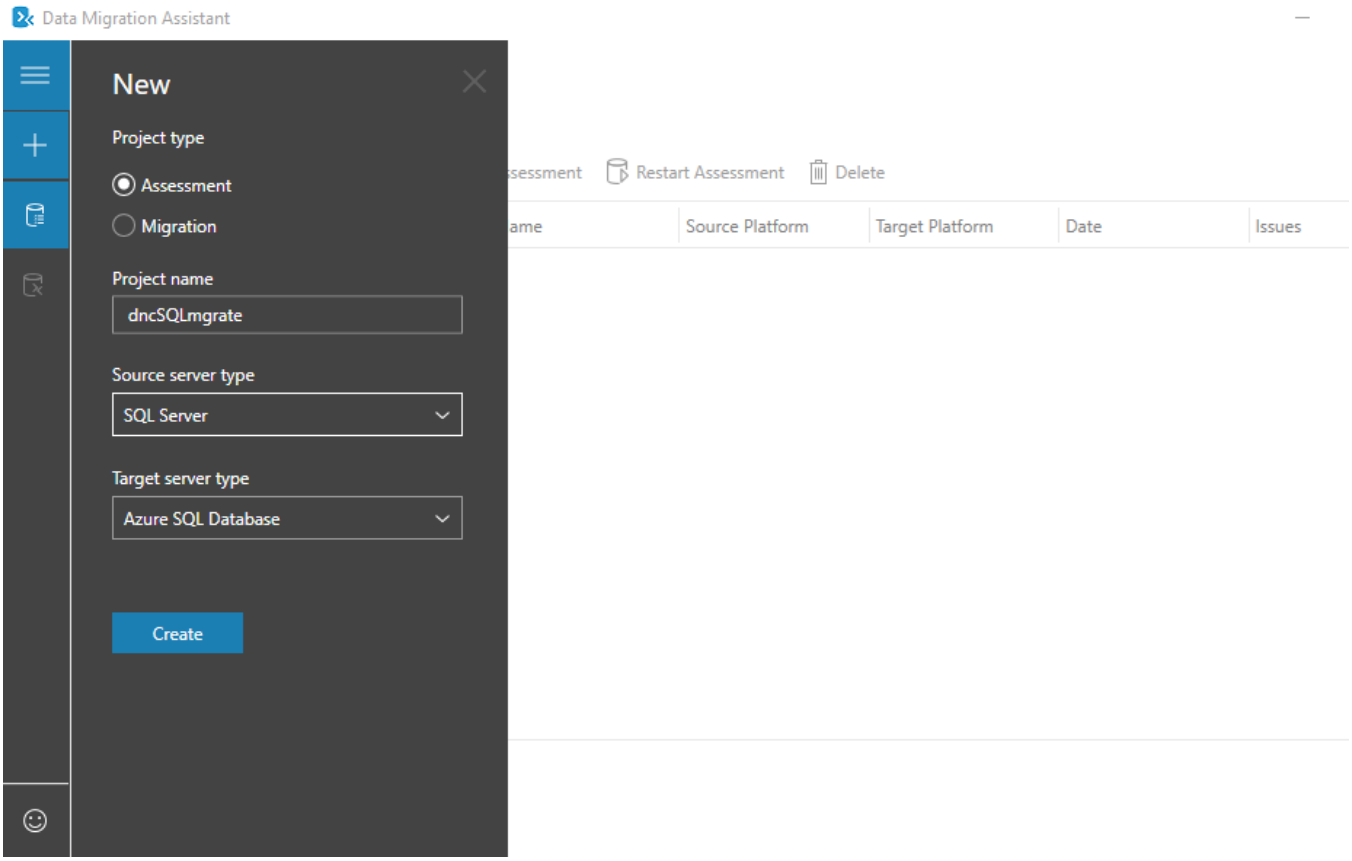

Figure 3: Azure Data Migration Assistant Tool

Besides assessment, it allows you to migrate from your instance located on-premise -> to Azure SQL, Azure SQL Managed instance or SQL on Azure VM.

Note: *If you are running SQL Server 2008 for your applications/business, kindly check the end of life (EOL) announcement for SQL Server 2008 and the newly announced "Azure Hybrid Benefit" offer from Microsoft for SQL Server 2008 migration. More details here - https://azure.microsoft.com/en-us/pricing/hybrid-benefit/*

Migrating to Cosmos DB

Microsoft Azure Cosmos DB is a revamped version of the previously available DocumentDB with many more new features and enhancements.

