

6 STEP MIGRATION STRATEGY

**SYSTEMATIC APPROACH TO
MIGRATING YOUR
WORKLOADS TO
MICROSOFT AZURE**

WRITTEN BY
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6 Step Migration Strategy – Systematic Approach to Migrating your Workloads to Microsoft Azure
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About the Author

Aman Sharma is Microsoft Azure MVP and is currently working as Principal Technical Consultant with Green House Data for the Private and Public cloud, where he architects and designs various solutions around Microsoft Azure and related technologies. He ensures the security in the design along with the incorporation of best practices leveraging various Azure technologies to their full potential.

Aman is passionate about technology and how it can change the way we experience life on day to day basis. He comes from a development background and has led the development of various products around Azure. He works with both IaaS and PaaS features of Azure. He has been building enterprise solutions around Azure Cost and Performance Optimizations, Azure Billing & Chargeback, Enterprise Datacenter Management solutions, etc.

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Introduction

With the cloud becoming more and more secure, it is becoming a natural progression to move to the cloud. Almost all enterprise organizations are working in a Hybrid model with workloads being migrated to the cloud every day. As migrations have become a necessary part of any organization's strategic goals, it makes sense that we understand the most optimal way to get the process right the first time.

When migrating your workloads to Microsoft Azure you want to follow a systematic approach. You want to build a solid step-by-step Strategy before even consider starting the migrations. A right strategy can set you up for success. A wrong one can cause a big dent in your budget and result in many unhappy business users.

In this post, we will try to uncover what steps will you require to plan and successfully lead the **migrations from on-premises to Microsoft Azure leveraging Azure Site Recovery or ASR**. This article considers the scenario of VMWare on-premises to Microsoft Azure migration scenario. Similar concepts from process perspective also hold true for Hyper-V or System Center Virtual Machine Manager (VMM) to Azure migrations.

Things to consider even before we start

Migrating your workloads directly to Microsoft Azure is a very easy choice. It provides you with a **lift-and-shift approach** to migrations. However, taking the extra effort to move it to PaaS services (Platform as a Service) can help you realize better performance with potential cost savings. Azure Web Apps (App Service) and Azure SQL Databases are two major PaaS services to consider amongst various offerings out there.

Therefore, even before you start, do consider the following for each server and every application on those servers:

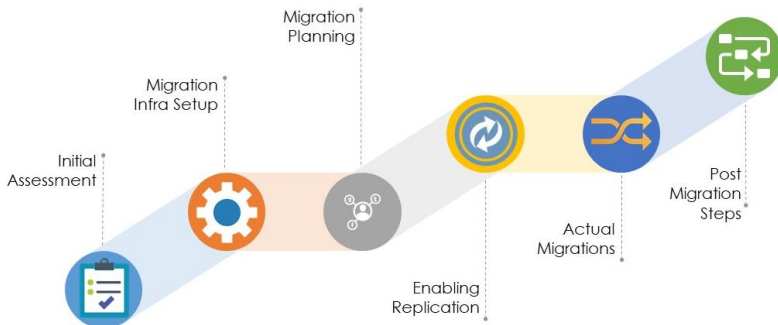
1. Do we really need this server? Can it be **decommissioned** if it is not being used by any processes?
2. Can the services or the application running on the servers be moved to any **PaaS service** in Azure?

These are the questions that should be considered prior to the start of the move or during the Initial Assessment and planning phases of the migration.

Overall Migration Strategy

An overall step-by-step strategy to migrate your workloads to Microsoft Azure can be summed into **six key stages**. These stages are:

1. Initial Assessment
2. Migration Infrastructure Setup
3. Migration Planning
4. Enabling Replications
5. Actual Migration of the Servers
6. Post Migration Steps



These stages should be roughly followed sequentially. But sometimes some stages can be executed in parallel. We will look at these scenarios as we discuss each and every stage.

Let us look at these stages in detail.

Stage 1 – Initial Assessment

This is the stage when you perform an initial assessment of the whole source environment, which you want to migrate into Azure. This is the “**Discovery**” phase where you get insights into the environment. Basically, you are looking to understand:

- Number of servers in the environment
- Compute power of each server
- Disk requirements of the server
- Data Churn Rate (i.e. how fast the data changes on the server)
- Pre-requisites check e.g. access and connectivity requirements

These details provide you with enough data to find how much compute power the server will require in Azure and therefore how much it will cost in Azure. It also provides you with insights around how much time it will take to replicate the server into Azure and how much bandwidth will be required to keep the server up to date (based on the data churn rate). You will also need to factor in the maximum bandwidth available to you. You do not want to choke your bandwidth and will want to throttle it (using throttling controls on your Configuration Server).

