Best Practices for Migrating Servers to Microsoft Azure with PlateSpin Migrate

Updated for PlateSpin Transformation Manager 1.1 and PlateSpin Migrate 12.2
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Introduction to Server Migrations

In today's dynamic world, the need for cost reduction and the desire to increase operational efficiency have a constant impact on the organization of IT resources.

Enterprises are relentlessly looking for better ways to manage infrastructure, systems and applications—and this often leads to the execution of projects where large numbers of servers are moved from one platform or data center to another. Typical examples include the migration of physical servers onto a virtual platform, the migration of virtual machines from one virtual platform to another, traditional data center consolidations, and the migration of on-premise servers into a managed or public cloud, like Microsoft Azure.

This White Paper contains best practices for migrating servers into the Microsoft Azure Cloud with PlateSpin® Migrate from Micro Focus®. PlateSpin Migrate is a powerful server portability solution that automates the process of moving servers over the network between physical machines, virtual hosts and enterprise cloud platforms—all from a single point of control. When migrating such servers, PlateSpin Migrate refers to these servers as “workloads.” A workload in this context is the aggregation of the operating system installed on the server, and all applications and data that come with it. PlateSpin Migrate provides enterprises and service providers with a mature, proven solution for testing, migrating and rebalancing workloads across infrastructure boundaries. Some of the key features in PlateSpin Migrate are:

- Anywhere to anywhere workload migration capabilities.
- Horizontally scalable with up to 40 concurrently active migrations per single PlateSpin Migrate server.
- Minimal service downtime during final cutover.
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Fig. 1
PlateSpin Migrate performs anywhere-to-anywhere migrations

Minimum Prerequisites

PlateSpin Migrate requires the use of Microsoft Azure’s new Resource Management for migrating workloads into the Microsoft Azure cloud. Before you can migrate workloads into Microsoft Azure with PlateSpin Migrate, you need to set up your cloud environment correctly. This means you need to have, as a minimum, the following items:

- A Microsoft Azure Account (i.e., a username and password combination).
- A Subscription you want to bill to (one Account can have multiple Subscriptions).
- An Application ID (the ID represents PlateSpin Migrate as an application that makes use of the Microsoft Azure API).
- An Azure Active Directory user created as a Contributor for the Subscription.
The PlateSpin Migrate server can be installed on-premise where the source workloads reside, or in the Microsoft Azure cloud itself.

- A Virtual Network with a Subnet. There are certain requirements related to ports and routing that we will discuss below.
- A Storage Account. There are certain requirements related to storage that we will discuss below.

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The minimum network-related prerequisites for a successful migration are:

- The source and the target workload need to be able to communicate with the PlateSpin Migrate server on port 443. The target workload is the replica of the source workload that will reside in Microsoft Azure.
- The PlateSpin Migrate server needs to be able to communicate with the Microsoft Azure API endpoint on port 443.
- The target workload needs to be able to reach the source workload on port 3725 or vice versa. This is the port over which the actual replication traffic is sent. The port number is configurable, consult the PlateSpin Migrate documentation for further details. By default the target workload will try to connect to the source workload over this port.

For source workload discovery, PlateSpin Migrate supports two options. For agent-less discovery the PlateSpin Migrate server needs to be able to connect to the source workload on the ports for protocols DCOM, WMI and RPC for Windows workloads, and on port 22 (SSH) for Linux workloads. Alternatively, for Windows workloads, the PlateSpin Migrate agent can be used. This agent is manually installed in the source workload and will connect to the PlateSpin Migrate server on port 443, to register the workload.

