Cloud

Monday, August 22, 2022 1:13 PM

Why cloud ? 80% of the organization are moving to cloud.
Developer you don't need to depend on anyone to deploy and test your application.,
I can work from anywhere?risk is low
Application maintainability.
Scalability
No restriction
Virtualization
All this cloud service provider has something called as Apps
They are like you just write down your code upload in the cloud service provider apps. They will provision the server for you with all the depndency
Biggest cloud service provider is aws.
Azure gcp
IAAS: I need a virtual machine networking storage.
PAAS: Platform as a Service. I want to deploy an database.
SAAS: Software as a Service
Zoho book.
22 lakh
Gst
Itr
30,000
Zoho book
545 200
What is region : every cloud service has presence aroung the world. Before I deploy my application I need to select a region.

1. Latency
2. Compliance: every single app collecting human data. We cannot store data out of the country.

What is az: every region will have data center also.
Availability zone: every region will have minimum two data center.
None of the cloud service provider will give you resilient architecture.
100 miles

Vm charge(cpu ram and networking)+
storage charges +
Oem software
Load balancer=final charge

VM

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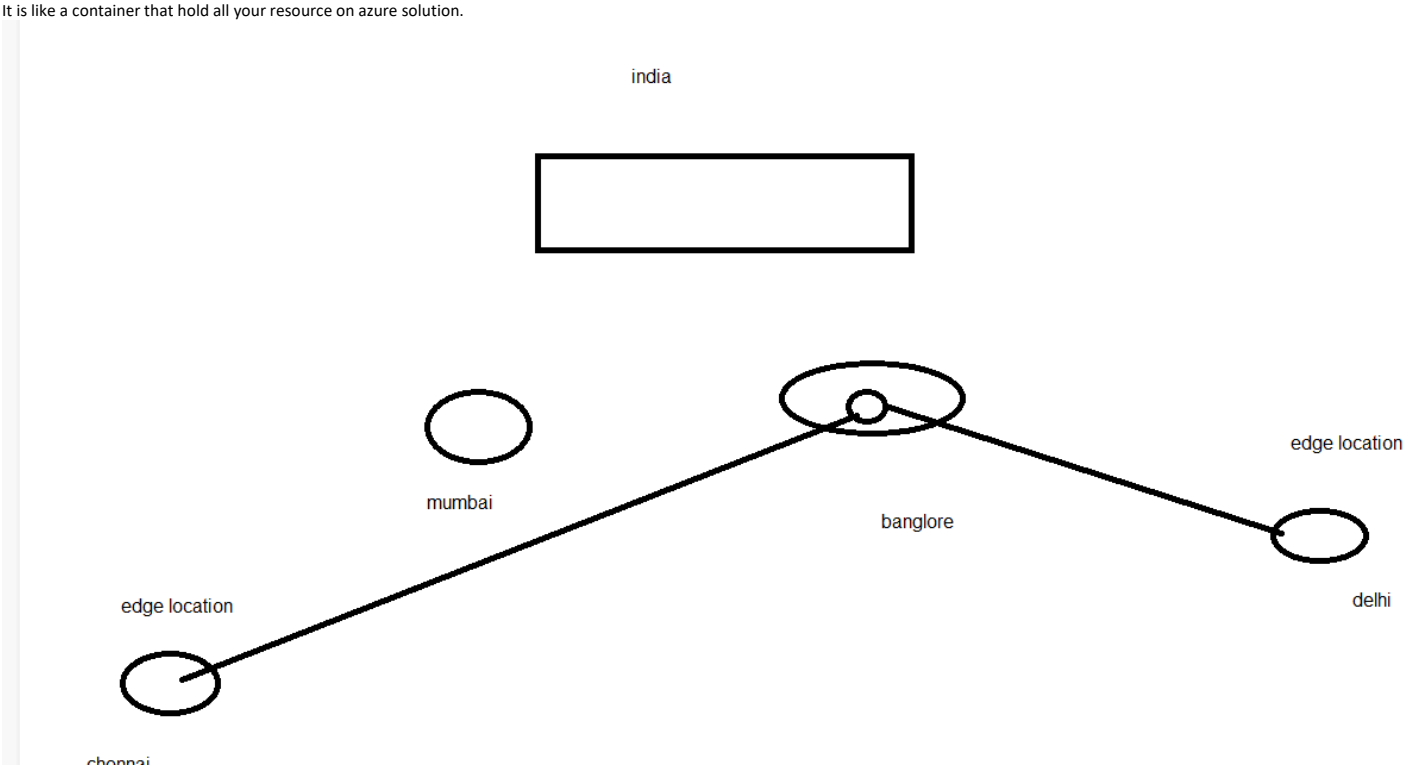
Resource group: in azure everything is integrated into a resource group. Whenever you launch anything in azure you have to first create a resource group. Inside the resource all the component will be created.
Inside the resource group we can launch our vm with all the component.
What is cloud and what is the need of the cloud ?
What is region and what is az in cloud ?
Region :
AZ:
Edge location: cache only location.
They are not full fledge data center they are cache only location.
Which content we access the most from a site.

1. Images and videos: they only consume most of bandwidth.

#####what is resource group#########
It is like a container that hold all your resource on azure solution.



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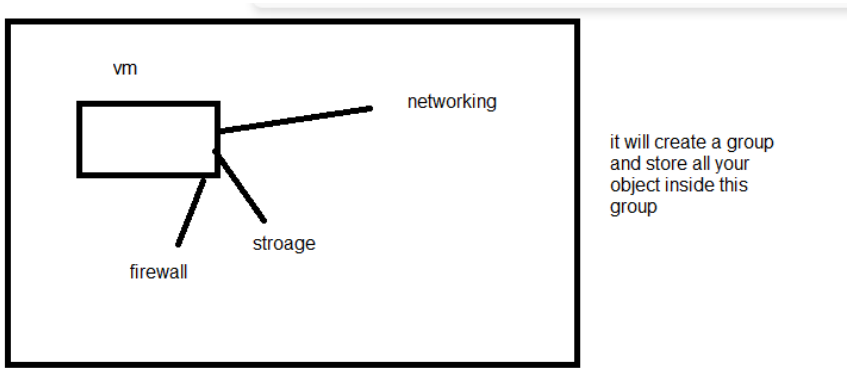
I want to deploy a vm in azure cloud. First you need to create a resource group then only I can launch the vm.



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Creating stages.
Dev staging prod: if you delete your rg all the resources inside the RG will also deleted.
When you create a resource it is always region specific.
To create the resource group we can use the azure portal or using a cli also we can create a resource

group.
We will launch an instance inside my resource group.

Security: it will launch an firewall on top of your vm.,

'images: by default azure provide all the images need to deploy on top of your vm. This is the library for all your operating system. All this os the minimal installation. Linux centos. It will have minimal centos system. No gui only cli.

What is spot instance ?
You know that all the cloud service provider they do not utilized the whole data center. There are plenty of resources available free.
In cloud we know that they go with pay as you go model.
But I have extra resource available.
They will give you spot instance. 90% discount on the pricing. There is a catch. This spot instance are available for 6 hours max. you can use this spot instance for temp work.
Spot instance azure once the time is over they decommission the spot instance.
Aws persistent spot instance. You take an spot instance. At a lower price. If they increase the price they will shutdown the vm and start with new price.

Azure has divided your instance type according the workload.
They have RAM and Processing Power.
A Series: they are entry level vm used for dev/test they are economical and low cost.
B series: Economical and Burstable. I am running a workload on a server with 2 core processor and 4 gb of ram. There is a scenario where you need more performance for a limited time. Whenever there is a need for more or faster process they will autmaticall increase the number of code and ram. They will give you 1 lakh burstable cpu credit every month.
Development and test server low traffic web server small database micro service build server.
D-series: that is general purpose instance. It is a combination of memeory and cpu. Whenever you haver production workload you can use this server.
E series: memory optimized instance: any app required too much memory. SAP hana Netweaver
F series: compute optimized virtual machine. They give you faster processing power. Batch processing.
N series: gpu: gamin
H series : fluid dynamics. Data modeling, weather mapping.