Tools Available

There are various tools that you can utilize at this stage. There is an Azure Site Recovery **Deployment Planner** from Microsoft that can provide you insights into the on-premises VMWare infrastructure with a very basic report. You can also leverage third-party solutions like **Movere** which provides you much more analytics to kick start your migration planning with better insights into your environment.

Azure Migrate is another service that you can leverage. It can also provide a cost analysis of running your on-premise workload in Microsoft Azure. It requires you to download and import a collector VM in your on-premises VMWare infrastructure with appropriate permissions. Then it can provide a rich dashboard with insights into your environment.

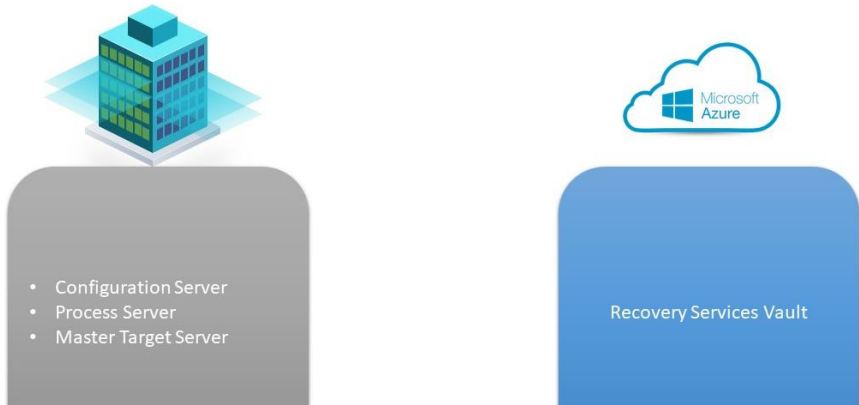
You can learn more about Deployment Planner on Microsoft official documentation here: <https://docs.microsoft.com/en-us/azure/site-recovery/site-recovery-deployment-planner>



Note: Actual report may vary depending upon the tool leveraged. The above report is based on the Movere tool. Image Credit: <https://www.movere.io/movere/>

Stage 2 – Migration Infrastructure Setup

Once you have all the information and insights into your environment, you need to prepare yourself with an environment to enable the migrations.



When setting up your environment, you will need to consider the setup on both Azure and on-premises sides. You will need to build an Azure Site Recovery (Recovery Services Vault) in Azure. You will also need to build a Configuration Server with appropriate configurations on-premises.

Generally, you start with building a Recovery Services Vault in Azure. From there you can follow the instructions on how to set up the on-premises environment. It automatically generates an OVF template that you can download and import into VMWare environment to create an all in one VM with Configuration Server, Process Server and Master Target server in one. It is collectively called the on-premises **Management Server**.

The Management Server keeps track of the configuration of the server being migrated and acts as an intermediary. The data from the source VM (virtual machine) is copied onto this server and then from here, it is copied over a secure channel to a Recovery Services Vault in Microsoft Azure.

Make sure to check all pre-requisites are setup properly. E.g. the VMWare account to be configured on the Management server should have enough permissions in the system. If you have a Firewall, then make sure all the relevant communication is allowed.

Recommendation: If possible perform a test replication and failover of a non-critical test VM to ensure that all pre-requisites are met and the Infrastructure is configured appropriately.

Step-by-Step configurations of this setup can be found on Microsoft documentation here: <https://docs.microsoft.com/en-us/azure/site-recovery/migrate-tutorial-on-premises-azure>

Stage 3 – Migration Planning

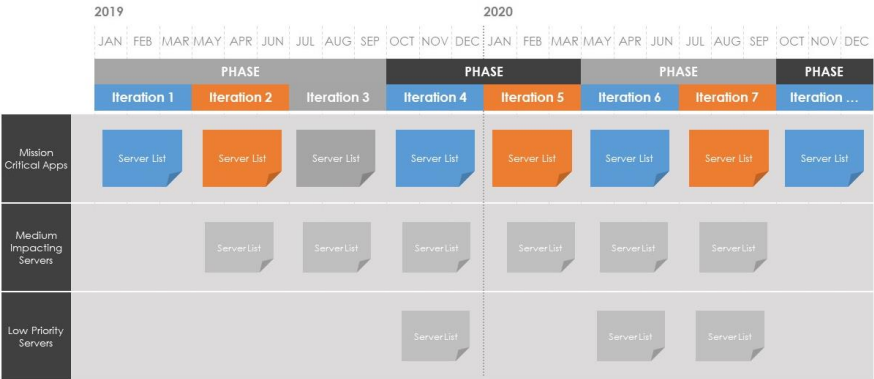
Migration planning seems simple but is the **most important stage** of the whole process. This stage can make or break the whole process depending upon the execution of this process. This stage charts the course which the subsequent stages will follow.

