Dublin Business School

B8IS124 CLOUD PLATFORM

AWS Topics and
Deploying a VM using ARM Template

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EXERCISE ONE

What is the difference between Paas, IaaS, and SaaS in Azure, and provide an example for each service?

Platform as a Service (PaaS) does not provide any access to the operating system and instead provides a framework for developers to build onto using cloud-based applications. An example of a PaaS would be Azure SQL Database which is a database engine that does most of the management functions by itself such as upgrading, creating backups, and patching without user interaction.

Infrastructure as a Service (IaaS) features scalable,on-demand access to cloud-hosted computing resources. That includes servers, storage, virtualization, and networking resources that can be configured to however the customer desires. Azure virtual machines would be an example of IaaS because they provide on-demand resources.

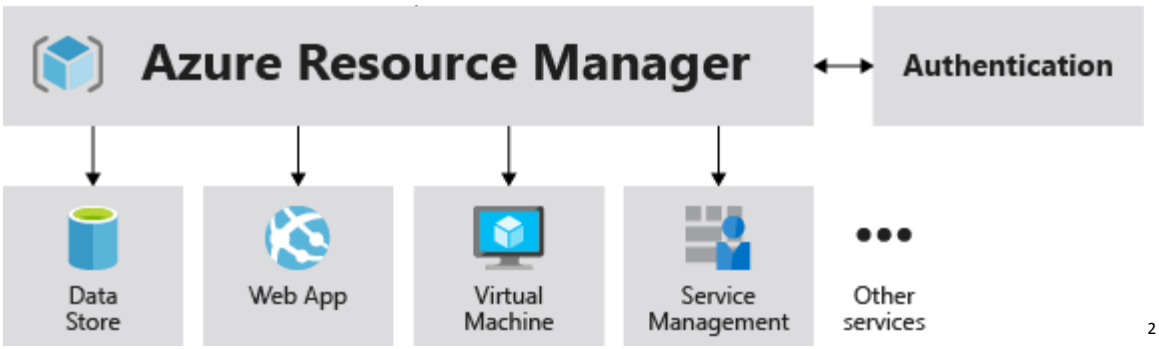
Software as a Service (SaaS) involves a cloud provider hosting the applications and making them available for end users to access over the internet. The appeal of this comes from companies not having to worry about installing, renewing, or maintaining software themselves. A popular file hosting service is Dropbox, they offer cloud storage, client software, and file synchronization.

What is Azure Resource Manager (ARM)?

Azure Resource Manager (ARM) is a service provided by Azure to manage and deploy resources. Resources are an asset that can be managed and can range from Virtual Machines to web applications, databases, and more.

ARM is also secure by always authenticating any requests before providing access to any of Azure's services and all events are logged with user and event details, in case there are unauthorized changes made.

Some enterprise companies use Microsoft Azure such as Bing, Coca-Cola, and Delta. This shows just how the services provided by Azure offer everything that is needed for small to monumental projects.[1]



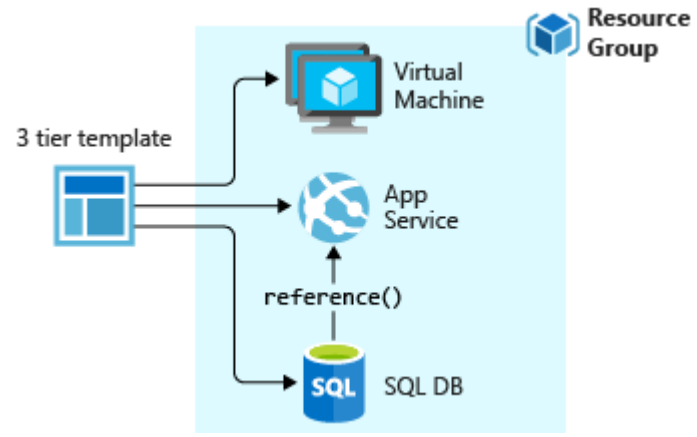
[2]

[1] Source of companies that use Microsoft Azure : https://www.infoclutch.com/installed-base/cloud-computing-software/microsoft-azure/ by infoclutch.com Last accessed 22/10/23