Because of the requirement that the target workload (residing in Microsoft Azure) needs to be able to communicate with the PlateSpin Migrate server on port 443, a VPN may be required between your on-premise networks and your Microsoft Azure networks if the PlateSpin Migrate server resides on-premise. The VPN can be set up using the Microsoft Azure portal, as explained in this article: https://docs.microsoft.com/en-us/azure/vpn-gateway/vpn-gateway-hwto-site-to-site-resource-manager-portal. Alternatively the Microsoft Azure PowerShell cmdlets can be used, as explained here: https://azure.microsoft.com/en-us/documentation/articles/vpn-gateway-create-site-to-site-arms-powershell, or as explained in this short Micro Focus YouTube video: www.youtube.com/watch?v=cqQg6WKxrOw
A VPN is not needed when running the PlateSpin Migrate server in the Microsoft Azure cloud, as the target workload can then connect to the PlateSpin Migrate server directly. However, in this scenario the PlateSpin Migrate agent has to be used for the discovery of the on-premise source workloads, and the PlateSpin Migrate server has to be configured to have source workloads connect to their target counterparts on port 3725. Consult the PlateSpin Migrate documentation on further details on how to install and configure the PlateSpin Migrate agent, and on how to change the replication connection initiation for port 3725.

Note that a Marketplace image of the PlateSpin Migrate server is available in the Microsoft Azure cloud for easy and fast deployment.

Cloud Resource Planning and Resource Group Management

Storage Access in Microsoft Azure is represented by a Storage Account. Storage resources in Microsoft Azure have some inherent limitations, which may require some up-front planning if large amounts of workloads are to be migrated into the cloud. One example of such a limitation is that the maximum size of a single disk stored in a Microsoft Azure Storage Account is 1 TB. Consult the Microsoft Azure documentation for further details on Storage Account limitations. Besides understanding these limitations, it is good to familiarize yourself with Microsoft Azure Resource Groups. Every resource (CPU, RAM, disk space, IP address, etc.) needs to belong to a Resource Group. The main purpose of the Resource Group is to manage the life cycle of resources.

When using PlateSpin Migrate to migrate workloads into Microsoft Azure, the Storage Account is referred to as the “Datastore”. When no Datastore is selected for a migration, PlateSpin Migrate will use (or create, for the first migration) a default Datastore (Storage Account). Like any other resource, the Storage Account must reside in a Resource Group, so when PlateSpin Migrate creates the Storage Account, it will also create a default Resource Group.

If you want full control over your Storage Accounts (i.e., you don’t want to rely on defaults created by PlateSpin Migrate), then you need to set them up in advance so that you can select them while configuring your migrations.
A second type of resource that may require some planning are Virtual Networks. As stated earlier in the section “Minimal Requirements”, at least one Virtual Network needs to be pre-created manually, before starting your migrations. This Virtual Network also needs to belong to a Resource Group, just like the Storage Account. Secondly, the Virtual Network needs to have at least one Subnet that’s available for workload provisioning. When performing a migration with PlateSpin Migrate, you will need to first select the Virtual Network, and then the Subnet where the workload needs to reside. Network resources are never created automatically by PlateSpin Migrate, so they always have to be set up manually in advance.

Creating an Azure Application to Represent PlateSpin Migrate

Because PlateSpin Migrate makes use of Microsoft Azure’s API to migrate workloads, it needs to be represented by an Azure Application, with a unique Application ID. To create an Azure Application, go to the Microsoft Azure portal (https://portal.azure.com) and select the Azure Active Directory management widget in the left menu column. In the “Default Directory”, select “App registrations”. Click “Add”. In the right pane, give the application a name (e.g., PlateSpin Migrate), select “Native” as Application Type, and enter a redirect URI. The redirect URI will not be used in practice, so you can type in anything that validates to a correct URI, e.g., https://platespinmigrate.mycompany.com. Click “Create” to create the application.

Once the application is created and shows up in the middle pane, click on it to expand into the detail view. Note down the Application ID, you’ll need it later to add a Microsoft Azure Location as a migration target in PlateSpin Migrate. Now Click “Required permissions” and then “Add” and then “1 Select an API”. Select the “Windows Azure Service Management API” and click “Select” to select this API. Now under “2 Select permissions” select the “Access Azure Service Management as organization users (preview)” and click “Select”. You should now see a green check mark next to “1 Select an API” and “2 Select permissions”. Click “Done”.