You have different items that you want to take care during this phase, but the most important task is to make the Business Users aware of the process. They are the owners and users of the servers you are planning to move. Therefore, it is critical that they should know what to expect during and after the move.

Make sure that you do the following during this stage:

1. Set up meetings with the Business Users
 - a. Ensure that they know what to expect
 - b. Talk about the rollback options. Easiest rollback option is to delete the migrated VM from Azure and bring up the VM back on-premises
2. The IP address changes after the migration. Ensure that the application is not hardcoded to the IP addresses.
3. Also, the MAC address changes after the migration. Ensure that there is no software on the VM that has its license tied to the MAC address of the VM. The license will need to be renewed post-migration.
4. If the application is critical, it is recommended to perform at least one pass of testing (via Test Failover option in Recovery Services vault).
5. Plan and block time with the Business Users during the test failover and actual migrations, so that they can test their applications after the migration
6. Decide if any server can be decommissioned (if it is not used by any process). Follow the appropriate process of the organization to decommission the server.
7. Check if any VM is not compatible and/or require any additional re-configurations
8. Plan for the Virtual Network, Subnet and IP addresses in that subnet that will be allocated to the VM when it will be migrated into Azure. This provides more transparency and predictability for the business/application users.
9. Distribute your server/applications into various categories like below. Depending upon the number of servers to be migrated, you can increase or decrease these categories
 - a. Mission critical servers
 - b. Medium priority servers
 - c. Low priority servers.
10. Plan for the downtime during the migration. If you have to put a change order (CO) then put at least for 1 hour.

- a. Even though the migration takes less time, it gives you buffer in case you have to troubleshoot any issues. I have sometimes performed the migration on 4-5 servers in parallel and was able to finish under 1 hour. But still every time I had buffer planned in case we need it for any troubleshooting
11. Finally, build a schedule based on the gathered data (specifically the availability of the business users and the criticality of the server to be moved)
- a. Document everything using a tool like Excel sheet, or Microsoft Project Plan, or a SharePoint site etc.
 - b. Ensure that the relevant stakeholders are aware of the schedule and planning that was done earlier



Stage 4 – Enabling Replications

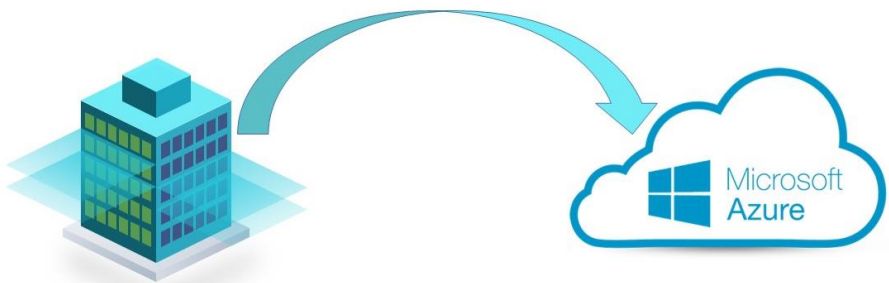
Replication is the process of copying of the Virtual Machine/Server from on-premises into the cloud. Enabling of replications should be done in batches to ensure that the bandwidth is consumed optimally. This should follow the schedule created earlier. The replication should be complete at least 2–3 days prior to the actual migrations.

Once the replication is complete, you should also ensure that the **target settings** in the Recovery Services Vault for the protected VM are updated to reflect the correct target details.

If you want to plug in any **automation with the migrations**, then now is the time. You should leverage Recovery Plans and should perform migrations only via Recovery Plans in such scenarios. You will need to have the automation scripts setup as Runbooks in an Azure Automation Runbooks. This should then be referenced via the Recovery Plan in Recovery Services vaults.

Make sure that you monitor the health of the VM after the initial replication is done and the VM is ready to be migrated.