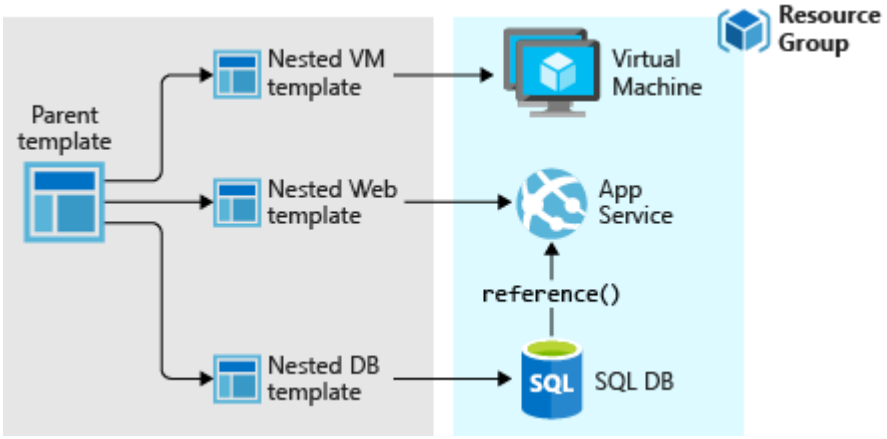
[2] ARM diagram taken from: https://learn.microsoft.com/en-us/azure/azure-resource-manager/management/overview by Microsoft. Last accessed on 14/10/23

ARM templates are JavaScript Object Notation (JSON) files used to quickly and effectively provision infrastructure and come with many benefits. Users can specify what to deploy without writing any commands that specify how to deploy it. These templates choose the resources to deploy and how they should be configured. There are different designs to manage your template such as:

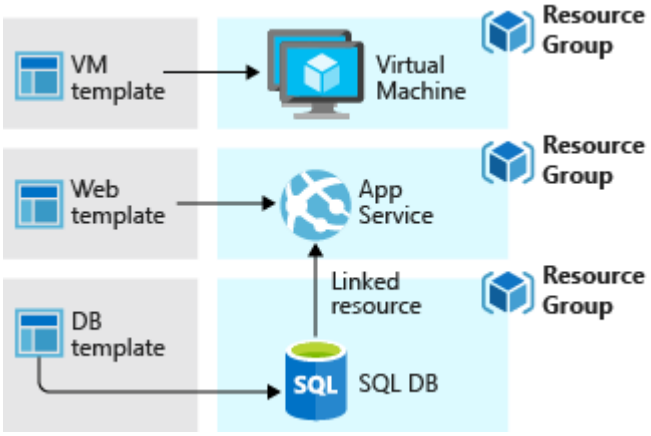
Single template: All resources are defined within a single template file. Simplest type.



Nested templates: Include templates within other templates. This way is the most reusable design.



Separate resource groups: This type gathers resources based on their lifecycle or functionality.



[3]

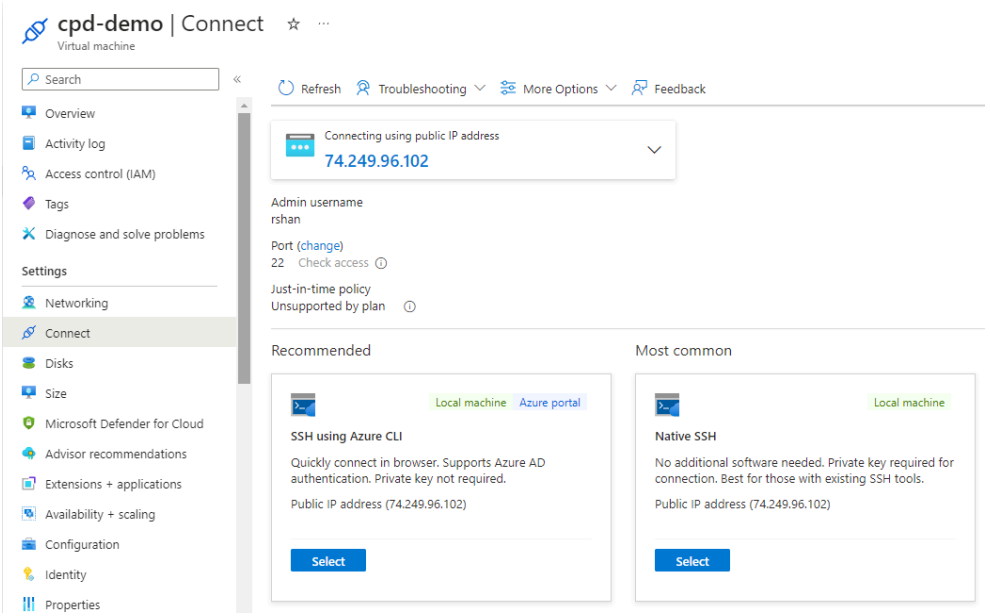
[3] Template designs from: https://learn.microsoft.com/en-us/azure/azure-resource-manager/templates/overview by Microsoft Last accessed on 14/10/23