According your workload they have created this instance type.
I will always select memory optimized instance.
I have a no sql database. Cassandra or mongoDB.
Faster storage. Iops. IN OUT PER SECOND read write. SSD
L series instance they come up with SSD>

1. General Purpose
2. Compute Optimzied
3. Storage Optimzied
4. Memory optimzied
5. Gpu optimzied instance.

To login to instance:
One is keypair based authentication
Password based auth

1. Premium SSD: it will give you 10,000 iops read write per second.
2. Standard SSD: 3000 till 10000 read write per second: variable speed
3. Standard HDD: 750 MBPS

So they dive your storage into multiple parts. You need to use the same according to your workload.

It will autmatically enable a firewall on top of your vm.
And stop DDOS attack. Denial of Service.
If they find that any server is requested more than the permitted limit they will automatically block.
Regex or sql injection. You have to enable azure web application firewall. Disable country wise.

They user we have login is having limited capability.
In linux system to become and admin user(sudo -i) make a root user
This is an redhat system.
We will update the system
Install apache
And try to access the same using public ip address.

In linux when you install a package
You need to start it.
Enable mens: it will put your package in startup so that next time when you reboot or stop of your instance and start again the package will be started autmatically.

We will change the default page to custom page

1. We launch an instance in azure.
2. Login using powershell
3. Update it using linux command
4. Install apache server.
5. Check the test page from terminal
6. But it don't work on using browser
7. We added a port in security group
8. Then we disable the linux firewall
9. And access the website
10. Update the index. Html

Create a new resource group
Launch a vm

Vnet

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Azure virtual network .
Why we need to create networking ?
There are multiple project I am running inside my azure portal.
Every project will have its own networking.
We have internet connection
Some ip address.
Some devices connected and they are getting internet. Some of the devices communicate with each other also.
Dev
Staging environment.
Private networking: you are running an db I don't want that from outside anyone can connected only internal connection will be there.
We need to understand few concept

1. Ip address
2. CIDR
3. Subnet
4. Ig
5. Nat gw
6. Private and public subnet.

Subnetting: a subnet or subnetwork is a segment. To divide your network into smaller network.
To do the same we use IPV4 IPV6]

Every network is divided into three common class

Class A: mostly used in ISP: 1 million devices you can addd
255.0.0.0
Class B: mostly used in enterprise: 65000
10.0.0.1 till 255
10.0.1.0 till 255
255.255.0.0
Class C : private network mostly used in home : you can add maximum 255 devices.
Suppose I take an ip address scheme
192.168.0(network bit).1(host bit)-till 255
255.255.255.0

Every computer previously can process 8 bit of information at a time.
101010110
8 power of 2
16 bit
32
64
128
256
Because it start from zero
In cloud networking you need to create as it is simplified.
Subneeting.
It is similar to our traditional network.
You can create point to point vpn

Site to site to vpn

What is vpc peering. We have seen . Creating our custom network and launch our vm inside custom network and connecting the same with bastion host.

How to Create Vnet In Azure

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Quickstart: Create a virtual network using the Azure portal

In this quickstart, you learn how to create a virtual network using the Azure portal. You deploy two virtual machines (VMs). Next, you securely communicate between VMs and connect to VMs from the internet. A virtual network is the fundamental building block for your private network in Azure. It enables Azure resources, like VMs, to securely communicate with each other and with the internet.

Prerequisites

- An Azure account with an active subscription.Create one for free.

Sign in to Azure

Sign in to theAzure portal.

Create a virtual network

1. Select Create a resource in the upper left-hand corner of the portal.
2. In the search box, enter Virtual Network. Select Virtual Network in the search results.
3. In the Virtual Network page, select Create.
4. In Create virtual network, enter or select this information in the Basics tab:

Setting	Value
Project details	
Subscription	Select your subscription.
Resource group	Select Create new. Enter myResourceGroup. Select OK.
Instance details	
Name	Enter myVNet.
Region	Select (US) East US.

5. Select the IP Addresses tab, or select the Next: IP Addresses button at the bottom of the page.
6. In IPv4 address space, select the existing address space and change it to 10.1.0.0/16.
7. Select + Add subnet, then enter MySubnet for Subnet name and 10.1.0.0/24 for Subnet address range.
8. Select Add.
9. Select the Security tab, or select the Next: Security button at the bottom of the page.
10. Under BastionHost, select Enable. Enter this information:

Setting	Value
Bastion name	Enter myBastionHost
AzureBastionSubnet address space	Enter 10.1.1.0/24

Public IP Address	Select Create new. For Name, enter myBastionIP. Select OK.

11. Select the Review + create tab or select the Review + create button.
12. Select Create.

Create virtual machines

Create two VMs in the virtual network:

Create the first VM

1. On the upper-left side of the portal, select Create a resource > Compute > Virtual machine.
2. In Create a virtual machine, type or select the values in the Basics tab:

Setting	**Value**
Project Details	
Subscription	Select your Azure subscription
Resource Group	Select myResourceGroup
Instance details	
Virtual machine name	Enter myVM1
Region	Select (US) East US
Availability Options	Select No infrastructure redundancy required
Image	Select Windows Server 2019 Datacenter
Azure Spot instance	Select No
Size	Choose VM size or take default setting
Administrator account	
Username	Enter a username
Password	Enter a password
Confirm password	Reenter password
Inbound port rules	
Public inbound ports	Select None.

3. Select the Networking tab, or select Next: Disks, then Next: Networking.
4. In the Networking tab, select or enter:

Setting	**Value**
Network interface	
Virtual network	Select myVNet.
Subnet	Select mySubnet
Public IP	Select None
NIC network security group	Select Basic
Public inbound ports network	Select None.

5. Select the Review + create tab, or select the blue Review + create button at the bottom of the page.
6. Review the settings, and then select Create.

Create the second VM

1. On the upper-left side of the portal, select Create a resource > Compute > Virtual machine.
2. In Create a virtual machine, type or select the values in the Basics tab:

Setting	Value
Project Details	
Subscription	Select your Azure subscription
Resource Group	Select myResourceGroup
Instance details	
Virtual machine name	Enter myVM2
Region	Select (US) East US
Availability Options	Select No infrastructure redundancy required
Image	Select Windows Server 2019 Datacenter
Azure Spot instance	Select No
Size	Choose VM size or take default setting
Administrator account	
Username	Enter a username
Password	Enter a password
Confirm password	Reenter password
Inbound port rules	
Public inbound ports	Select None.

3. Select the Networking tab, or select Next: Disks, then Next: Networking.
4. In the Networking tab, select or enter:

Setting	Value
Network interface	
Virtual network	Select myVNet.
Subnet	Select mySubnet
Public IP	Select None
NIC network security group	Select Basic
Public inbound ports network	Select None.

5. Select the Review + create tab, or select the blue Review + create button at the bottom of the page.
6. Review the settings, and then select Create.
   Note
   Azure provides a default outbound access IP for VMs that either aren't assigned a public IP address or are in the back-end pool of an internal basic Azure load balancer. The default outbound access IP mechanism provides an outbound IP address that isn't configurable.
   For more information, see Default outbound access in Azure.
   The default outbound access IP is disabled when either a public IP address is assigned to

the VM or the VM is placed in the back-end pool of a standard load balancer, with or without outbound rules. If anAzure Virtual Network network address translation (NAT) gateway resource is assigned to the subnet of the virtual machine, the default outbound access IP is disabled.

VMs that are created by virtual machine scale sets in flexible orchestration mode don't have default outbound access.

For more information about outbound connections in Azure, seeUse source network address translation (SNAT) for outbound connections.

