EXPERIMENT NO: 13 DATE:

LINUX VM USING ANSIBLE PLAYBOOK

AIM: DEPLOY LINUX VM USING ANSIBLE PLAYBOOK

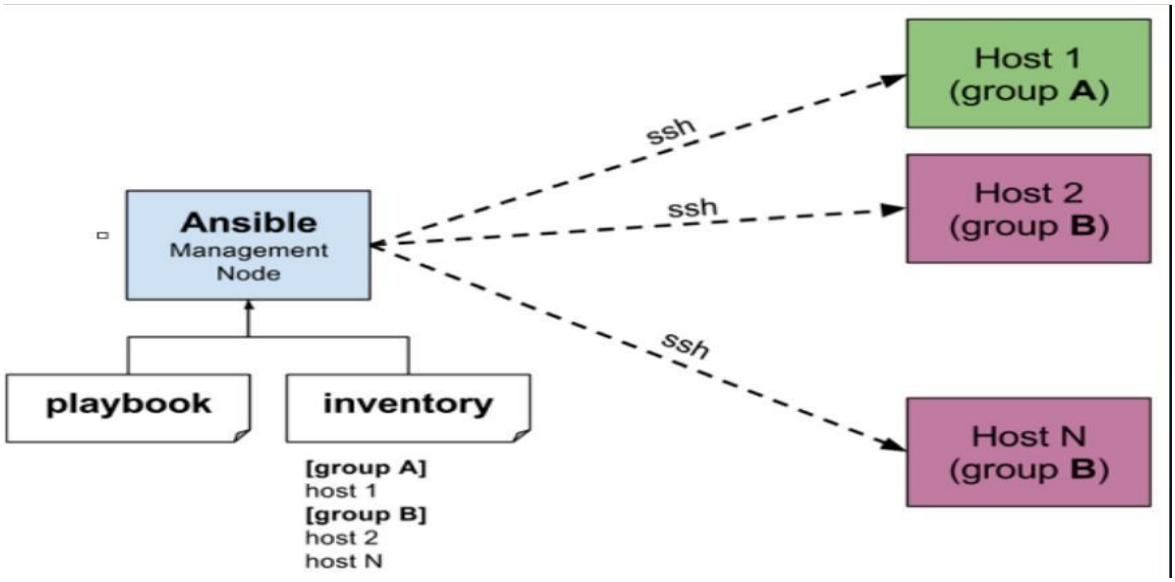
What is Ansible ?

- Ansible is a simple open source IT engine which automates application deployment, intra service orchestration, cloud provisioning and many other IT tools.
- Ansible is easy to deploy because it does not use any agents or custom security infrastructure
- Ansible uses playbook to describe automation jobs, and playbook uses very simple language
  i.e. YAML (It's a human-readable data serialization language & is commonly used for configuration files, but could be used in many applications where data is being stored)which is very easy for humans to understand, read and write. Hence the advantage is that even the IT infrastructure support guys can read and understand the playbook and debug if needed (YAML – It is in human readable form).
- Ansible is designed for multi-tier deployment. Ansible does not manage one system at a time, it models IT infrastructure by describing all of your systems as interrelated. Ansible is completely agentless which means Ansible works by connecting your nodes through ssh(by default). But if you want another method for connection like Kerberos, Ansible gives that option to you.

● After connecting to your nodes, Ansible pushes small programs called "Ansible Modules". Ansible runs that module on your nodes and removes them when finished. Ansible manages your inventory in simple text files (These are the hosts file). Ansible uses the hosts file where one can group the hosts and can control the actions on a specific group in the playbooks.

How do Ansible playbooks work?

- Ansible works by connecting to your nodes and pushing out small programs, called "Ansible modules" to them. Ansible then executes these modules (over SSH by default), and removes them when finished. Your library of modules can reside on any machine, and there are no servers, daemons, or databases required.



Installation Process

- Ansible can be run from any machine with Python 2 (versions 2.6 or 2.7) or Python 3 (versions 3.5 and higher) installed.
- Ansible can be installed on control machines which have above mentioned requirements in different ways. You can install the latest release through Apt, yum, pkg, pip, OpenCSW, pacman,etc.

Installation through Apt on Ubuntu Machine

- For installing Ansible you have to configure PPA on your machine. For this, you have to run the following line of code:

sudo apt-add-repository

ppa:ansible/ansible sudo apt update

sudo apt install ansible

Setting up Inventory File

The *inventory file* contains information about the hosts you'll manage with Ansible. You can include anywhere from one to several hundred servers in your inventory file, and hosts can be organized into groups and subgroups. The inventory file is also often used to set variables that will be valid only for specific hosts or groups, in order to be used within playbooks and templates. Some variables can also affect the way a playbook is run, like the `ansible_python_interpreter` variable that we'll see in a moment.