Describe two ways a user can access a running virtual machine in Azure

Two ways to access a running virtual machine would be to either use the **Azure portal** or through the **terminal (for Linux users) and command line (for Windows) using SSH**.

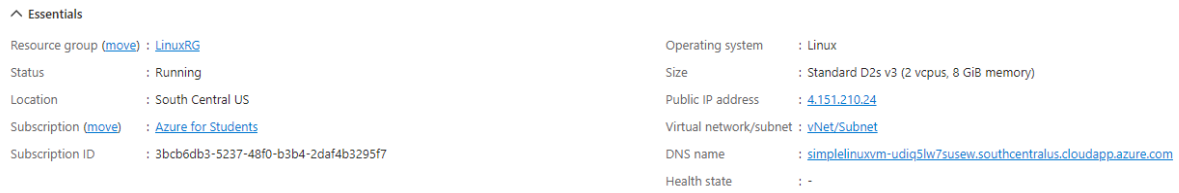
The Azure portal method is very convenient and easy to use.

- First sign into the Azure portal through the official site.
- Go to the Virtual machines (VM) category or search and select at the top of the screen.
- Select the desired VM and use the “Connect” button on the left side of the screen.
- You will see a similar page as seen below and then choose the desired connection method.



The Terminal/Command prompt method is also convenient once you have the admin username and password used when setting up the VM:

- The VM must be already running and accessible over the internet or VPN to access through SSH.
- Locate the server information which will supply the required Server IP address, username, and password. For an azure VM, this be found by clicking on the chosen virtual machinen and there will be the information as shown below.



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- Use a terminal/command line and enter the following command line to access the VM directly from your desktop SSH client:
  ssh -p <port> user@<ip-address-or-hostname>
- Next there will be a prompt for a password. Enter the password from the server information.
- This will connect you to the virtual server, you can manage the virtual server remotely from this connection.

```
C:\Users\rshan>ssh rshan@74.249.96.102
rshan@74.249.96.102's password:
Permission denied, please try again.
rshan@74.249.96.102's password:
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-1047-azure x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

 System information disabled due to load higher than 1.0

 * Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
   just raised the bar for easy, resilient and secure K8s cluster deployment.

   https://ubuntu.com/engage/secure-kubernetes-at-the-edge

Expanded Security Maintenance for Applications is not enabled.

8 updates can be applied immediately.
3 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status


The list of available updates is more than a week old.
To check for new updates run: sudo apt update

Last login: Thu Oct 12 09:04:37 2023 from 89.100.141.145
```

- This is what a successful connection should look like.

Describe Git

Git is all about source code management. This means it has loads of features used to share project files and track any changes being made and it also keeps a history of versions of a project. This has made it very commonly used in work involving multiple people at once.

Some other features of Git are Commits and Branches. Commits are changes to the code grouped together. Each commit records a set of changes along with a message explaining what was done. This history of commits makes it easy to understand the evolution of the codebase for everyone involved.