Connect to myVM1

1. Go to theAzure portalto manage your private VM. Search for and select Virtual machines.
2. Pick the name of your private virtual machine myVM1.
3. In the VM menu bar, select Connect, then select Bastion.
4. In the Connect page, select the blue Use Bastion button.
5. In the Bastion page, enter the username and password you created for the virtual machine previously.
6. Select Connect.

Communicate between VMs

1. In the Bastion connection of myVM1, open PowerShell.
2. Enterping myVM2.

   You'll get a reply message like this:

   PowerShellCopy

   ```
   PS C:\Users\myVM1> ping myVM2

   Pinging myVM2.ovvzzdcazhbu5iczfvonhg2zrb.bx.internal.cloudapp.net
   Request timed out.
   Request timed out.
   Request timed out.
   Request timed out.

   Ping statistics for 10.0.0.5:
      Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
   ```

   The ping fails, because it uses the Internet Control Message Protocol (ICMP). By default, ICMP isn't allowed through your Windows firewall.
3. To allow myVM2 to ping myVM1 in a later step, enter this command:

   PowerShellCopy

   ```
   New-NetFirewallRule –DisplayName "Allow ICMPv4-In" –Protocol ICMPv4
   ```

   That command lets ICMP inbound through the Windows firewall.
4. Close the Bastion connection to myVM1.
5. Complete the steps inConnect to myVM1, but connect to myVM2.
6. Open PowerShell on myVM2, enterping myVM1.

   You'll receive a successful reply message like this:

   PowerShellCopy

   ```
   Pinging myVM1.cs4wv3rxdjgedggsfghkjrxuqf.bx.internal.cloudapp.net [10.1.0.4] with 32 bytes of data:
   Reply from 10.1.0.4: bytes=32 time=1ms TTL=128
   ```

```
Reply from 10.1.0.4: bytes=32 time=1ms TTL=128
Reply from 10.1.0.4: bytes=32 time=1ms TTL=128
Reply from 10.1.0.4: bytes=32 time=1ms TTL=128

Ping statistics for 10.1.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms
```

7. Close the bastion connection to myVM2.

Clean up resources

In this quickstart, you created a default virtual network and two VMs.

You connected to one VM from the internet and securely communicated between the two VMs.

When you're done using the virtual network and the VMs, delete the resource group and all of the resources it contains:

1. Search for and select myResourceGroup.
2. Select Delete resource group.
3. Enter myResourceGroup for TYPE THE RESOURCE GROUP NAME and select Delete.

Vpc Peering

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Instance details	
Name	Enter myVNet.
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Administrator account	
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1. On the upper-left side of the portal, select Create a resource > Compute > Virtual machine.
2. In Create a virtual machine, type or select the values in the Basics tab:

Setting	Value
Project Details	
Subscription	Select your Azure subscription
Resource Group	Select myResourceGroup
Instance details	
Virtual machine name	Enter myVM2
Region	Select (US) East US
Availability Options	Select No infrastructure redundancy required
Image	Select Windows Server 2019 Datacenter
Azure Spot instance	Select No
Size	Choose VM size or take default setting
Administrator account	
Username	Enter a username
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   Request timed out.
   Request timed out.
   Request timed out.

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   The ping fails, because it uses the Internet Control Message Protocol (ICMP). By default, ICMP isn't allowed through your Windows firewall.
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   PowerShellCopy

   ```
   New-NetFirewallRule –DisplayName "Allow ICMPv4-In" –Protocol ICMPv4
   ```

   That command lets ICMP inbound through the Windows firewall.
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6. Open PowerShell on myVM2, enter ping myVM1.

   You'll receive a successful reply message like this:

   PowerShellCopy

   ```
   Pinging myVM1.cs4wv3rxdjgedggsfghkjrxuqf.bx.internal.cloudapp.net [10.1.0.4] with 32 bytes of data:
   Reply from 10.1.0.4: bytes=32 time=1ms TTL=128
   ```

```
Reply from 10.1.0.4: bytes=32 time=1ms TTL=128
Reply from 10.1.0.4: bytes=32 time=1ms TTL=128
Reply from 10.1.0.4: bytes=32 time=1ms TTL=128

Ping statistics for 10.1.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
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```

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3. Enter myResourceGroup for TYPE THE RESOURCE GROUP NAME and select Delete.

Storage

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What is storage in cloud and what is need of storage.

We cannot store all our data in hdd. Either you store it in external hdd or you store the same in a google drive.
Similar to that every orgnization have an storage.
What is the problem with maintain our own storage.
No I have an orgnization which have around 40 tb of data.
This hdd need to replaced on a particular time.
In cloud we can store our data and they give you SLA of 99.9999%
And we just pay 1000 per month.
Iphone: 5 gb of storage free 50gb of storage per month at the cost of 75 rupees.
4500 rupess. HDD.
Now orgnaization do not maintain there data on premises. And move to the cloud.

Amazon has s3
Azure has Blob Storage. They are kind of object storage in the cloud
You can use the same to store massive amount of data . What type of data. Unstructured data.
Images document video audio log file backup .
To access this unstructured data you can use HTTP or HTTPS request. Get put delete
What is Azure Blob Storage.
Blob Storage offer three types of resources.

5/31/2022 9:58 AM - Screen Clipping

This storage account. Azure storage support multiple types of account

1. General Purpose: standard store used for storing file share tables. 99.99%. Max storage 190TB. 50Gb of data per month cost 1dollar
2. Block Blob: Premium storage: where your transaction rate is high. Once I store my data I can retrieve immediately with low latency. You can upload same time 8 TB of data 2 dollar plus downloading charges
3. Page Blob: extra premium: you data is always live.

What are the two things you need to take care when you store your data.

1. Redundancy
2. Retrieval.

Local Redundancy: which means if you store your data it will be autmaticall replicated inside two storage device.

Any data I upload in any cloud will always be private.
Today I upload a data it will attach a time stamp.
If I try to upload the same data multiple times. By default it will overwright.
We can use blob storage to host a website also.
May be there is some downtime in your apllication .
We want to redirect our page to an static website. . You can use html css to build this static website.,
Storage insight.
It is build on top of your azure blob storage.

I want to see which storage are being frequently
Transaction by storage
Anlyze by capacity
Migration plan. Lift and shift. This do not give performance. All the cloud service provider will have latest hardware and software.
Lift shift and tinker.
I will lift my app shit to the cloud. To get better capability. I will recompile my app.

App Service

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What is app service?
Different language
Different environment
We follow a cicd pipeline or agile methodology.
Development process. As per customer requirement we build application into multiple stages.
Every time whenever there is an change we need to redeploy our app.
It is an beteer idea that we should do fresh installation.
Every change require deployment. And a feedback.
If I try to do it manually.
We need something called as automation in deployment. Where I just need to select my application type upload my code and everything will be done by the cloud service provider.
It will launch your server install packages inside it. Not only that it will deploy your app also.
Second time when you modify your application. It will redeploy your application.
This way what will happen.
Deployment time will be reduces.
I don’t need to worry about the resource creation any more.
I also get frequent feedback once the deployment is completed.

If you have an maven application and want to deploy the maven app as azure app. Maven already have a plugin called
It may ask you for subscription id
It may ask you which os do you want to deploy
Which java version
Pricing tear
Press enter

App Service with Springboot

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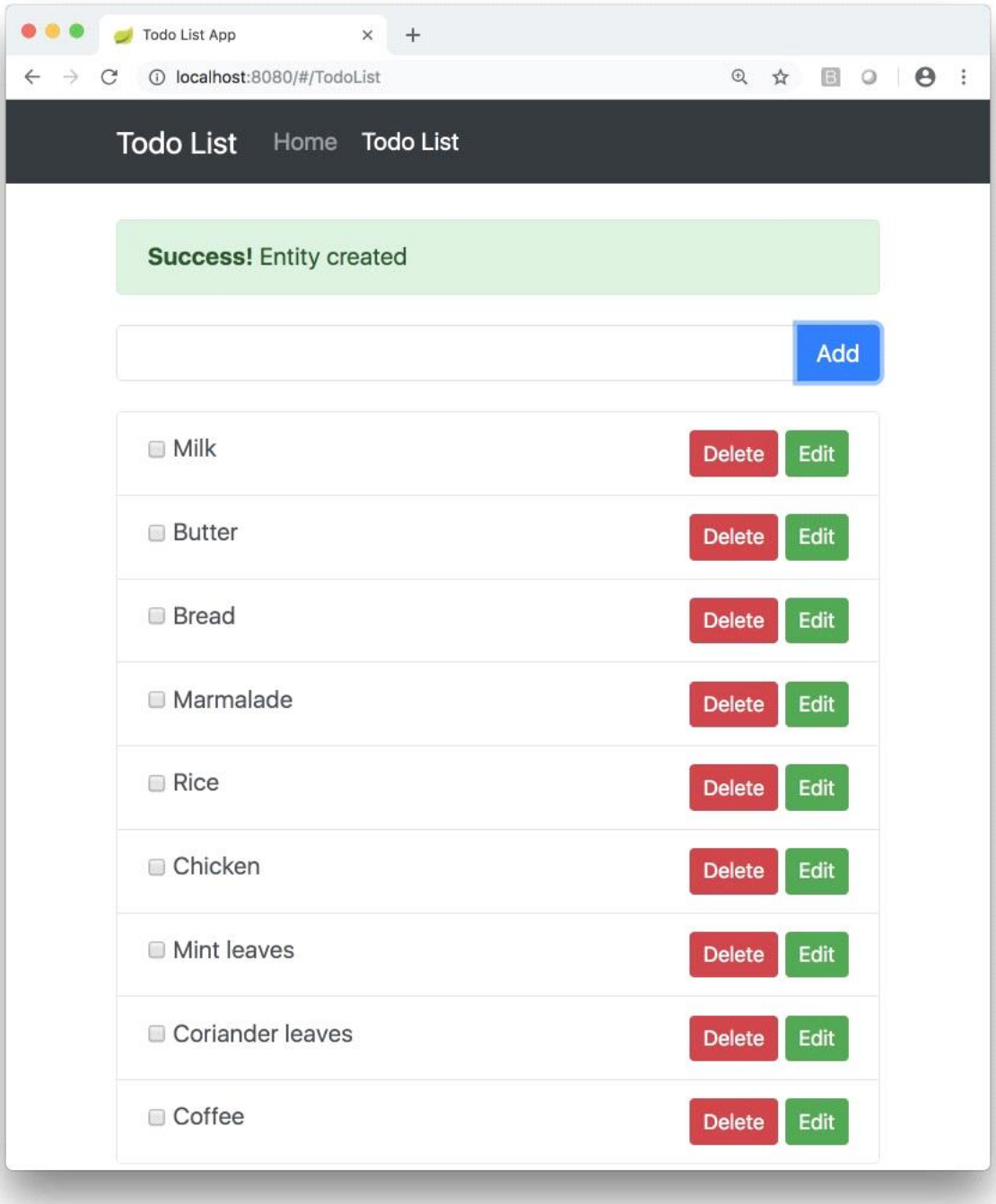
Tutorial: Build a Java Spring Boot web app with Azure App Service on Linux and Azure Cosmos DB

This tutorial walks you through the process of building, configuring, deploying, and scaling Java web apps on Azure. When you are finished, you will have a Spring Bootapplication storing data in Azure Cosmos DBrunning on Azure App Service on Linux.



In this tutorial, you learn how to:

- Create a Cosmos DB database.
- Connect a sample app to the database and test it locally
- Deploy the sample app to Azure
- Stream diagnostic logs from App Service
- Add additional instances to scale out the sample app

If you don't have anAzure subscription, create anAzure free accountbefore you begin.

Prerequisites

- Azure CLI, installed on your own computer.
- Git
- Java JDK
- Maven

Clone the sample TODO app and prepare the repo

This tutorial uses a sample TODO list app with a web UI that calls a Spring REST API backed bySpring Data Azure Cosmos DB. The code for the app is availableon GitHub. To learn more about writing Java apps using Spring and Cosmos DB, see theSpring Boot Starter with the Azure Cosmos DB SQL API tutorialand theSpring Data Azure Cosmos DB quick start.

Run the following commands in your terminal to clone the sample repo and set up the sample app environment.

BashCopy

```
git clone --recurse-submodules  https://github.com/Azure-Samples/e2e-java-experience-in-app-service-linux-part-2.git
cd e2e-java-experience-in-app-service-linux-part-2
yes | cp -rf .prep/* .
```

Create an Azure Cosmos DB

Follow these steps to create an Azure Cosmos DB database in your subscription. The TODO list app will connect to this database and store its data when running, persisting the application state no matter where you run the application.

1.
2. Create an Azure Resource Group, noting the resource group name.

   Azure CLICopy

   ```
   az group create -n <your-azure-group-name> \
     -l <your-resource-group-region>
   ```

3. Create Azure Cosmos DB with theGlobalDocumentDBkind. The name of Cosmos DB must use only lower case letters. Note down thedocumentEndpointfield in the response from the command.

   Azure CLICopy

   ```
   az cosmosdb create --kind GlobalDocumentDB \
     -g <your-azure-group-name> \
     -n <your-azure-COSMOS-DB-name-in-lower-case-letters>
   ```

4. Get your Azure Cosmos DB key to connect to the app. Keep theprimaryMasterKey,documentEndpointnearby as you'll need them in the next step.

Azure CLICopy

```
az cosmosdb keys list -g <your-azure-group-name> -n <your-azure-COSMOSDB-name>
```

Configure the TODO app properties

Open a terminal on your computer. Copy the sample script file in the cloned repo so you can customize it for your Cosmos DB database you just created.

BashCopy

```
cd initial/spring-todo-app
cp set-env-variables-template.sh .scripts/set-env-variables.sh
```

Edit.scripts/set-env-variables.shin your favorite editor and supply Azure Cosmos DB connection info. For the App Service Linux configuration, use the same region as before (your-resource-group-region) and resource group (your-azure-group-name) used when creating the Cosmos DB database. Choose a WEBAPP_NAME that is unique since it cannot duplicate any web app name in any Azure deployment.

BashCopy

```
export COSMOSDB_URI=<put-your-COSMOS-DB-documentEndpoint-URI-here>
export COSMOSDB_KEY=<put-your-COSMOS-DB-primaryMasterKey-here>
export COSMOSDB_DBNAME=<put-your-COSMOS-DB-name-here>

# App Service Linux Configuration
export RESOURCEGROUP_NAME=<put-your-resource-group-name-here>
export WEBAPP_NAME=<put-your-Webapp-name-here>
export REGION=<put-your-REGION-here>
```

Then run the script:

BashCopy

```
source .scripts/set-env-variables.sh
```

These environment variables are used inapplication.propertiesin the TODO list app. The fields in the properties file set up a default repository configuration for Spring Data:

propertiesCopy

```
azure.cosmosdb.uri=${COSMOSDB_URI}
azure.cosmosdb.key=${COSMOSDB_KEY}
azure.cosmosdb.database=${COSMOSDB_DBNAME}
```

JavaCopy

```
@Repository
public interface TodoItemRepository extends DocumentDbRepository<TodoItem, String> {
}
```

Then the sample app uses the@Documentannotation imported fromcom.microsoft.azure.spring.data.cosmosdb.core.mapping.Documentto set up an entity type to be stored and managed by Cosmos DB:

JavaCopy

```
@Document
public class TodoItem {
   private String id;
   private String description;
   private String owner;
   private boolean finished;
```

Run the sample app

Use Maven to run the sample.

BashCopy