To edit the contents of your default Ansible inventory, open the `/etc/ansible/hosts` file using your text editor of choice, on your Ansible Control Node:

```
$ sudo nano /etc/ansible/hosts
```

/etc/ansible/hosts

```
[servers]
server1 ansible_host=203.0.113.111
server2 ansible_host=203.0.113.112
server3 ansible_host=203.0.113.113

[all:vars]
ansible_python_interpreter=/usr/bin/python3
```

ansible-inventory --list -y

Testing Connection

- After setting up the inventory file to include your servers, it's time to check if Ansible is able to connect to these servers and run commands via SSH.
- You can use the -u argument to specify the remote system user. When not provided, Ansible will try to connect as your current system user on the control node.

ansible all -m ping -u root

Output

```
server1 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
server2 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
server3 | SUCCESS => {
    "changed": false,
    "ping": "pong"
}
```

PaaS (Platform-as-a-Service)

- Platform-as-a-service (PaaS) is a model of cloud service delivery where a third-party cloud service provider delivers some hardware and software tools, often those needed for application hosting or development, to customers over the internet. The key benefit of the PaaS model is that it enables users to access hardware and software that can be used to develop and run applications without having to purchase, install and maintain the infrastructure.

Microsoft Azure

- Microsoft Azure, formerly known as Windows Azure, is Microsoft's public cloud computing platform. It provides a range of cloud services, including compute, analytics,

storage and networking. Users can pick and choose from these services to develop and scale new applications, or run existing applications in the public cloud.

- The Azure platform aims to help businesses manage challenges and meet their organizational goals. It offers tools that support all industries -

- including e-commerce, finance and a variety of Fortune 500 companies

-- and is compatible with open source technologies. This provides users with the flexibility to use their preferred tools and technologies. In addition, Azure offers 4 different forms of cloud computing: infrastructure as a service (IaaS), platform as a service (PaaS), software as a service (SaaS) and serverless.

What is Microsoft Azure used for?

- Microsoft Azure consists of numerous service offerings, its use cases are extremely diverse.

  Running virtual machines or containers in the cloud is one of the most popular uses for Microsoft Azure. These compute resources can host infrastructure components, such as domain name system (DNS) servers; Windows Server services -- such as Internet Information Services (IIS); or third-party applications. Microsoft also supports the use of third-party operating systems, such as Linux.
- Azure is also commonly used as a platform for hosting databases in the cloud. Microsoft offers serverless relational databases such as Azure SQL and non-relational databases such as NoSQL.
- In addition, the platform is frequently used for backup and disaster recovery. Many organizations use Azure storage as an archive in order to meet their long-term Data retention requirements.

AZURE SERVICES

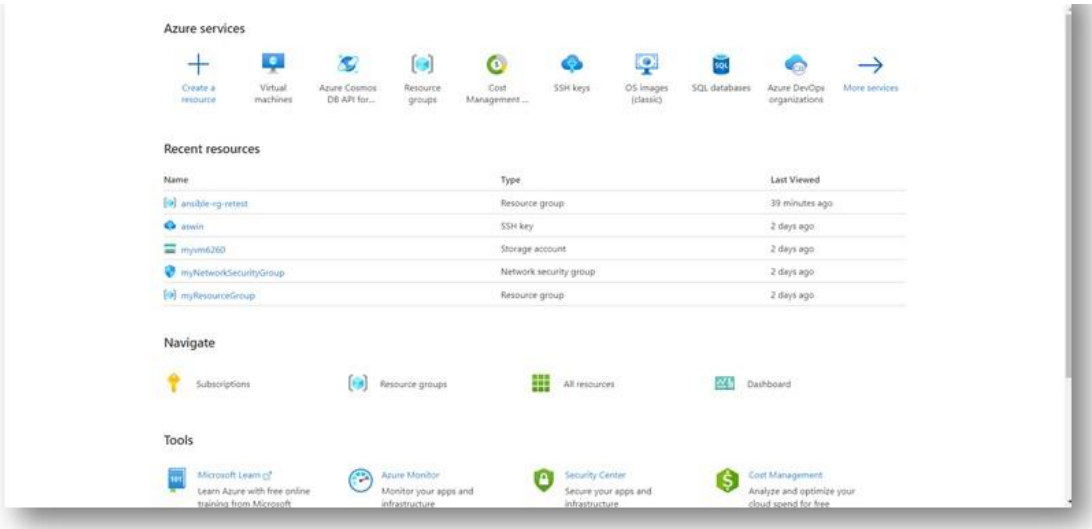
- Microsoft sorts Azure cloud services into nearly two dozen categories, including:
- **Compute.** These services enable a user to deploy and manage VMs, containers and batch jobs, as well as support remote application access. Compute resources created within the Azure cloud can be configured with either public IP addresses or private IP addresses, depending on whether the resource needs to be accessible to the outside world.
- **Mobile.** These products help developers build cloud applications for mobile devices, providing notification services, support for back-end tasks, tools for building application program interfaces (APIs) and the ability to couple geospatial context with data.
- **Web.** These services support the development and deployment of web applications. They also offer features for search, content delivery, API management, notification and reporting.
- **Storage.** This category of services provides scalable cloud storage for structured and unstructured data. It also supports big data projects, persistent storage and archival storage.
- **Analytics.** These services provide distributed analytics and storage, as well as features for real-time analytics, big data analytics, data lakes, machine learning (ML), business intelligence (BI), internet of things (IoT) data streams and data warehousing.