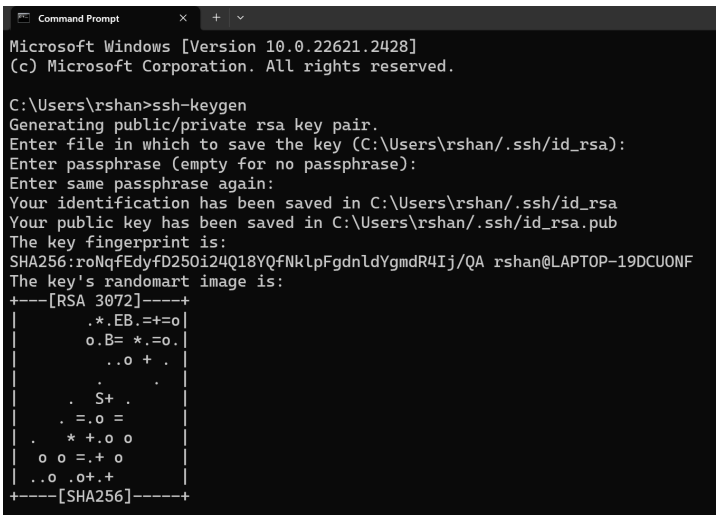
Git also supports branching, which allows developers to work on new features or bug fixes by themselves from the main codebase. This can be done without affecting the main code until the changes are ready to be merged with the main code.

These features and more are what have made Git a fundamental tool in modern software development, enabling collaborative and efficient code management.

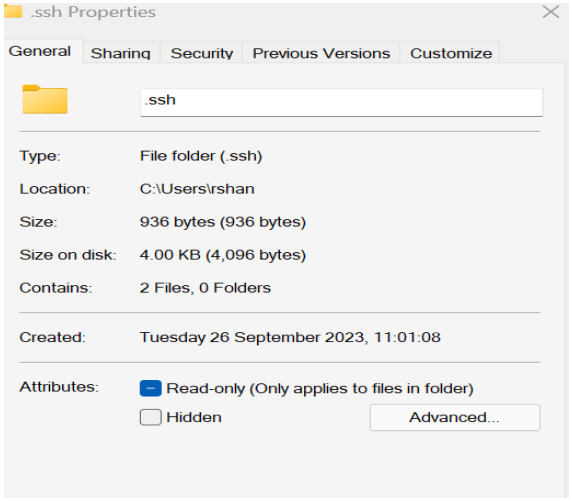
EXERCISE TWO

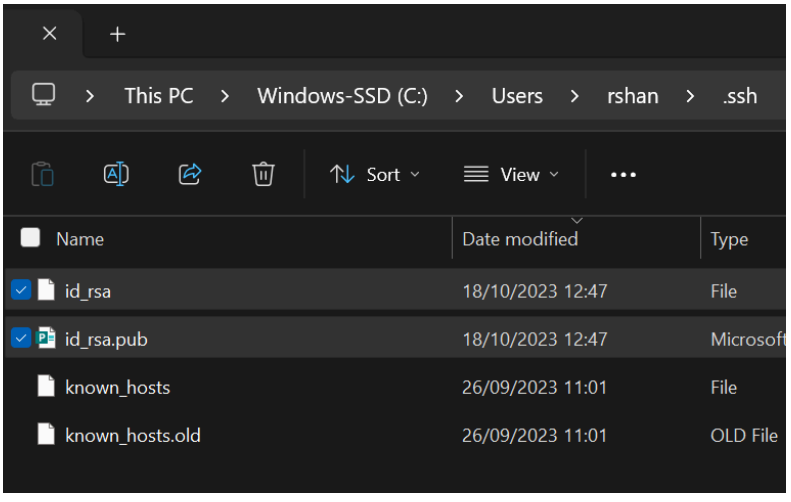
Create an SSH key on your local machine and document the steps.

1. I am using Windows, so I opened the command prompt for this exercise.
2. On the command line I used: **ssh-keygen**. Then follow the prompts displayed.



3. The system then creates a key pair, key fingerprint, and a randomart image. These all are used to identify your keys. They can be located at “Users\username\.shh” are shown below.
4. Navigate to that folder and you will find two new files. The identification is saved in the **id_rsa** file and the public key is called **id_rsa.pub**. This is your **SSH key pair**. All of these are important to verify that you are talking to the correct remote machine and help increase security through authentication.