```
mvn package spring-boot:run
```

The output should look like the following.

OutputCopy

```
bash-3.2$ mvn package spring-boot:run
[INFO] Scanning for projects...
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] Building spring-todo-app 2.0-SNAPSHOT
[INFO] ------------------------------------------------------------------------
[INFO]

[INFO] SimpleUrlHandlerMapping - Mapped URL path [/webjars/**] onto handler of type [class
org.springframework.web.servlet.resource.ResourceHttpRequestHandler]
[INFO] SimpleUrlHandlerMapping - Mapped URL path [/**] onto handler of type [class
org.springframework.web.servlet.resource.ResourceHttpRequestHandler]
[INFO] WelcomePageHandlerMapping - Adding welcome page: class path resource [static/index.html]
2018-10-28 15:04:32.101  INFO 7673 --- [          main] c.m.azure.documentdb.DocumentClient      : Initializing
DocumentClient with serviceEndpoint [https://sample-cosmos-db-westus.documents.azure.com:443/],
ConnectionPolicy [ConnectionPolicy [requestTimeout=60, mediaRequestTimeout=300, connectionMode=Gateway,
mediaReadMode=Buffered, maxPoolSize=800, idleConnectionTimeout=60, userAgentSuffix=;spring-
data/2.0.6;098063be661ab767976bd5a2ec350e978faba99348207e8627375e8033277cb2,
retryOptions=com.microsoft.azure.documentdb.RetryOptions@6b9fb84d, enableEndpointDiscovery=true,
preferredLocations=null]], ConsistencyLevel [null]
[INFO] AnnotationMBeanExporter - Registering beans for JMX exposure on startup
[INFO] TomcatWebServer - Tomcat started on port(s): 8080 (http) with context path ''
[INFO] TodoApplication - Started TodoApplication in 45.573 seconds (JVM running for 76.534)
```

You can access Spring TODO App locally using this link once the app is started: http://localhost:8080/.

If you see exceptions instead of the "Started TodoApplication" message, check that the`bash`script in the previous step exported the environment variables properly and that the values are correct for the Azure Cosmos DB database you created.

Configure Azure deployment

Open the`pom.xml`file in the`initial/spring-boot-todo`directory and add the following Azure Web App Plugin for Maven configuration.

XMLCopy

```
<plugins>

<!--**************************************************-->
  <!-- Deploy to Java SE in App Service Linux         -->
  <!--**************************************************-->

  <plugin>
    <groupId>com.microsoft.azure</groupId>
    <artifactId>azure-webapp-maven-plugin</artifactId>
    <version>2.5.0</version>
    <configuration>
      <schemaVersion>v2</schemaVersion>
```

```
<!-- Web App information -->
        <resourceGroup>${RESOURCEGROUP_NAME}</resourceGroup>
        <appName>${WEBAPP_NAME}</appName>
        <region>${REGION}</region>
        <pricingTier>P1v2</pricingTier>
        <!-- Java Runtime Stack for Web App on Linux-->
        <runtime>
           <os>linux</os>
           <javaVersion>Java 8</javaVersion>
           <webContainer>Java SE</webContainer>
         </runtime>
         <deployment>
           <resources>
           <resource>
              <directory>${project.basedir}/target</directory>
              <includes>
              <include>*.jar</include>
              </includes>
           </resource>
           </resources>
         </deployment>

<appSettings>
          <property>
            <name>COSMOSDB_URI</name>
            <value>${COSMOSDB_URI}</value>
          </property>
          <property>
            <name>COSMOSDB_KEY</name>
            <value>${COSMOSDB_KEY}</value>
          </property>
          <property>
            <name>COSMOSDB_DBNAME</name>
            <value>${COSMOSDB_DBNAME}</value>
          </property>
          <property>
            <name>JAVA_OPTS</name>
            <value>-Dserver.port=80</value>
          </property>
        </appSettings>

</configuration>
   </plugin>
   ...
</plugins>
```

Deploy to App Service on Linux

Use the`mvn azure-webapp:deploy`Maven goal to deploy the TODO app to Azure App Service on Linux.

BashCopy

```
# Deploy
bash-3.2$ mvn azure-webapp:deploy
[INFO] Scanning for projects...
[INFO]
```

```
[INFO] ------------------------------------------------------------------------
[INFO] Building spring-todo-app 2.0-SNAPSHOT
[INFO] ------------------------------------------------------------------------
[INFO]
[INFO] --- azure-webapp-maven-plugin:2.5.0:deploy (default-cli) @ spring-todo-app ---
Auth Type: AZURE_CLI
Default subscription: xxxxxxxxx
Username: xxxxxxxxx
[INFO] Subscription: xxxxxxxxx
[INFO] Creating App Service Plan 'ServicePlanb6ba8178-5bbb-49e7'...
[INFO] Successfully created App Service Plan.
[INFO] Creating web App spring-todo-app...
[INFO] Successfully created Web App spring-todo-app.
[INFO] Trying to deploy artifact to spring-todo-app...
[INFO] Successfully deployed the artifact to https://spring-todo-app.azurewebsites.net
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time: 02:19 min
[INFO] Finished at: 2019-11-06T15:32:03-07:00
[INFO] Final Memory: 50M/574M
[INFO] ------------------------------------------------------------------------
```

The output contains the URL to your deployed application (in this example,https://spring-todo-app.azurewebsites.net). You can copy this URL into your web browser or run the following command in your Terminal window to load your app.

BashCopy

```
explorer https://spring-todo-app.azurewebsites.net
```

You should see the app running with the remote URL in the address bar:

Stream diagnostic logs

To access the console logs generated from inside your application code in App Service, turn on diagnostics logging by running the following command in theCloud Shell:

Azure CLICopy

Try It

```
az webapp log config --resource-group <resource-group-name> --name <app-name> --docker-container-logging filesystem --level Verbose
```

Possible values for--levelare:Error,Warning,Info, andVerbose. Each subsequent level includes the previous level. For example:Errorincludes only error messages, andVerboseincludes all messages.

Once diagnostic logging is turned on, run the following command to see the log stream:

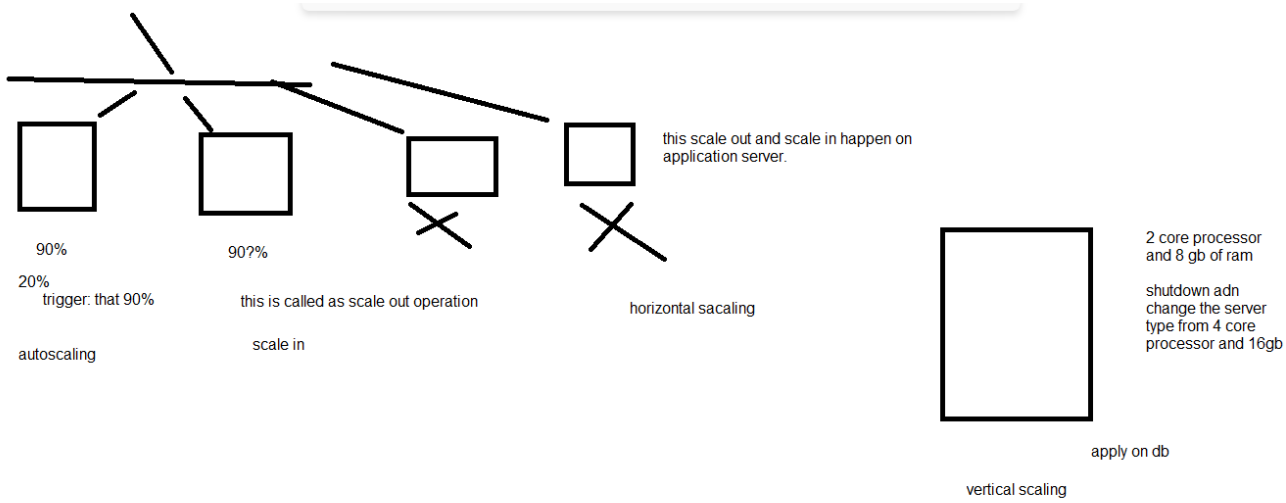
Azure CLICopy

Try It