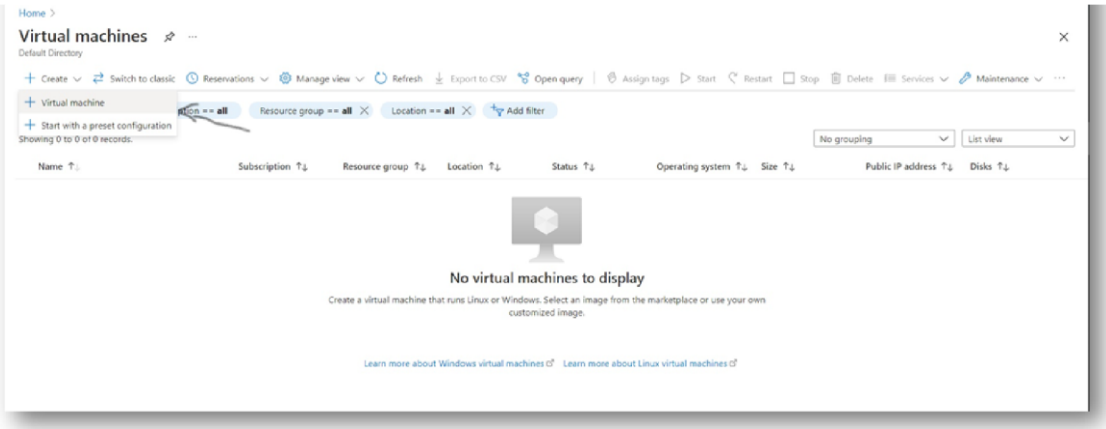
- **Networking.** This group includes virtual networks, dedicated connections and gateways, as well as services for traffic management and diagnostics, load balancing, DNS hosting and network protection against distributed denial-of-service (DDoS) attacks.
- **Media and content delivery network (CDN).** These CDN services include on-demand streaming, digital rights protection, encoding and media playback and indexing.
- **Integration.** These are services for server backup, site recovery and connecting private and public clouds.
- **Identity.** These offerings ensure only authorized users can access Azure services and help protect encryption keys and other sensitive information in the cloud. Services include support for Azure Active Directory and multifactor authentication (MFA).
- **Internet of things.** These services help users capture, monitor and analyze IoT data from sensors and other devices. Services include notifications, analytics, monitoring and support for coding and execution.
- **DevOps.** This group provides project and collaboration tools, such as Azure DevOps -- formerly Visual Studio Team Services -- that facilitate DevOps software development processes. It also offers features for application diagnostics, DevOps tool integrations and test labs for build tests and experimentation.
- **Development.** These services help application developers share code, test applications and track potential issues. Azure supports a range of application programming languages, including JavaScript, Python, .NET and Node.js. Tools in this category also include support for Azure DevOps, software development kits (SDKs) and blockchain.
- **Security.** These products provide capabilities to identify and respond to cloud security threats, as well as manage encryption keys and other sensitive assets.
- **Artificial intelligence (AI) and machine learning.** This is a wide range of services that a developer can use to infuse artificial intelligence, machine learning and cognitive computing capabilities into applications and data sets.
- **Containers.** These services help an enterprise create, register, orchestrate and manage huge volumes of containers in the Azure cloud, using common platforms such as Docker and Kubernetes.
  Databases. This category includes Database as a Service (DBaaS) offerings for SQL and NoSQL, as well as other database instances -- such as Azure Cosmos DB and Azure Database for PostgreSQL. It also includes Azure SQL Data Warehouse support, caching and hybrid