- Enable Threat Protection for Azure SQL DBs
- Manage SAS Tokens and Keys effectively for Azure Storage and keys of other APIs
- Implement Multi-Factor Authentication for applications
- Implement AD Authentication to enforce policies
- Ensure to classify your data (Public Vs Confidential) and accordingly choose appropriate data source and protect the same
- Use Azure Key Vault to store secret keys (including passwords of Azure VMs)
- Ensure to run OWASP Top 10 testing for your application and align as per OWASP Top 10 policies
- Restrict IP address by adding your resources to Virtual Network
- User Azure DDoS protection and Azure Pen Test to ensure highest level of security for your application

With this, we have covered the major items for Foo Solution Ltd. and provided guidance for their Migration approach, Security of the applications and Cloud components.

Now let us discuss some reasons why organizations fail in their Cloud Migration journey, and how it impacts adoption.

Common reasons of Failures and Extra Costs Incurred during Azure Adoption and how to avoid these mistakes

Let us quickly understand some high-level points due to which enterprises/companies going on Microsoft Azure fail to get maximum Return on Investment (ROI) from the platform or even take the decision to opt out.

Moving to the Cloud is not an easy decision and thus opting out is equally painful. But to avoid such painful acts, I will enlist some preventive measures and points to consider in order to illustrate an ROI on your Cloud investment.

We will basically bucket them into two categories (Technical and Non-Technical).

Technical Challenges

- **Assuming Azure IaaS is the final solution and burning out** – By not designing appropriate High Availability/Availability Zones, moving everything on Azure IaaS can be a disaster. We have discussed couple of assessment tools in this article. Enterprises/companies should first do a thorough analysis using the tools available, and then make a clear choice of IaaS or PaaS. Usually PaaS is cheaper and flexible, easy to deploy, and for maintaining the overall environment.
- **Lack of awareness of Azure Services and Tooling** – Microsoft Azure is a dynamic cloud platform and is continuously evolving with new features. Microsoft keeps adding and updating their value-added services. After doing an assessment, Architects and Decision makers need to map Azure Services with

their existing apps and see what is best suitable for them to achieve their business goals, as well as customer satisfaction.

- **Blindly Mapping Services with Competing Cloud Providers (eg: Amazon AWS)** – Many customers while moving from Amazon AWS or while having a multi-cloud strategy, always tend to map head to head services and assume it will work hassle free. Well, I recommend to do a quick assessment especially for Microsoft Azure where there is a plethora of services and wider choices available. For example – In case of mapping for AWS Lambda, off course, the equivalent choice is Azure Functions since both are serverless offerings. But then do revisit the requirement once since it may happen that what you are looking for, can be served using Azure API Apps as well. This is just a high-level example but besides this, "Cost" is also a factor, so ensure you are not blindly mapping services, but rather evaluating it for a better optimized use.

- **Wrong Technical assumptions and SLA assumptions** – Enterprises/companies are first required to understand the different SLAs for different services in Azure. They also need to understand the terms and conditions to achieve those SLAs and ensure the steps to be taken to fulfill them. "High Availability" and "Maintenance of VMs" (especially in Azure IaaS) are the most misunderstood terminologies. For Azure IaaS, do understand the "Shared Responsibilities" concept before opting for it.

- **Wrong assumptions about Security** – In an earlier section of the article, I mentioned that customers often ask "Is Azure Secure?" Do feel free to have a conversation with the customer and ask her/him a few questions of your own like "Is your application secure in its current environment and what measures have been take to ensure its security?".

  While this may open up Pandora's box, you will get the opportunity to showcase some of the built-in security measures or cloud native security services, Microsoft offers. This should lead to a good value proposition. You need to understand and help the customer understand the following:

  o Data Classification – Difference between Public Data and Private Data. How Microsoft treats data hosted in Azure. What are the Microsoft policies for the same (Check Microsoft Trust Center for more details - https://www.microsoft.com/en-us/trustcenter/cloudservices/azure).

  o Help customer to educate how Microsoft ensures enterprise grade security to its Data centers across the world and compliances they have.

  o Educate customer to differentiate between Application Security and Cloud Security and the different measures and services associated with it.

  o Encourage Customers to opt for Monitoring services (many customers bypass this recommendation to save few $ in the monthly bills)

Non-Technical Challenges (Sales / Pre-Sales phase)

- Wrong mapping of services or service choices for saving the cost in proposals/RFPs.

- Lack of tools/questionnaire to capture the requirements for Azure (capturing Business goals, high level details of current application/infrastructure etc).

- Poor understanding of Security and Compliance offerings from Azure.

- Poor knowledge of Azure cost calculator and different pricing models like:
  - Cloud Solution Provider (CSP)
  - Enterprise Agreement (EA)
  - Pay-As-You-Go (PAYG) etc.

- Missing out non-functional requirements (NFRs).

- Lack of knowledge and wrong assumptions about 3rd Party Services integration in Azure.

- Lack of knowledge of different Support Model Microsoft offers for Azure.

- Poor knowledge of different product licensing especially in Hybrid or Lift and Shift migration scenarios in Azure. Lack of knowledge of license reusability.

