

Presidio Cloud Solutions

Azure ASM to ARM Migrations

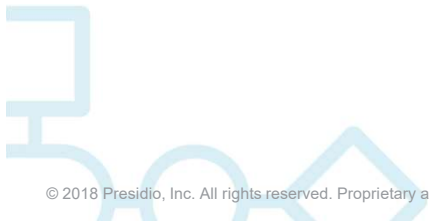
Technical Primer

PRESIDIO[®]

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Getting Started with ASM to ARM

- Envisioning and Design
- Planning, Guidance and Architecture
- Discussion Points
 - **Overview of ARM**
 - **Infrastructure as Code**
 - **Templates and Authoring**
 - **Planning your Migration to ARM**
 - **Resource Conversion Considerations**
 - **Resources Not Supported by ARM from ASM**



Planning and Delivery Schedule - Example

- Monday – Envisioning & Design
- Tuesday – Azure Services Capabilities Review
- Wednesday – Delivery
- Thursday – Delivery Continuation
- Friday – Q&A, Education and Path Forward Objectives



Topics

Overview of Resource
Manager

Infrastructure as Code

ARM Deep Dive

ASM to ARM
Migration Planning

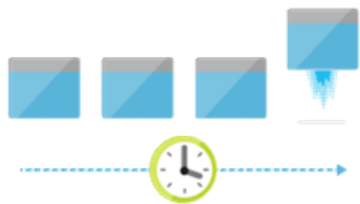
Overview of Resource Manager

Azure Resource Manager

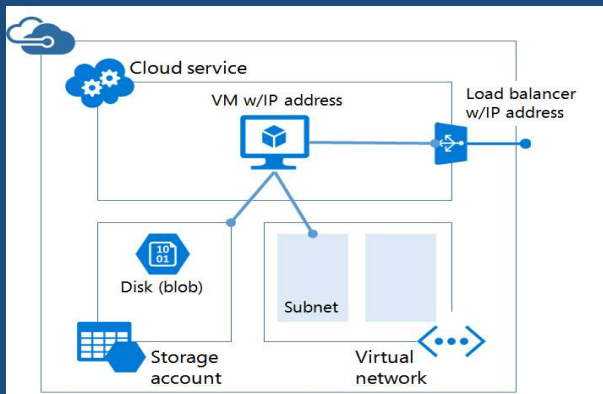
- What is ARM?
- History of ARM
- Resource Groups
- Organizing resources
- Managing resources
- Controlling access to resources

WHAT IS ARM

Resource Manager is the core of the platform, providing a control plane for the management of all resources provisioned within Azure.

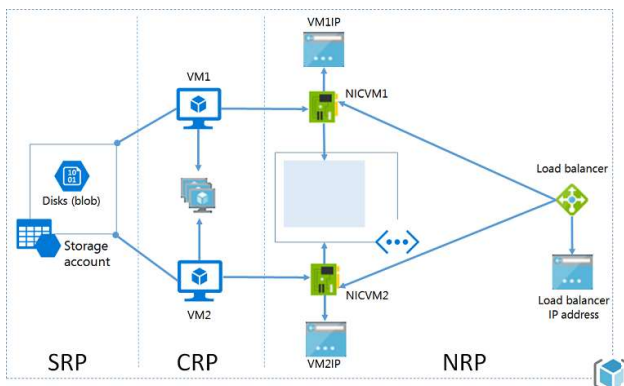


HISTORY OF ARM



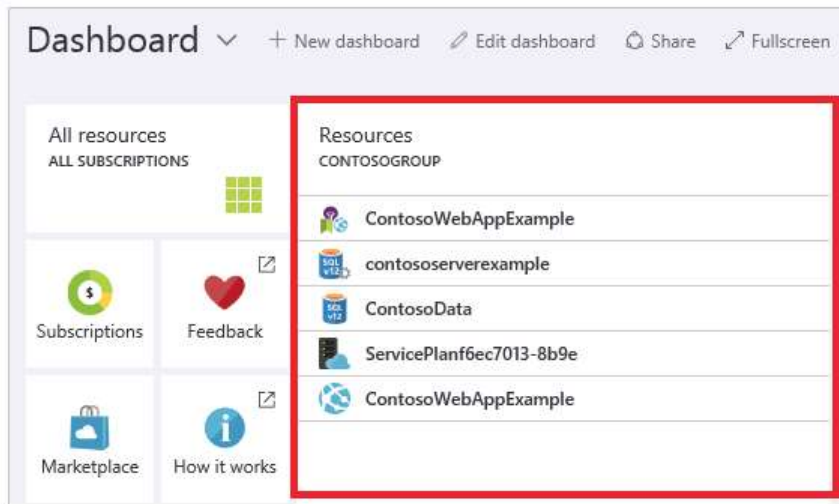
Azure Service Manger (ASM aka 'Classic')