Because PlateSpin Migrate makes use of Microsoft Azure’s API to migrate workloads, it needs to be represented by an Azure Application, with a unique Application ID.
Configuring a User for PlateSpin Migrate to Use

Now that you have successfully created an Azure Application (for PlateSpin Migrate) with access to the Microsoft Azure API, you need to create a user that will be used by PlateSpin Migrate when it will be accessing the Microsoft Azure API as this Application via your subscription. On the Microsoft Azure portal (https://portal.azure.com), once more select “Azure Active Directory”. Select “Users and groups”, then “All users”, and click “Add” to add a user. Enter a name (e.g., PlateSpin Migrate) and a user name. The user has to be part of the Default Directory (federation is currently not supported). The name of the default directory is listed at the top of the Microsoft Azure portal, before “(Default Directory)”. The format of the user name has to be <username>@<Default Directory name>.onmicrosoft.com, where <username> can be freely chosen. Click “Show Password” and note down the auto-generated password so you can change it later. Click “Create”. Once the user is created, log out of the Azure portal and log in with your newly created user and the noted-down default password. Change the password for the user when prompted, log out, and then log in again with your Azure account that you use to manage your subscriptions.

Back in the Microsoft Azure Portal, go to “Subscriptions” and select the subscription you want to use for your migrations. Note down the subscription ID, as you’ll need it when adding a Microsoft Azure Location as a migration target in PlateSpin Migrate. Next we need to configure the user as a Contributor for the subscription. As you select the subscription, the subscription detail view will appear. Select “Access control (IAM)” and then “Add”. For “1 Select a role” choose “Contributor”. For “2 Add users” select your PlateSpin Migrate user and click “Select”. You should now see a green check mark next to “1 Select an role” and “2 Add users”. Click “OK”. In the User overview panel for your subscription you will now see your PlateSpin Migrate user with a Contributor role assigned to it.

Enabling Azure Subscriptions for Deployment of the PlateSpin Migrate Replication Environment

While replicating a workload to Microsoft Azure, PlateSpin Migrate has the future target workload booted from a temporary helper VM. This helper VM is called the “PlateSpin Migrate Replication Environment”.
Select the PlateSpin Migrate Replication Environment suitable for the version of PlateSpin Migrate you are using for your migrations.

to Microsoft Azure with PlateSpin Migrate, you must enable programmatic deployment of the helper VM. Once this enablement has been done, PlateSpin Migrate will transparently use the helper VM as needed, while performing migrations. No manual management of this helper VM is needed beyond enabling its initial deployment for your subscription.

**Enabling Programmatic Deployment of the Replication Environment**

In the Microsoft Azure portal menu, click “New” in the upper left corner, and search for “PlateSpin Migrate” using the search widget. Select the PlateSpin Migrate Replication Environment suitable for the version of PlateSpin Migrate you are using for your migrations. If you only see one listing, then select that one.

At the bottom of the PlateSpin Migrate Replication Environment detail screen, click the blue link called “Want to deploy programmatically? Get started”, to display the terms of use. Scroll down until you see “Choose the subscriptions”. Here, for each subscription that will perform migrations with PlateSpin Migrate, change its status from “Disable” to “Enable”. Then click “Save”.

**Adding a Microsoft Azure Location as a Migration Target**

In the PlateSpin Migrate Web UI, to add a Microsoft Azure Location as a migration target, click on “Targets” in the upper menu bar, click on “Add Target”, and provide the following information:

- **Type** (choose “Microsoft Azure Location”)
- **Subscription ID**
- **Application ID** (this is the Application ID you noted down earlier when you created the Application; previously this was called “Client ID” in the PlateSpin Migrate Web UI.)
- **Username** (this is the user name of the new user you created earlier for PlateSpin Migrate to use)
- **Password** (this is the password for the user)
- **Location Name** (choose the desired Microsoft Azure Location)

Click on “Add” to add the Location as a PlateSpin Migrate Target. This may take a minute. Note: you should only choose locations for which you have the vpn configured if your PlateSpin Migrate server is installed on-premise.
Configuring and Executing Server Migrations

Once all prerequisites are fulfilled, and your cloud resources are set up correctly, and at least one Microsoft Azure Location is configured as a migration target, you can start migrating servers. PlateSpin Migrate has an intuitive and easy-to-use Web UI, which allows you to drive migrations with just a couple of clicks. The migration process consists of three parts: discovery, configuration, and cutover.