```
az webapp log tail --resource-group <resource-group-name> --name <app-name>
```

Vertical and Horizontal Scaling

Monday, August 22, 2022 1:19 PM



6/1/2022 10:25 AM - Screen Clipping

Handle my workload I cannot add more number of server to handle my workload.
Horizontal scaling no down time.
Vertical scaling: there will be down time.

From <https://onenote.officeapps.live.com/o/onenoteframe.aspx?edit=0&ui=en-US&rs=en-US&hid=a9gX7MIXr0umD%2FQDGgk61Q.0&wopisrc=https%3A%2F%2Fwopi.onedrive.com%2Fwopi%2Ffolders%2F2D49916A6050AB24!9464&wd=target%28Linux.one%7Cf6c5096c-35dc-4428-9226-fcb8ac3f9053%2Fcommand%7Cbd238a13-054c-498e-b223-9d5c4e022836%2F%29&wdorigin=NavigationUrl&sc=host%3D%26qt%3DDefault&wdp=7&uih=OneDrive&wdhostclicktime=1661150557336&jsapi=1&jsapiver=v1&newsession=1&corrid=06a90541-48f5-4681-a5fa-c42769e868b7&usid=06a90541-48f5-4681-a5fa-c42769e868b7&sftc=1&readonly=1&wdredirectionreason=Force_SingleStepBoot>

Google compute engine

Monday, August 22, 2022 1:19 PM

It is similar to vm which we created in azure.
GCE.
Using GCP
We will first launch a virtual machine
What are different type of vm you have in gce
Install an HTTP web server on GCE
We will play with static and dynamic ip
Simplify the web server setup with compute engine
We will see how to create
Enable billing alert.
Launching instance creating.
GCP cloud is used for advance technologies.
Big query
AI and ML
Docker and kubernetes

By default gcp do not allow you to do password based authentication they always you to do keypair based authentication.
While learning linux we will know how to generate an ssh key and transfer the ssh key to my server.
How to launch an instance in gcp
How to connect to the instance
How to terminate an instance.

User data

Monday, August 22, 2022 1:23 PM

When we use azure app. And try to deploy my java application inside azure.
We just upload the code
And azure use some mechanism to install all the package and deploy your jar file inside your vm.
Maven
Python
Nodejs

When we try to create the plan it say you need to select and language.
By default azure have userdata. Which is nothing simply a shell script.
Which will install packages in your vm while launching only.
User data are shell script or cloud init.
When we put this shell script inside user data while launch it will autmaticall run the shell script.
User data apply while launching your instance.
Once you finish launching your instance. Next time when you modify your user data it will never apply
Sometimes we called this user data as startup script.

When we launch an vm it is totally blank no packages.
I want to launch an instance
After launching it will update my system as per user data
Install an apache webserver
It will also create an test website.
Bootstraping

Instance template

Monday, August 22, 2022 1:25 PM

It is a resource that you can use to create virtual machine
No need to create any resource group.
I want to launch multiple server with similar configuration.
Machine type
Storage
Os
Labels
Startup script
Some other instance property

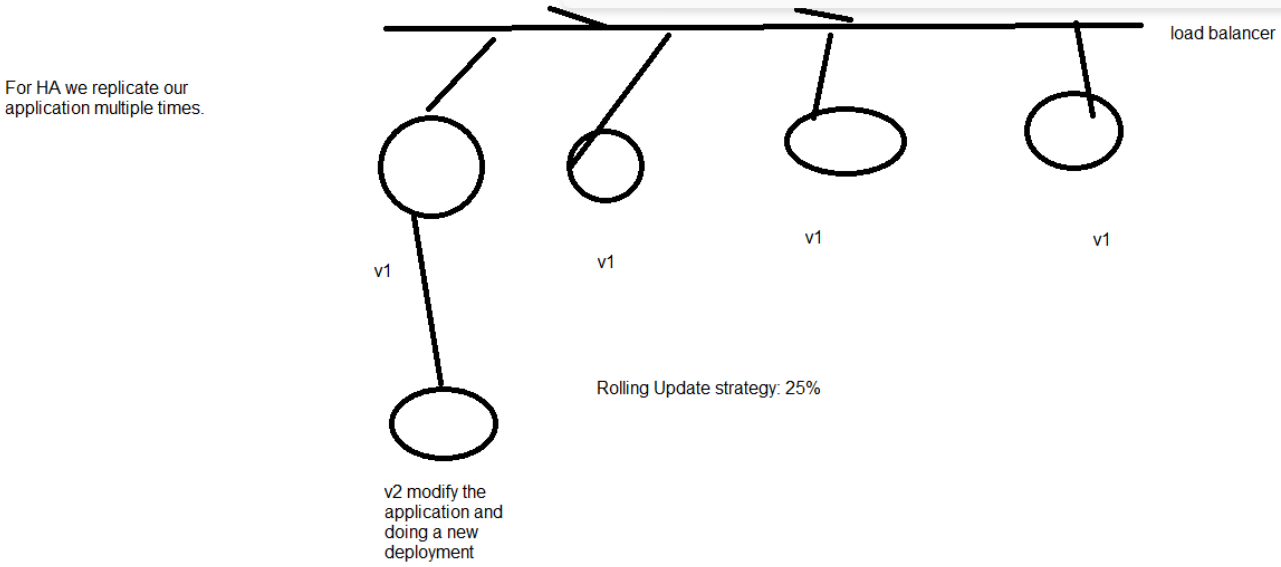
All the attributes related to your instance will be fixed
When to use instance template. You want to quickly launch an instance with preconfigured attributes.
Not only that
Instance template cannot be upgraded.
You need to create a new template.
There is no cost involve in creating instance template

Instance group

Monday, August 22, 2022 1:25 PM

It is a collection of virtual machine which you can manage as single entitory.
There are two type of instance group

1. Managed instance group : you create an managed instance group. Inside the group if any instance get failed using the template it going to launch another instance. They are self-healing instance. Not only that as per your workload you can increase and decrease the number of instance. Autoscaling
   If you multiple instance to distrbute your workload we will use a load balancer.
2. If you update your application you can update the template and deploy the new version of your application.
3. That also withought any down time rolling update fashion.
4. Canary deployment: test new version with a group of instance before you relase across all instance.



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5. Unmanaged instance group
   Canary deployment they run in groups: whenever they find food. Some of them will go and eat the food.
   If nothing happen then other will come and eat it.

   Same instance will be deployed multiple time.
   To do the same what we need first

1. Template is already ready
   Please enable waf: web application firewall with ddos.

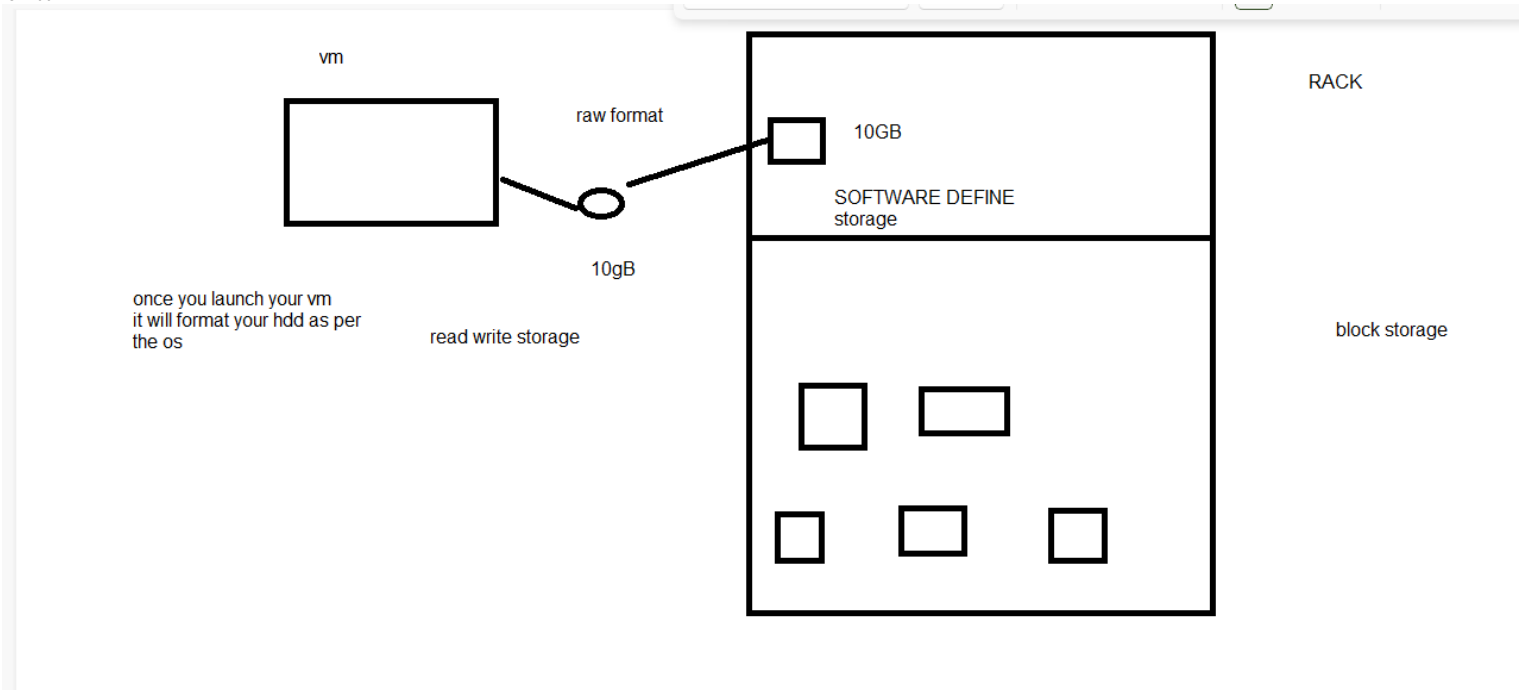
   Cool down period.
   Using a template I will launch an instance.
   Instance will be launched. But there are some software unpacking or installation is going on.
   Once it start launching any instance wait for 60 second before traffic will come to those instance.

Storage

Monday, August 22, 2022 1:26 PM

We will never store everything inside my vm we will always need and storage where we store our data for future use.
Three type of storage

1. File storage: we can see on your laptop of desktop we create a folder and store our data in hierarchical format.



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2. Block storage
3. Object storage. : object: all the data you stored in object storage will be stored as read only.
4. Object storage: you store your data they will automatically replicate the same to multiple data center. 99%
5. Any changes any modification we cannot do it.,
   Data can be hot and cold.
   Hot : means we are frequently access some data.
   Cold means once in a year or quartely or monthly.

   Standard storage: you store your data and you can retrieve immediately.
   Nearline: you store your data retival time will be 5 min to 4 hour
   Coldline: you store your data retrival time will be 24 hour.
   Archival: you store your data retrival time will be 48 hour.
   When we talk about storage
   Amount of data.
   Plus data download.
   In cloud any data you upload it is free of cost. But when you download they start charging.
   Data in transit: encrypted
   Data in rest: they are in rest state.
   All thje cloud service provider provide storage: they should also give you encryption.
   Anything you download from cloud they charge you.