- Legacy methodology for deployment & management
- Classic "View" of the portal
- Default Mode – Powershell/CLI
- No template or group based management capabilities



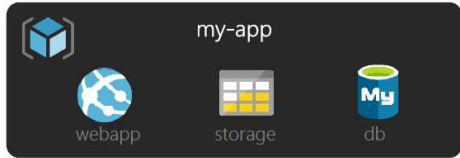
Azure Resource Manager (ARM)

- Current/Future-State method for deploy+manage
- Orchestration via templates + declarative approach
- Cross platform CLI + Powershell capable
- Support of REST API's
- Units of Measure via Resource Groups
- Infra-as-Code for DevOps

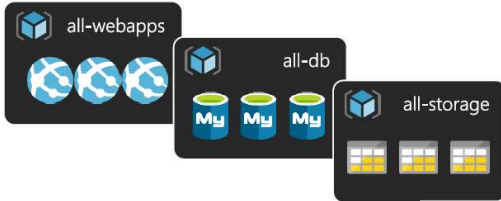


- **Manage** Resource Groups
- **Tag** Resources
- **Monitor** Resources
- **Group** Resources
- **Move** Resources
- **Lock** Resources

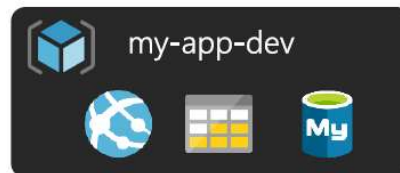
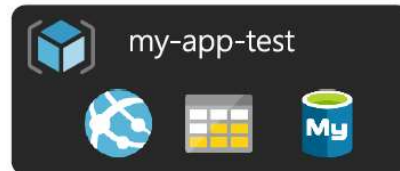
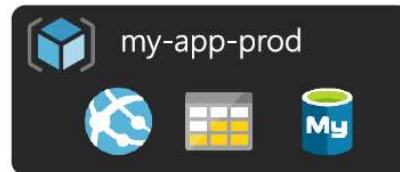
RESOURCE GROUPS