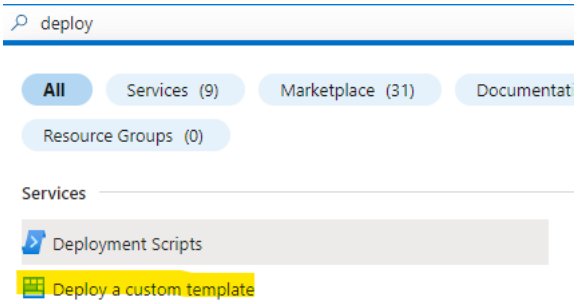
Deploy a VM using ARM Template

I will be demonstrating how to deploy an Azure VM using ARM Template into a resource group in a single operation. This is an important feature because a lot of businesses create and use virtual machines on a daily basis. Vmware.com describes the importance of Virtual machines as:

"Virtual machines (VMs) allow a business to run an operating system that behaves like a completely separate computer in an app window on a desktop. VMs may be deployed to accommodate different levels of processing power needs, to run software that requires a different operating system, or to test applications in a safe, sandboxed environment."[4]

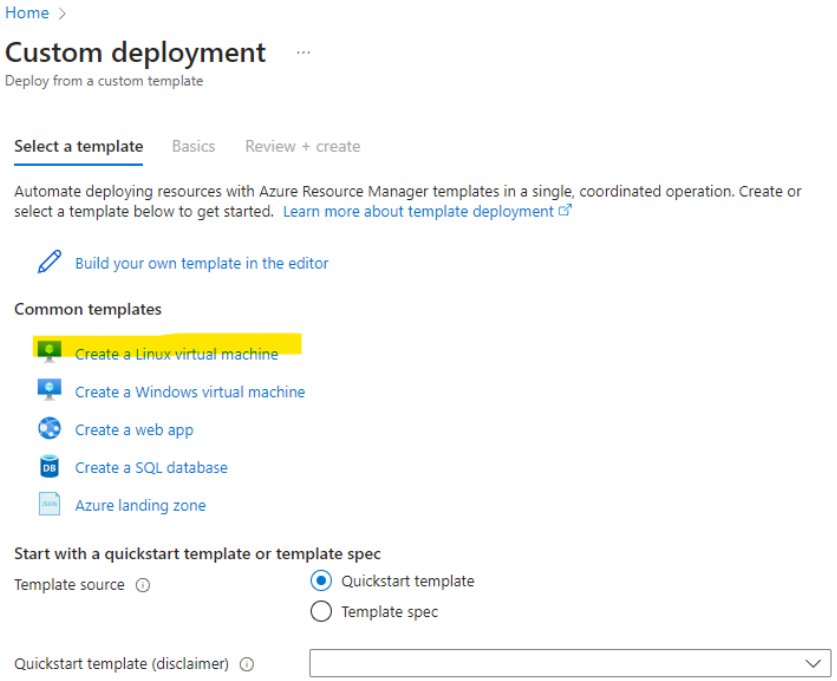
ARM templates will make VM deployments faster and more repeatable for further use. This will remove the need to run the VM in the portal and wait for that to be created before moving on to the next one. The ARM template will take care of everything involved in the deployment. To use an ARM template, we will:

1. Navigate to the Azure portal and search for "Deploy a custom Template".



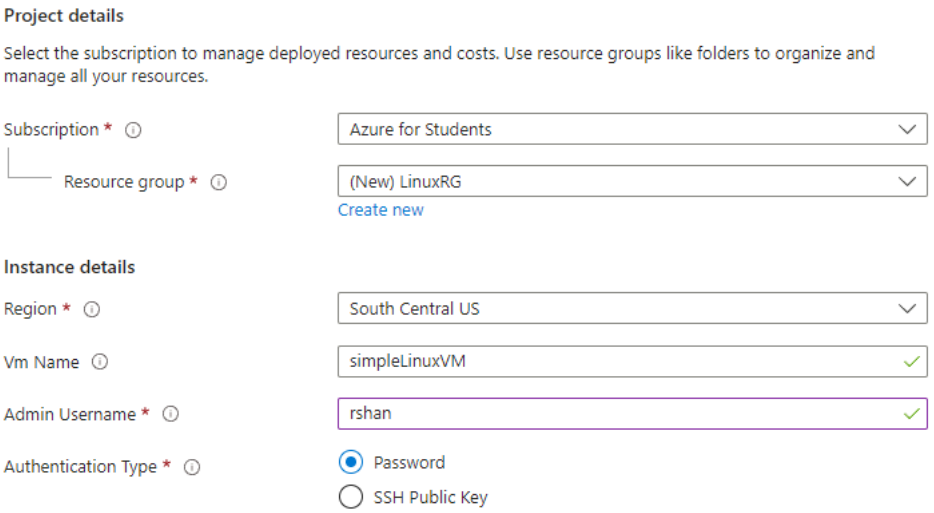
2. Choose your ARM template, I am creating a simple Linux virtual machine which is found under the Common templates as shown below. But this is where you would choose a different template if required in the dropdown menu which has hundreds of options to choose from depending on the required configuration of the resource you are deploying.