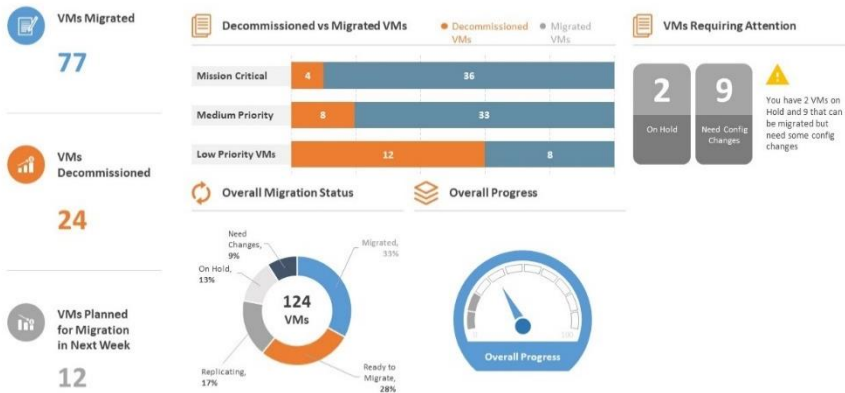
Immediately before migration, you should check on the Disks if any delta changes are pending to be replicated and should wait at least 15 mins to see if the cache clears or not. After that, if the changes are important then you should wait further. If the changes are not important, then you can proceed with the migration.



Stage 5 – Actual Migrations

Once you are ready, you can trigger the actual migrations. These should be carried out systematically and as per the plan drafted earlier.

The important part here is to provide periodic reports to the stakeholders on the progress. As a best practice, you should have reported (based on the initial plan) to update the stakeholder. Below is a sample of one such report.



Stage 6 – Post Migration Steps

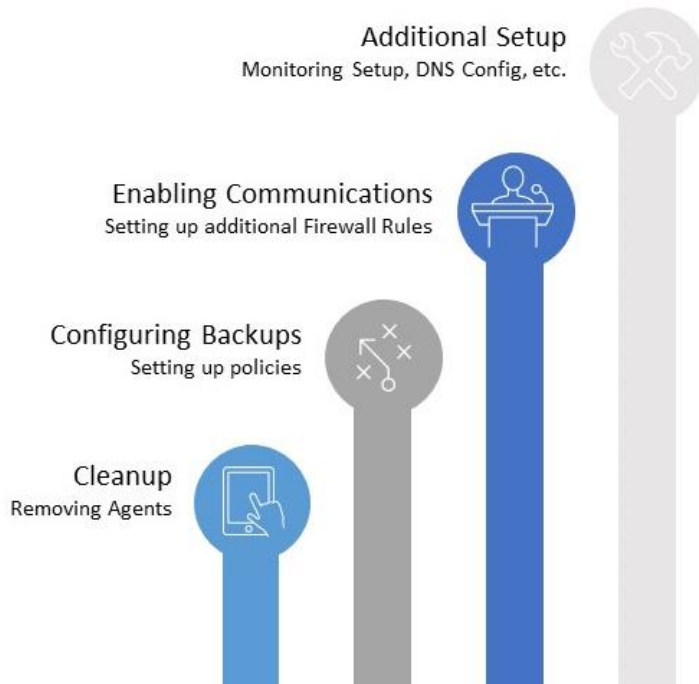
Now that your VM has migrated from on-premises to Azure, your work is not quite done yet. Post-migration steps are important to perform final cleanup before handing over the VM to the end users. These steps may differ from customer to customer, based on the infrastructure and tools that are already being used in the customer's environment.

At a very high level, below are some of the steps, that should be executed during this stage:

1. Cleanup of Azure Site Recovery Agent (if you do not want to fail back from Azure to on-premises then this should be cleaned)
2. Cleanup of the VMWare Agent
3. Validation and Installation of the Azure VM Agent (if not already)
4. Configuring the Backups using Azure Backups on the VMs migrated
5. If you have any Firewall appliances or even Network Security Groups, then you may need to open some rules/ports based on the requirements of the application running on the server
6. Reconfiguration of the Pagefile on the VM
7. Updating the time-zone on the VM as per the geographical region of the VM
8. Check if the Hybrid User Benefit (HUB) licensing or Reserved Instances quota is applied (if allowed and applicable) to realize potential cost savings
9. Updating the DNS Configurations
10. Updating the Monitoring system

As a best practice, after performing any potential post-migration steps, you should restart the Virtual machine one last time.

You should also have the business users test their server as soon as you are done with this stage.



Conclusion

These 6 steps constitute the high-level strategy to perform any migrations from on-premises to the Microsoft Azure cloud. These stages ensure that you follow a step-by-step approach and you do not miss any compliance. We have refined this strategy over a large period of time and over around 500 server migrations. Following this strategy also avoids any potential pitfalls during or after the migrations.