OR

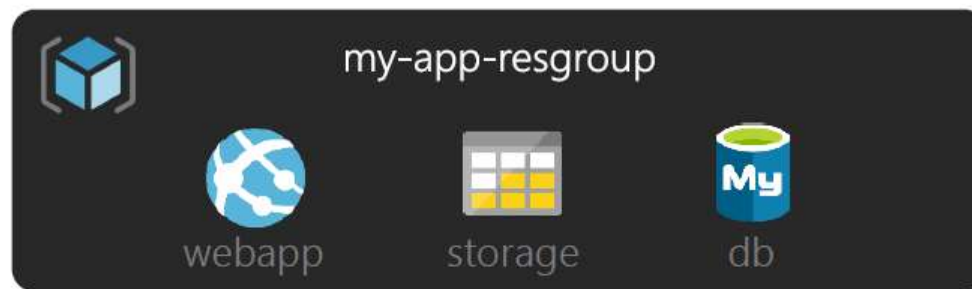


or



ORGANIZE With ARM

MANAGE with ARM



Manage groups not individual resources



Tagging



Role Based
Access Control



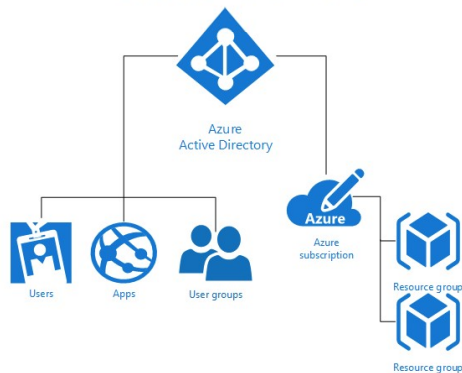
Policies



Locks

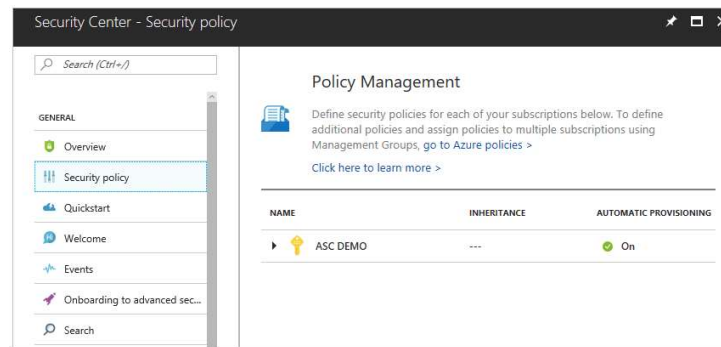
Resource Access with ARM

Roles Based Access Control



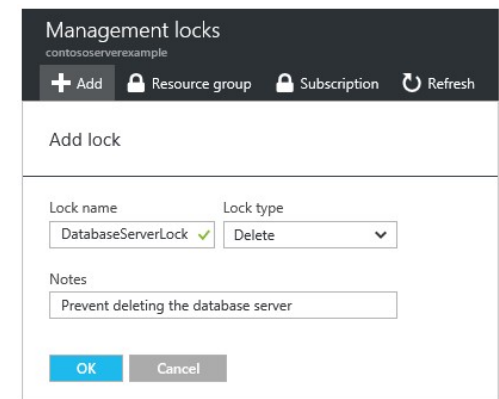
- Strict controls for access
- Granular role based capability
- Integrated with Azure AD

Policies



- Governance model for resources vs rules assignments
- Ability to apply custom restrictions on type, region, size, name, etc.
- Policies can be applied globally or at group level

Locks



- Protect live resources
- Ability to prevent accidental changes with RBAC
- Prevent deletion or modification of resources

Infrastructure As Code

Azure IaaS-as-Code

- Templating
- Authoring
- Deploying
- Resources to get started

TEMPLATING, AUTHORIZING & DEPLOYING With ARM

Templating

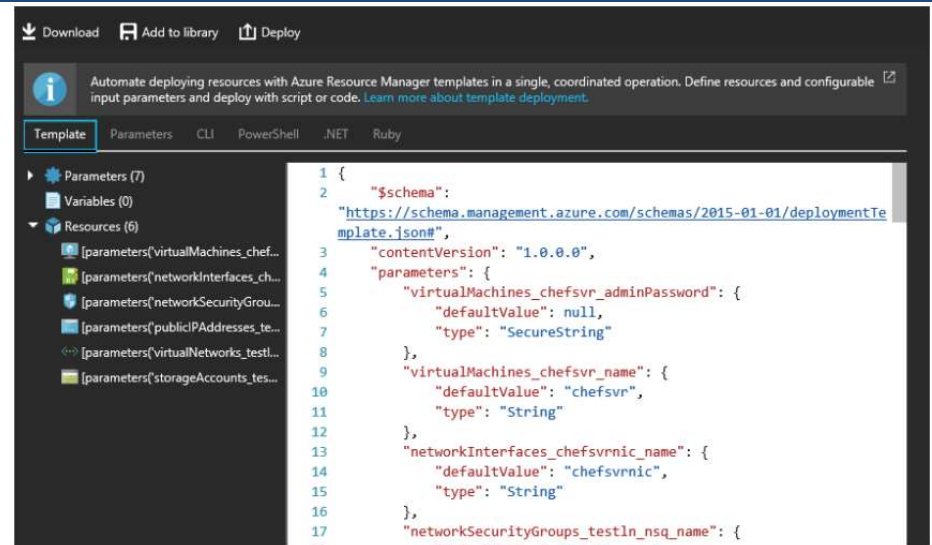
1. Specify resource & dependencies
2. Declarative
3. Deployment model is repeatable
4. Deployment can be incremental
5. JSON enabled

Authoring

1. Visual Studio
2. Azure Portal
3. Ability to export existing resources
4. In-house code/text editors supported with JSON Support