- Poor communication with ground Sales and Partner teams of Microsoft who can frequently share publicly available value-added updates, and can share more insights.

Value added Services and Tools

We detailed out the Migration and Security aspects along with common challenges and reasons for failure on Microsoft Azure. Now once you embrace Microsoft Azure, in order to illustrate a better ROI, here are some services and tools which will not only ease your Azure journey, but will also add value to your customers.

App Configurator Service (Currently in "Preview")

Many large enterprise applications have complex and huge configurations settings which play a key role in running these apps successfully. Maintaining them is a complex task and it is a challenge when overriding these settings.

Being an enterprise friendly organization, Microsoft understood this aspect and to resolve this problem, they have introduced the "App Configurator Service" which is single stop repository to store all your key values and configurations securely. Like you read your configuration files, similarly you can read these settings with a set of APIs.

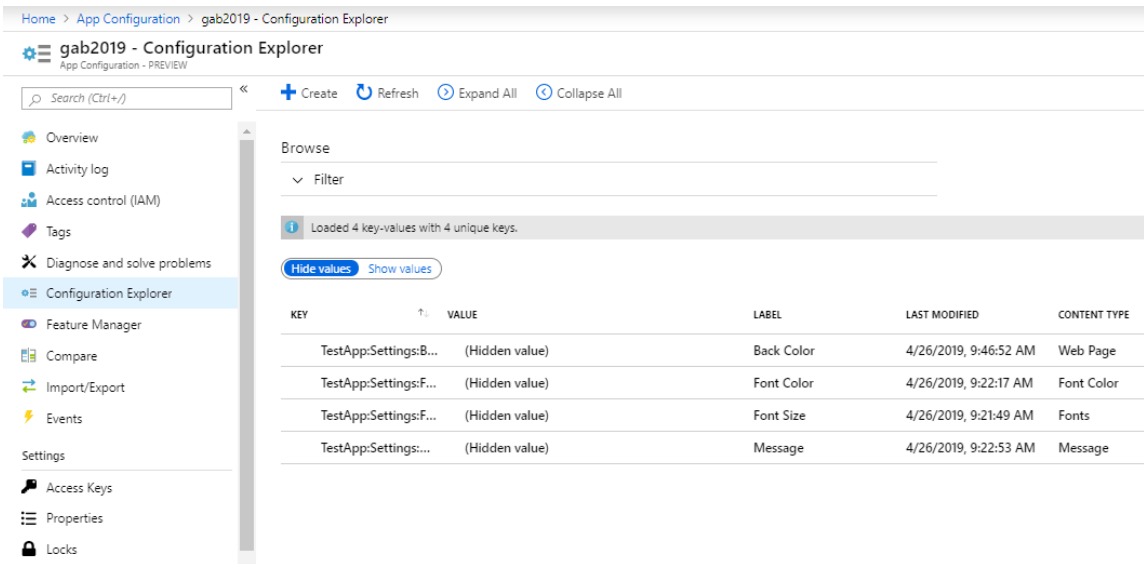

Figure 17: Azure App Configuration Explorer for storing Keys

You can also Import and Export them any time, and it is quite easy to manage them from the Azure Portal too.

Cloudockit

Cloudockit is a multi-cloud third party solution to document your Cloud workload with in-depth details. This tool produces in-depth Technical documentation and works where you may have any compliance rules to share the documents with customers, or maintain them for customers for audit purpose. It is a quick tool which will save you time which you would otherwise spend on building manual documentation.