Discovery of Source Workloads

Click on “Workloads” in the top menu bar, and click on “Add Workload”. To add (i.e., discover) a workload, you need to provide the following information:

- **Hostname or IP.** The IP address or resolvable hostname of the source workload.
- **Type.** Windows or Linux.
- **Credentials.** A username and password combination that has administrative privileges for the source workload.

Once all information is provided, click on “Add Workload”, and wait until the workload shows up as “Not Configured” in the Workloads list. The workload is now fully discovered.

Configuration of the Migration

In the Workloads overview, select the workload and click the “Configure Migration” button. This brings you to a screen where you can first configure the basic migration settings:

- **Full or incremental replication.** For migrations to Microsoft Azure, only full replications are supported
- **Target selection.** Choose any Microsoft Azure Location which was previously configured as a Target

When these selections have been made, click on “Configure Migration” at the bottom of the screen. This brings you to the configuration screen for the workload migration. This screen has four subsections:

**Schedule Settings**

This section allows you to schedule the execution of the migration. If you will manually kick off the migration after its configuration, no schedule needs to be set up.
Migration Settings
This section contains most of the Microsoft Azure-specific migration settings. You need to provide information for the following configuration settings:

- **Cloud Instance Size.** by default the size that most closely matches your workload will be selected. If you want to use another Cloud Instance Size, you can select it from the drop-down menu.

- **Replication Network for Target.** this is the network (Virtual Network and Subnet) that will be used for the replication traffic. Usually these will be the same as for the final target workload, but they can be different if needed.

- **Replication Networks for Source.** networks on the source workload that can be used for replication.

- **Virtual Machine Name.** name of the virtual machine in Microsoft Azure. The default pattern used by PlateSpin Migrate is "<hostname>-VM".

- **Disk(s).** the disks that need to be replicated. For each disk you can select the Datastore (i.e., the Storage Account) that will provide the necessary storage services. The DiskPath is auto-generated using the pattern "<hostname>/<hostname>-VM_<index>.vhd".

Target Workload Settings
Besides having to select the final network (Virtual Network and Subnet) for the target workload, no settings in this section are specific to migration to Microsoft Azure. Consult the PlateSpin Migrate documentation for more information.

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Cutover: Executing the Migration
Once all information is provided, click on “Save” to save the configuration. This brings you to a summary page called “Cutover Configured” with all migration configuration details. Check the details one last time, and then click the “Run Cutover” button and confirm the extra “Execute” step in the next screen. This will initiate the workload migration. For Windows workloads, PlateSpin Migrate will automatically enable RDP services on the target workload if they were not enabled on the source workload and will modify the firewall settings of the target workload to enable RDP traffic.

When the migration is finished, PlateSpin Migrate will boot the target workload in Microsoft Azure.
Micro Focus recommends shutting down services on the source workload prior to starting the cutover. This ensures that all application data is captured in the migration.

**Troubleshooting**

Currently these Knowledge Base (KB) articles are available for migrations to Microsoft Azure:

- **7018000**—Unable to login to the Azure cloud. 
  
  "[AuthenticationFailed] AADSTS65001: The user or administrator has not consented to use the application ID, Send an interactive authorization request for this user and resource"

- **7017999**—Unable to login to the Azure cloud 
  
  "[AuthenticationFailed] wstrust_endpoint_not_found: WS-Trust endpoint not found in metadata document"

You can consult these KB articles on [www.microfocus.com/support](http://www.microfocus.com/support), where you can find them with the search parameter “Azure” for product “PlateSpin Migrate.”