Deploying – Many Options

1. Azure Portal
2. Powershell and Azure CLI
3. VSO and TFS
4. REST API capable
5. Many SDKs - .NET, JAVA, Node.js, Python, etc
6. Ansible, Chef, Puppet, Jenkins



```
1 {
2   "$schema":
3   "https://schema.management.azure.com/schemas/2015-01-01/deploymentTe
4   mplate.json#",
5   "contentVersion": "1.0.0.0",
6   "parameters": {
7     "virtualMachines_chefsvr_adminPassword": {
8       "defaultValue": null,
9       "type": "SecureString"
10    },
11    "virtualMachines_chefsvr_name": {
12      "defaultValue": "chefsvr",
13      "type": "String"
14    },
15    "networkInterfaces_chefsvrnic_name": {
16      "defaultValue": "chefsvrnic",
17      "type": "String"
18    },
19    "networkSecurityGroups_testln_nsq_name": {
```



Create automation
script (export)



Portal template
management



Visual Studio

ARM KB RESOURCES

- [Github Quickstart](#)
- [Full Reference – ARM Template](#)
- [Template Library](#)
- [Azure Marketplace](#)

The screenshot shows the GitHub repository for Azure Quickstart Templates. The repository name is "Azure / azure-quickstart-templates" and it has 426 watches, 3,054 stars, and 4,399 forks. The repository is located at <https://github.com/Azure/azure-quickstart-templates>. The repository has 16,375 commits, 6 branches, 0 releases, and 588 contributors. The repository is licensed under MIT. The repository is currently on the master branch. The repository has a pull request #4135 from bmoore-mst/merge pull request #4135 from bmoore-mst/createuidef. The repository has a commit history table with the following entries:

Commit	Message	Time
bmoore-mst	Merge pull request #4135 from bmoore-mst/createuidef	Latest commit 856c81c 2 days ago
github	fix typo in link to checklist	a year ago
1-CONTRIBUTION-GUIDE	Git commands fixed with valid uri	10 months ago
100-blank-template	Update README.md	3 months ago
101-1vm-2nics-2subnets-1vnet	update from CI failures	5 months ago
101-aci-dynamicsnav	use unique username	22 days ago
101-aci-linuxcontainer-public-ip	Adding descriptions	4 months ago
101-acs-dcos	fix travis error	9 months ago
101-acs-kubernetes	corrected azuredeploy.parameters.json	2 months ago
101-acs-swarm	fix travis error	9 months ago
101-acsengine-swarmmode	Merge branch 'master' into correct_api_version	3 months ago
101-api-management-create-wit...	Fix Issues with MSI Templates	a month ago
101-app-service-certificate-stan...	correcting arm templates of type and names	4 months ago
101-app-service-certificate-wildc...	Fixing formatting issues in README.md and typos in template files	a year ago

The screenshot shows the Azure Marketplace search results for ARM templates. The search results are displayed in a grid of product cards. The search results are for "Product results (341)". The product cards are:

- Jenkins** by Microsoft: Microsoft published Jenkins Master on a Linux (Ubuntu) VM. Price varies. [Get it now](#)
- Bing Maps API for Enterprise** by Bing Maps: Bing Maps API offers an integrated set of services and map data with a diverse imagery portfolio. Software plans start at **Free**. [Get it now](#)
- SendGrid Email Delivery** by SendGrid: Eliminate your email headaches and save money. The email infrastructure of tomorrow, delivered today. Price varies. [Text Drive](#)
- Chef Automate** by Chef Software, Inc: Build, deploy, and manage your applications and infrastructure at speed. Price varies. [Text Drive](#)
- Jenkins Certified by Bitnami** by Bitnami: Continuous Integration software from the leading publisher. Bring your own license. [Get it now](#)

Azure ASM to ARM Migration Planning

Future-Proofing Your Journey to the Cloud

THE MIGRATION EXPERIENCE - WORKFLOW

ASM to ARM

Validate

- The validate operation is the first step in the migration process. The goal of this step is to analyze the state of the resources you want to migrate in the classic deployment model. The operation evaluates whether the resources are capable of migration (success or failure).

Prepare

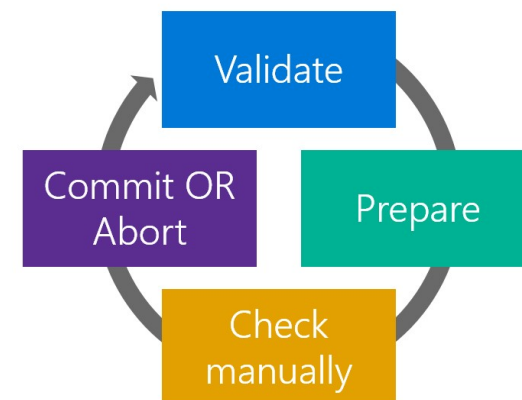
- The prepare operation is the second step in the migration process. The goal of this step is to simulate the transformation of the IaaS resources from the classic deployment model to Resource Manager resources. Further, the prepare operation presents this side-by-side for you to visualize.