[4] Importance of Virtual machines :https://www.vmware.com/topics/glossary/content/virtual-machine.html#:~:text=Virtual%20machines%20are%20best%20for,may%20also%20be%20used%20together.
By vmware.com last accessed 22/10/23

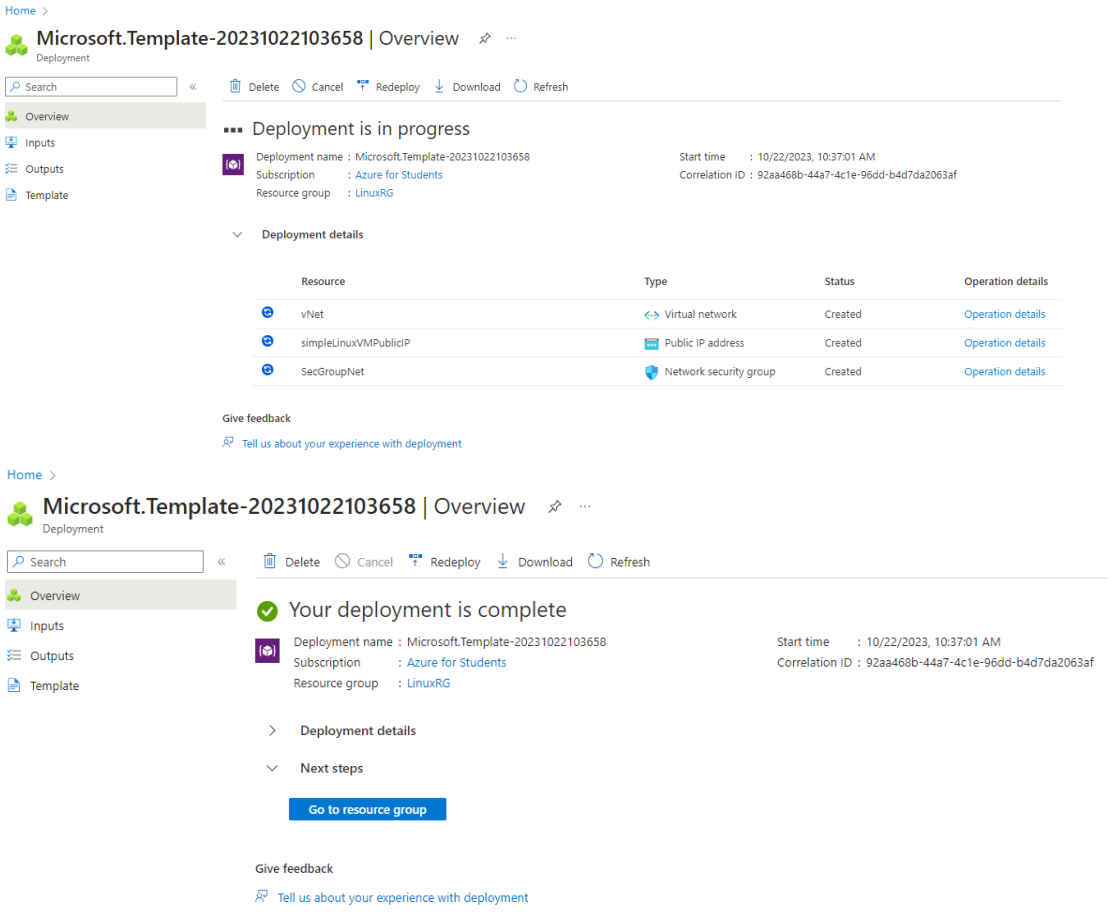


3. Next, most of the project details will already be filled out for you thanks to the ARM template but you still have the option to edit the template or parameters before creating the VM if required.