   I am uploading some premium content or premium picture.
   If someown donwload the content they need to pay for the same.
   We need to reduce the cost in storage.
   We don't frequently delete our data.
   I store my data today. Then access the same frequently for a week. Till my task is going on. We hardly access those data.
   After few days or month it should move to nearline or cold storage. Manually doing the same.
   You can create a life cycle policy which will ensure that whatever data I am uploading today will move to another storage.
   Object locking

VPC

Monday, August 22, 2022 1:26 PM

How to create our custom network inside gcp.
To do the same we will create a vpc which is similar to creating in azure vnet.
Why we need to create an vpc ?
They main purpose of creating vpc is to replicate a network similar to the network you have on premises or in your head office.
Not only that you can customized the network configuration.

we want to launch
an vm.

to create your network
you need to also define public subnet
private subnet intenet gw nat gw routing.
all the cloud service provider they create
a default network and whenever you
launch an instance it get launch with the
default netowrk.

6/2/2022 2:14 PM - Screen Clipping

Vpc flow logs means: it will collect all the internal networking logs.

There are two way to deploy your application
Once is using mvn plugin. Appengine
But in microsfot what it do is once I define the plugin it autmatically do modifcation in your pom.xml file and deploy the package in app
Here manually I am adding the plugin in pom.xml
And try to deploy it. But this maven plugin has some bugs.
Gcloud app deploy provide the target file jar.

Linux

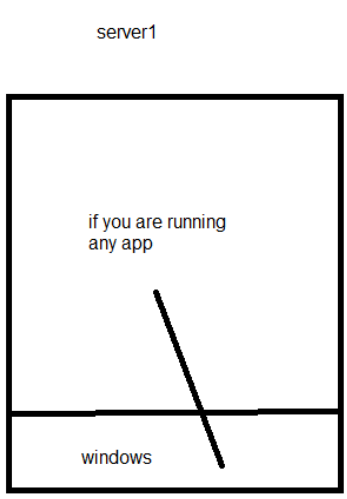
Monday, August 22, 2022 1:26 PM

ANY APPLICATION YOU create and want that application to be accessed by multi user around the world.
You need an os. It may be windows or linux.
The whole market of os is dominated by two os company one is windows another is mac.
Now also windows dominate 60% share in the market.
40 % other os.

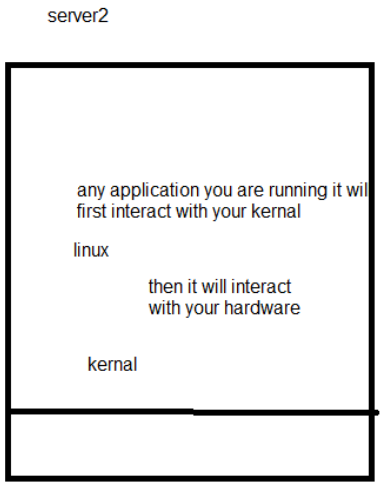
- Who use mac

When you want to run an application. Build using java. You want to host the app in a server.
We never look for windows server.
Apache or nginx
Enterprise environment.
Every server run on top of linux SAP. Amazon gcp
It is community driven.
Linux all the development is done by different community
Microsoft is an oem. It is closely shadow project. Every development is being done by one organization that is Microsoft only.
Most of the project now a days are moving to linux.
Linux is open source. It has more than 256 flavour.
But the whole market is being managed by two linux
Redhat Linux: support. Opensource. What is the gurantee that data leak will not happen from your linux.
Redhat: which provide support and updates for enterprises. You need to pay for the licence. The charge for support and updates.
Debian.

1. Linux is an open source
2. Linux is based on kernal



in windows all your application interact with your hardware



kernal is a compnent in linux os it is an core interface between a computer hardware.
it will also manage your resourc es efficentyl.

i can say kernal is a seed inside a hardshell.

kernal is an addtional layer of security in your linux system.

6/3/2022 9:42 AM - Screen Clipping

The main 4 job of a kernal is that

1. Memory management
2. Process management: if a process is in sleep mode.
3. Device drive
4. System calls and security

Kernal is like an personal sec
Windows server need reboot frequently.
Linux system 365 days.

Final : windows is an package based system. Where as linux is a file system.
Windows is an package: I want to worprocessing
Where as in linux everything run as a file. I will have full control on my application. Not only that it will always be faster.
Linux has a directory structure. Which is common in most of the popular linux system.

Everything in linux start with root directory /
All the binary we install in linux you can find it inside /bin
/dev: it contains all the device file.

/etc: it is one of the imp directory. Suppose I install an package in linux mysql or apache. The configuration file default.
/home/ it is user home directory
/opt: whenever you install an custom appl ication or package.

All your log file related to linux is stored in var file
/etc
Home
Opt
Var: logs
We will install a linux and verify this directory.

Cat is an concatinate command in linux used for access or read a content from a file.
The user we create while launch your instance has limited accessibility. All this log file can be accessed using a root user permission.
By default when you launch your instance it create a root user
To become a root user

Editor in linux.
Because when we move to devops.
Editor called a vi editor
It run through key stroke.

VI Editing commands

- i – Insert at cursor (goes into insert mode)
- a – Write after cursor (goes into insert mode)
- A – Write at the end of line (goes into insert mode)
- ESC – Terminate insert mode
- u – Undo last change
- U – Undo all changes to the entire line
- o – Open a new line (goes into insert mode)
- dd – Delete line
- 3dd – Delete 3 lines.
- D – Delete contents of line after the cursor
- C – Delete contents of a line after the cursor and insert new text. Press ESC key to end insertion.
- dw – Delete word
- 4dw – Delete 4 words
- cw – Change word
- x – Delete character at the cursor
- r – Replace character
- R – Overwrite characters from cursor onward
- s – Substitute one character under cursor continue to insert
- S – Substitute entire line and begin to insert at the beginning of the line
- ~ – Change case of individual character

Make the vi/vim text editor show or hide line numbers

Vim can display line numbers in the left margin:

1. Press ESC key
2. At the : prompt type the following command to run on line numbers: **set number**
3. To turn off line numbering, type the following command at the : prompt **set nonumber**

To save and quit

You can save and quit vi editor from command mode. Before writing save or quit command you have to press colon **(:)**.Colon allows you to give instructions to vi.
exit vi table:

Commands	Action
:wq	Save and quit
:w	Save
:q	Quit
:w fname	Save as fname
ZZ	Save and quit
:q!	Quit discarding changes made
:w!	Save (and write to non-writable file)

Vi Commands