Check (manual or scripted)

- In the check step, you have the option to use the configuration that you downloaded earlier to validate that the migration looks correct. Alternatively, you can sign in to the portal, and spot check the properties and resources to validate that metadata migration looks good.
- If you are migrating a virtual network, most configuration of virtual machines is not restarted. For applications on those VMs, you can validate that the application is still running.
- You can test your monitoring and operational scripts to see if the VMs are working as expected, and if your updated scripts work correctly. Only GET operations are supported when the resources are in the prepared state.
- There is no set window of time before which you need to commit the migration. You can take as much time as you want in this state. However, the management plane is locked for these resources until you either abort or commit.
- If you see any issues, you can always abort the migration and go back to the classic deployment model.

Abort

- This is an optional step if you want to revert your changes to the classic deployment model and stop the migration. This operation deletes the Resource Manager metadata (created in the prepare step) for your resources.

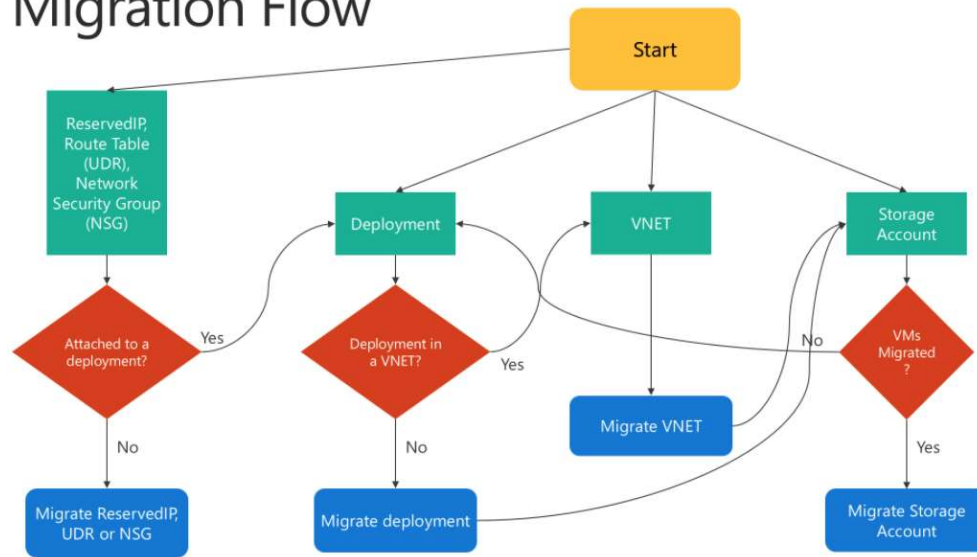


Presidio - Approach

THE MIGRATION FLOWCHART

ASM to ARM

Migration Flow



RESOURCES SUPPORTED FOR ASM to ARM

Supported Resources for Migration

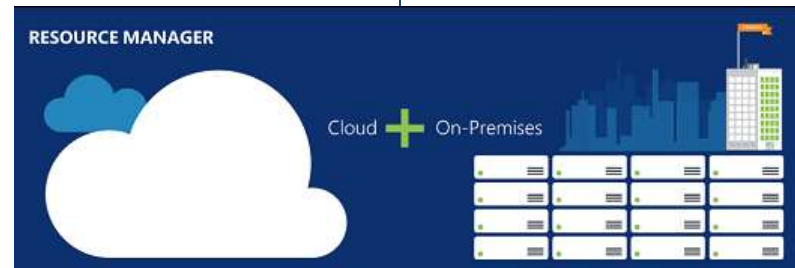
These classic IaaS resources are supported during migration

- Virtual Machines
- Availability Sets
- Cloud Services
- Storage Accounts
- Virtual Networks
- VPN Gateways
- Express Route Gateways (*in the same subscription as Virtual Network only*)
- Network Security Groups
- Route Tables
- Reserved IPs

Supported Scopes of Migration

There are 4 different ways to complete migration of compute, network, and storage resources.