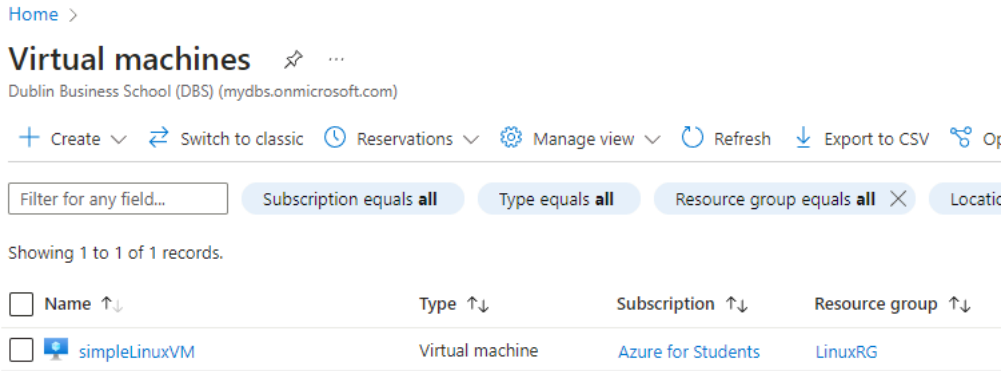
4. I then created a new resource group for this VM called “LinuxRG”. Then I filled in a username and password as required.



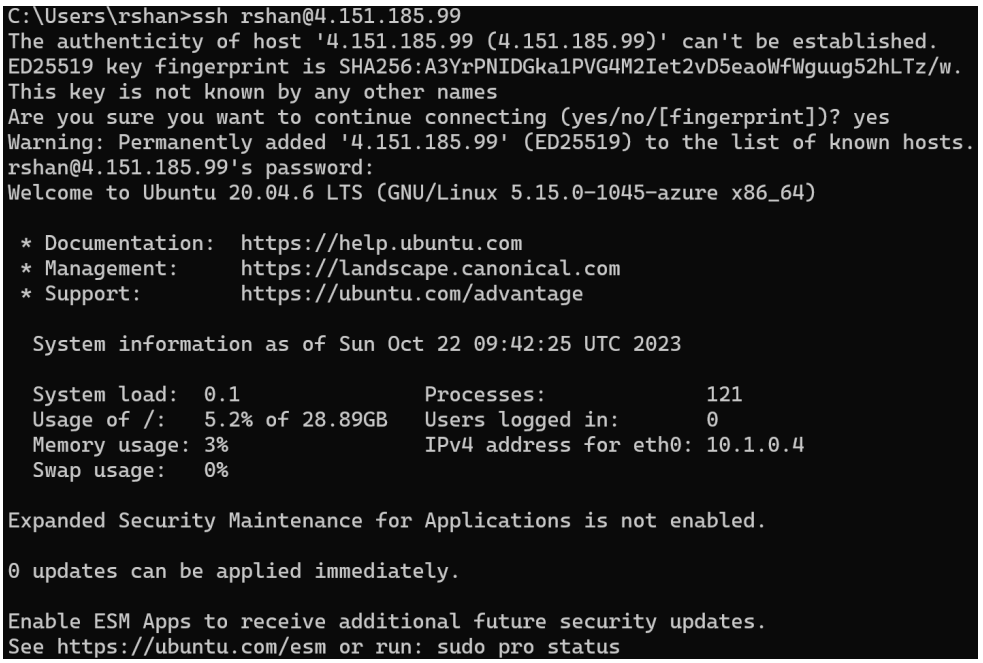
5. Next, I clicked the create button at the bottom of the page which began creating the resources involved in my chosen template and it began deploying them. After a few minutes, my deployment was a success.



6. By navigating to the Virtual machine section of the Azure Portal I ensured my Linux VM was properly deployed.



7. I then connected to the Linux server by using SSH through the command prompt using the Linux VM's public IP address. It requested the password I had set it up with for admission then worked as intended.



This concludes my demonstration on how to deploy a Linux VM using an ARM Template into a resource group in a single operation. Everything went as expected and now I have a VM and could deploy identical ones just as easily and they would be easy to manage and maintain thanks to Microsoft Azure and ARM templates.

Sources