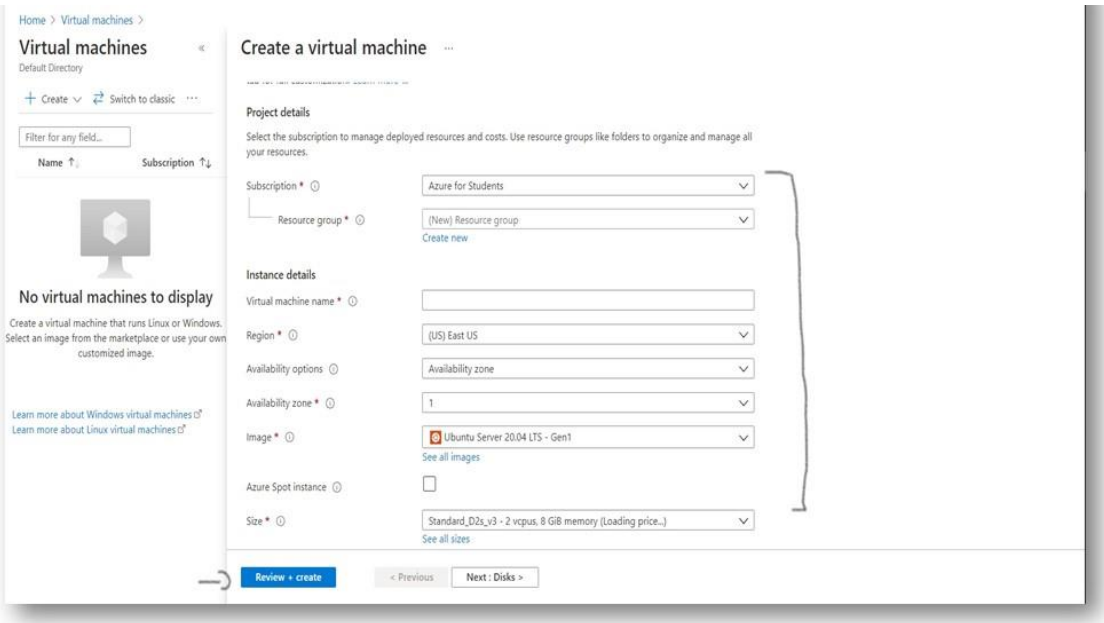
- database integration and migration features. Azure SQL is the platform's flagship database service. It is a relational database that provides SQL functionality without the need for deploying a SQL server.
- **Migration**. This suite of tools helps an organization estimate workload Migration costs and perform the actual migration of workloads from local data centers to the Azure cloud.
- **Management and governance.** These services provide a range of backup, recovery, compliance, automation, scheduling and monitoring tools that can help a cloud administrator manage an Azure deployment.
- **Mixed reality.** These services are designed to help developers create content for the Windows Mixed Reality environment.
- **Blockchain.** The Azure Blockchain Service allows you to join a blockchain consortium or to create your own.

VM DEPLOYMENT WITHOUT ANSIBLE

HOME PAGE OF AZURE


Azure services
Create a resource
Virtual machines
Azure Cosmos DB API for...
Resource groups
Cost Management ...
SSH keys
OS images (classic)
SQL databases
Azure DevOps organizations
More services
Recent resources
Name
Type
Last Viewed
ansible-rg-retest
Resource group
39 minutes ago
aswin
SSH key
2 days ago
myvm6260
Storage account
2 days ago
myNetworkSecurityGroup
Network security group
2 days ago
myResourceGroup
Resource group
2 days ago
Navigate
Subscriptions
Resource groups
All resources
Dashboard
Tools
Microsoft Learn
Learn Azure with free online training from Microsoft
Azure Monitor
Monitor your apps and infrastructure
Security Center
Secure your apps and infrastructure
Cost Management
Analyze and optimize your cloud spend for free