- Migration of virtual machines (NOT in a virtual network)
- Migration of virtual machines (in a virtual network)
- Storage accounts migration
- Unattached resources (Network Security Groups, Route Tables & Reserved IPs)



<https://docs.microsoft.com/en-us/azure/virtual-machines/windows/migration-classic-resource-manager-overview>

RESOURCES NOT SUPPORTED FOR ASM to ARM

Features and Configurations Not Supported

These classic IaaS resources are unsupported for migration

Unsupported features

The following features are not currently supported. You can optionally remove these settings, migrate the VMs, and then re-enable the settings in the Resource Manager deployment model.

Resource provider	Feature	Recommendation
Compute	Unassociated virtual machine disks.	The VHD blobs behind these disks will get migrated when the Storage Account is migrated
Compute	Virtual machine images.	The VHD blobs behind these disks will get migrated when the Storage Account is migrated
Network	Endpoint ACLs.	Remove Endpoint ACLs and retry migration.
Network	Application Gateway	Remove the Application Gateway before beginning migration and then recreate the Application Gateway once migration is complete.
Network	Virtual networks using VNet Peering.	Migrate Virtual Network to Resource Manager, then peer. Learn more about VNet Peering.

<https://docs.microsoft.com/en-us/azure/virtual-machines/windows/migration-classic-resource-manager-overview>

RESOURCES NOT SUPPORTED FOR ASM to ARM

Configurations Not Supported

These classic IaaS configs are unsupported for migration

The following configurations are not currently supported.

Service	Configuration	Recommendation
Resource Manager	Role Based Access Control (RBAC) for classic resources	Because the URI of the resources is modified after migration, it is recommended that you plan the RBAC policy updates that need to happen after migration.
Compute	Multiple subnets associated with a VM	Update the subnet configuration to reference only subnets.
Compute	Virtual machines that belong to a virtual network but don't have an explicit subnet assigned	You can optionally delete the VM.
Compute	Virtual machines that have alerts, Autoscale policies	The migration goes through and these settings are dropped. It is highly recommended that you evaluate your environment before you do the migration. Alternatively, you can reconfigure the alert settings after migration is complete.
Compute	XML VM extensions (BGInfo 1.*, Visual Studio Debugger, Web Deploy, and Remote Debugging)	This is not supported. It is recommended that you remove these extensions from the virtual machine to continue migration or they will be dropped automatically during the migration process.
Compute	Boot diagnostics with Premium storage	Disable Boot Diagnostics feature for the VMs before continuing with migration. You can re-enable boot diagnostics in the Resource Manager stack after the migration is complete. Additionally, blobs that are being used for screenshot and serial logs should be deleted so you are no longer charged for those blobs.
Compute	Cloud services that contain web/worker roles	This is currently not supported.
Compute	Cloud services that contain more than one availability set or multiple availability sets.	This is currently not supported. Please move the Virtual Machines to the same availability set before migrating.

Compute	VM with Azure Security Center extension	Azure Security Center automatically installs extensions on your Virtual Machines to monitor their security and raise alerts. These extensions usually get installed automatically if the Azure Security Center policy is enabled on the subscription. To migrate the Virtual Machines, please disable the security center policy on the subscription which will remove the Security Center monitoring extension from the Virtual Machines.
Compute	VM with backup or snapshot extension	These extensions are installed on a Virtual Machine configured with the Azure Backup service. To migrate these Virtual Machines, follow the guidance here.
Network	Virtual networks that contain virtual machines and web/worker roles	This is currently not supported. Please move the Web/Worker roles to their own Virtual Network before migrating. Once the classic Virtual Network is migrated, the migrated Azure Resource Manager Virtual Network can be peered with the classic Virtual Network to achieve similar configuration as before.
Network	Classic Express Route circuits	This is currently not supported. These circuits need to be migrated to Azure Resource Manager before beginning IaaS migration. To learn more about this see Moving ExpressRoute circuits from the classic to the Resource Manager deployment model.
Azure App Service	Virtual networks that contain App Service environments	This is currently not supported.
Azure HDInsight	Virtual networks that contain HDInsight services	This is currently not supported.
Microsoft Dynamics Lifecycle Services	Virtual networks that contain virtual machines that are managed by Dynamics Lifecycle Services	This is currently not supported.
Azure AD Domain Services	Virtual networks that contain Azure AD Domain services	This is currently not supported.
Azure RemoteApp	Virtual networks that contain Azure RemoteApp deployments	This is currently not supported.
Azure API Management	Virtual networks that contain Azure API Management deployments	This is currently not supported. To migrate the IaaS VNET, please change the VNET of the API Management deployment which is a no downtime operation.