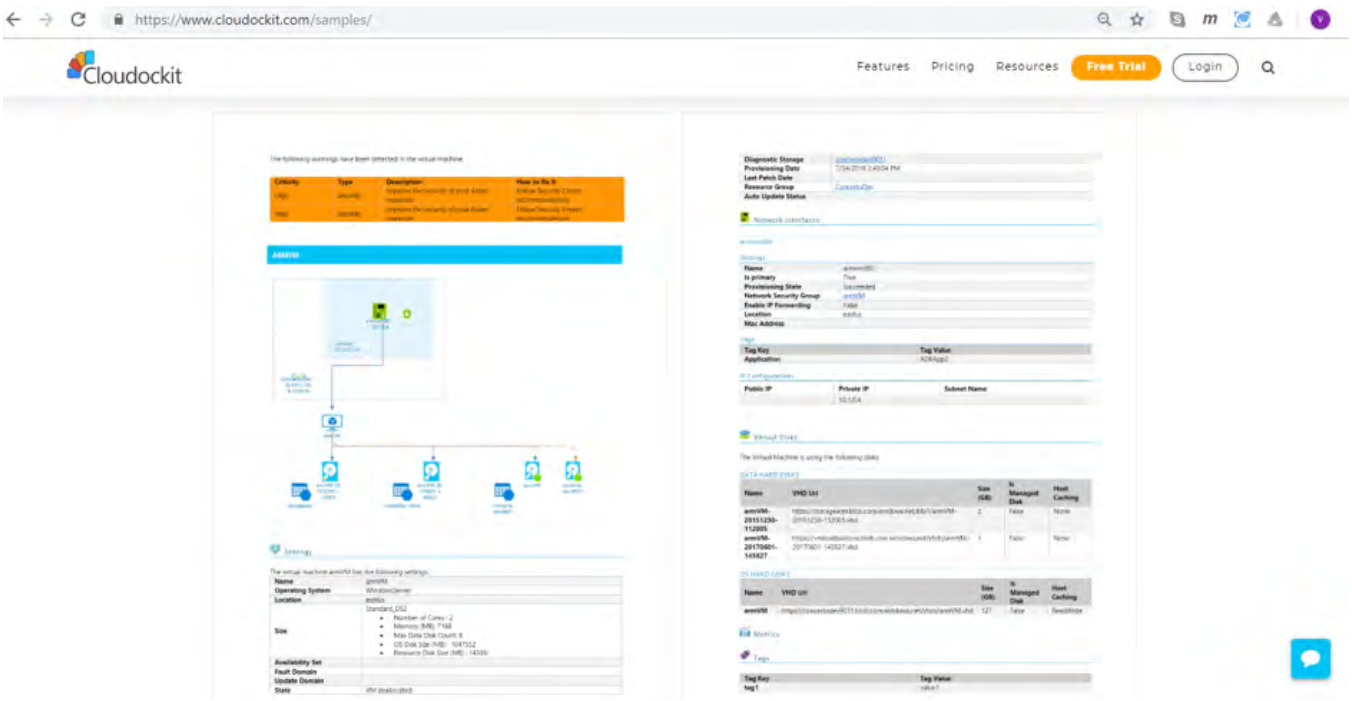

Figure 18: Cloudockit Tool

Cloudockit supports Microsoft Azure (including multiple subscriptions).

This is a paid tool and you can take a free trial at cloudockit.com.

Choosing the right compute type and size

This is a complex and critical area and requires lot of exercise and extensive experience. There is no documentation which selectively states that for 1 million users, use this VM type or for a pick load of 50 million expected users, use a different class of VM to get a good performance.

The number of cores and memory usually can be picked with the following parameters:

- Nature of the business and availability in the multiple regions
- SLAs committed to end customers/consumers
- Ballpark number of users

If you are new to Azure DevOps, the best way to get hands-on experience is to try out the FREE step by step labs from Microsoft here - https://azuredevopslabs.com as well as check out some tutorials at www.dotnetcurry.com/tutorials/devops.

Conclusion:

Microsoft Azure is one of the top leading Public Cloud Platform with unique offerings and true hybrid, secure and enterprise grade SLA offerings.

Azure gives good ROIs provided you align your migration and new application development strategy to it. I hope this tutorial has helped you get over common misconceptions about Microsoft Azure.

The suggestions described in this tutorial will also help you avoid mistakes, illustrate a better ROI and enable you to take decisions and build a long term, sustainable, profitable and secure Cloud roadmap for your organization, to serve your customers and consumers better!

Microsoft MVP Most Valuable Professional

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Vikram Pendse is currently working as Cloud Solution Architect in e-Zest Solutions Ltd. in (Pune) India. He has 12+ years of IT experience spanning a diverse mix of clients and geographies in the Microsoft Domain. He is an active Microsoft MVP since year 2008 and has currently received the MVP award in Microsoft Azure. Vikram is responsible for building "Digital Innovation" strategy for e-Zest customers globally using Microsoft Azure and AI. He is a core member of local Microsoft Communities and participates as a Speaker in many Microsoft and other community events talking about Microsoft Azure and AI.

Thanks to Tim Sommer for reviewing this article.

Gouri Sohoni

AZURE DEVOPS - YAML FOR CI-CD PIPELINES

In this tutorial, I will give an overview of how to use YAML in Azure Pipelines.

Azure Pipelines is a service which provides CI (Continuous Integration) and CD (Continuous Delivery). It can integrate with various repositories like GitHub, GitHub Enterprise, BitBucket or even Azure Repositories for source code.

Continuous Integration (CI) is a process which automatically starts the server side build, the moment any team member checks-in or commits the code to source control. The build can be automated and deployed to Microsoft Azure and tested.

A common way to create and configure your build and release pipelines in the web portal is by using the classic editor. Though Azure Pipelines can work with a classic editor (formerly called as vNext – which is GUI based), I am going to show how **YAML** can be used.

In this article, I will discuss:

- **the basics of YAML**
- **how to use it with Azure Pipelines and**
- **how it can be used for configuring CI-CD pipelines in Azure DevOps.**