Home
Virtual machines
Default Directory
Create
Switch to classic
Reservations
Manage view
Refresh
Export to CSV
Open query
Assign tags
Start
Restart
Stop
Delete
Services
Maintenance
Virtual machine
Start with a preset configuration
Showing 0 to 0 of 0 records.
Resource group == all
Location == all
Add filter
No grouping
List view
Name
Subscription
Resource group
Location
Status
Operating system
Size
Public IP address
Disks
No virtual machines to display
Create a virtual machine that runs Linux or Windows. Select an image from the marketplace or use your own customized image.
Learn more about Windows virtual machines
Learn more about Linux virtual machines


Home > Virtual machines
Virtual machines
Default Directory
Create
Switch to classic
Filter for any field...
Name
Subscription
No virtual machines to display
Create a virtual machine that runs Linux or Windows. Select an image from the marketplace or use your own customized image.
Learn more about Windows virtual machines
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Create a virtual machine
Project details
Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.
Subscription *
Azure for Students
Resource group *
(New) Resource group
Create new
Instance details
Virtual machine name *
Region *
(US) East US
Availability options
Availability zone
Availability zone *
1
Image *
Ubuntu Server 20.04 LTS - Gen1
See all images
Azure Spot instance
Size *
Standard_D2s_v3 - 2 vcpus, 8 GiB memory (Loading price...)
See all sizes
Review + create
< Previous
Next : Disks >

USING ANSIBLE

★ For Queries, go to:

https://docs.microsoft.com/en-us/azure/developer/ansible/vm-configure?tabs=ansible

★ To Configure LINUX VM Using Ansible Playbook , First we need an azure account, to get a free account:

https://azure.microsoft.com/en-in/free/

- Create a resource group
- Create a virtual network
- Create a public IP address
- Create a network security group
- Create a virtual network interface card
- Create a virtual machine

-Open The Azure Shell, we can directly run Ansible in Azure Cloud Shell, where Ansible is preinstalled.

-In case not installed,

Update all packages that have available

updates. *sudo yum update –y* # Install

Python 3 and pip.

sudo yum install -y python3-

pip # Upgrade pip3.

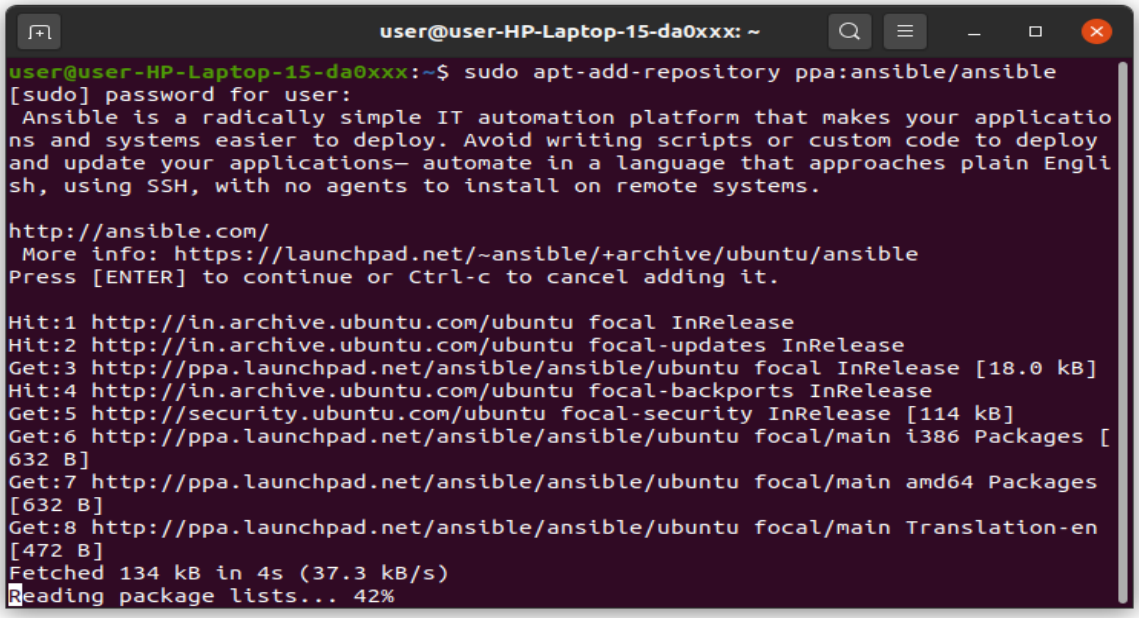
sudo pip3 install --upgrade

pip # Install Ansible.

pip3 install "ansible==2.9.17“

Install Ansible azure_rm module for interacting with Azure.

pip3 install ansible[azure]



RESULT: FAMILIARISED LINUX VM USING ANSIBLE PLAYBOOK