<https://docs.microsoft.com/en-us/azure/virtual-machines/windows/migration-classic-resource-manager-overview>

PLANNING FOR MIGRATION OF IAAS

From ASM to ARM



1 - Plan

Technical Considerations

Depending on your technical requirements size, geographies and operational practices, you might want to consider:

- Why is Azure Resource Manager desired for your organization? What are the business reasons for a migration?
- What are the technical reasons for Azure Resource Manager? What (if any) additional Azure services would you like to leverage?
- Which application (or sets of virtual machines) is included in the migration?
- Which scenarios are supported with the migration API? Review the [unsupported features and configurations](#).
- Will your operational teams now support applications/VMs in both Classic and Azure Resource Manager?
- How (if at all) does Azure Resource Manager change your VM deployment, management, monitoring, and reporting processes? Do your deployment scripts need to be updated?
- What is the communications plan to alert stakeholders (end users, application owners, and infrastructure owners)?
- Depending on the complexity of the environment, should there be a maintenance period where the application is unavailable to end users and to application owners? If so, for how long?
- What is the training plan to ensure stakeholders are knowledgeable and proficient in Azure Resource Manager?
- What is the program management or project management plan for the migration?
- What are the timelines for the Azure Resource Manager migration and other related technology road maps? Are they optimally aligned?

PLANNING FOR MIGRATION OF IAAS

From ASM to ARM



2 – Lab Test

Technical Considerations

Conducting a lab test of your exact scenario (compute, networking, and storage) is the best way to ensure a smooth migration. This will help ensure:

- A wholly separate lab or an existing non-production environment to test. We recommend a wholly separate lab that can be migrated repeatedly and can be destructively modified. Scripts to collect/hydrate metadata from the real subscriptions are listed below.
- It's a good idea to create the lab in a separate subscription. The reason is that the lab will be torn down repeatedly, and having a separate, isolated subscription will reduce the chance that something real will get accidentally deleted.

PLANNING FOR MIGRATION OF IAAS

From ASM to ARM



3 - Migrate

Technical Considerations

Depending on your technical requirements size, geographies and operational practices, you might want to consider:

- Plan and schedule the virtual network (smallest unit of migration) with increasing priority. Do the simple virtual networks first, and progress with the more complicated virtual networks.
- Prioritize non-production and production environments. Schedule production last.
- **(OPTIONAL)** Schedule a maintenance downtime with plenty of buffer in case unexpected issues arise.
- Communicate with and align with your support teams in case issues arise.

PLANNING FOR MIGRATION OF IAAS

From ASM to ARM



4 – Beyond Migration Technical Considerations

- Bundling the migration with other activities. Most customers opt for an application maintenance window. If so, you might want to use this downtime to enable other Azure Resource Manager capabilities like encryption and migration to Managed Disks.
- Revisit the technical and business reasons for Azure Resource Manager; enable the additional services available only on Azure Resource Manager that apply to your environment.
- Modernize your environment with PaaS services.

Patterns of Success

- **Do a validate/prepare/abort dry run**
- This is perhaps the most important step to ensure Classic to Azure Resource Manager migration success. The migration API has three main steps: Validate, Prepare and Commit. Validate will read the state of your classic environment and return a result of all issues. However, because some issues might exist in the Azure Resource Manager stack, Validate will not catch everything. The next step in migration process, Prepare will help expose those issues. Prepare will move the metadata from Classic to Azure Resource Manager, but will not commit the move, and will not remove or change anything on the Classic side. The dry run involves preparing the migration, then aborting (**not committing**) the migration prepare. The goal of validate/prepare/abort dry run is to see all of the metadata in the Azure Resource Manager stack, examine it (*programmatically or in Portal*), and verify that everything migrates correctly, and work through technical issues. It will also give you a sense of migration duration so you can plan for downtime accordingly. A validate/prepare/abort does not cause any user downtime; therefore, it is non-disruptive to application usage.

Q & A



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