Linux vi editor is different from other editors. You have to use different keys to use different functions. Although, it's quite easy and interesting to use vi editor.
The vi editor commands are case sensitive.
Have a look at the vi commands in the following table.

To switch from command to insert mode:

Command	Action
i	Start typing before the current character
I	Start typing at the start of current line

a	Start typing after the current character
A	Start typing at the end of current line
o	Start typing on a new line after the current line
O	Start typing on a new line before the current line

To move around a file:

Commands	Action
j	To move down
k	To move up
h	To move left
l	To move right

To jump lines:

Commands	Action
G	Will direct you at the last line of the file
``	Will direct you to your last position in the file

To delete:

Commands	Action
x	Delete the current character
X	Delete the character before the cursor
r	Replace the current character
xp	Switch two characters
dd	Delete the current line
D	Delete the current line from current character to the end of the line
dG	delete from the current line to the end of the file

To repeat and undo:

Commands	Action
u	Undo the last command
.	Repeat the last command

Command to cut, copy and paste:

Commands	Action
dd	Delete a line
yy	(yank yank) copy a line
p	Paste after the current line
P	Paste before the current line

Command to cut, copy and paste in blocks:

Commands	Action
<n>dd	Delete the specified n number of lines
<n>yy	Copy the specified n number of lines

Start and end of line:

Commands	Action
θ	Bring at the start of the current line
^	Bring at the start of the current line
$	Bring at the end of the current line
dθ	Delete till start of a line
d$	Delete till end of a line

Joining lines:

Commands	Action
J	Join two lines
yyp	Repeat the current line
ddp	Swap two lines

Move forward or backward:

Commands	Action
w	Move one word forward
b	Move one word backward
<n>w	Move specified number of words forward
dw	Delete one word
yw	Copy one word
<n>dw	Delete specified number of words

Search a string:

Commands	Action
/string	Forward search for given string
?string	Backward search for given string
/^string	Forward search string at beginning of a line
/string$	Forward search string at end of a line
n	Go to next occurrence of searched string
/\<he\>	Search for the word he (and not for there, here, etc.)
/pl[abc]ce	Search for place, plbce, and plcce

Replace all

Syntax:

1. :**<startLine>**,endLine>s/**<oldString>**/**<newString>**/g

Example:

Commands	Action
:1,$ s/readable/changed/	Replace forward with backward from first line to the last line
:3,6 s/letters/neww/g	Replace forward with backward from third line to the ninth line

Text buffers:

Commands	Action
"add	Delete current line and put text in buffer a
"ap	Paste the line from buffer a

Abbreviation

Syntax:

2. :ab**<abbreviation><abbreviatedWord>**

Example:

Commands	Action
:ab au abbrevition and unabbreviation	Abbreviate au to be 'abbrevition and unabbreviation'
:una au	Un - abbreviate au

How to insert
How to save a file
How to quit and save
How to search for a line in a file
Line number
Ctrl dd
Ctrl yy
We will create a user
Then add this user in admin group. To add this user in admin group I need to open the sshconfig file using vi editro and add this user

It is controlled externally by some arm template. From azure. If you forget the password

Simulink & File Permission

Monday, August 22, 2022 1:27 PM

How to create symbolic link in linux.
I will download maven

File permission in linux.
Using linux you can easily control file permission attributes and ownership control.
Linux File permission.
Every linux file permission associate with a owner and a group but you can assign permission to three different type of user

1. The file owner
2. Group member
3. Everyone

But this user will have three type of permission

1. Read
2. Write
3. Execution
4. Ls -la

d(d)rwx(owner)r-x(group)r-x(other). 6 root root 99 Jun 3 07:11 apache-maven-3.8.5
-(file)rw-r--r--. 1 root root 0 Jun 3 07:15 testfile.txt

To manage this permission we use a command chmod
Chmod accept an argumner in number also character
Chmod 777 filename
7
4: read
2:write
1: execute
Total 7
Chmod 7(owner will have read write execute)6(group will have read and write)4(other will have read access)
Chmod 700 filename
Chmod u-rwx,g-r,o= filename
7

Every read write execute has the folliwiung number number
4=read
w=2
Execute=1
No permission=0
This is also called as sometime
Setuid
Setgid
sticky

User Group Permission

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We create group and add permission to the group---finally add multiple user to the group.

In linux we install packages. I install jenkins or docker or kubernetes.
When we install jenins it download multiple file. Every file will have permission of jenkins as user and group
Similar to that I install docker all the files will have docker as permission
Where jenkins pipline want to conver an maven based application into container based app.
When I try to run this pipline I will always get an error that jenkins cannot run docker deamon
We need to add the jenkins user to docker group

We will create a file or a folder when we create this files and folder it will be created with default user and group
Like I logged as gopal
Like I install tomcat server
And the tomcat folder has a permission of root user and group.
This is an security risk.
Using ansible I have install some packages.
But if we use default username and group to install the package. We cannot keep track of who has done the same.
Once the user login he will allow to make changes on the files and folder.

You have a console based system. I need to search for a file. Or folder.
It will search for the file in current directory

Vi
Similar to that
I need to create a file with some content inside it.
Redirector operator using that I can put some content inside a file >

Pipes in linux

a pipes will be used by the shell to connect the output of one command directly to the input of another command.
In kubernetes I want to create a configmap for my database and want to store the configmap
Mysql |
Drop database webdb
Create database webdb

I have a log file but I want to see the log file page wise more
I have a log file can I want to see the last few line of log file
Cat message | more
Cat message | tail -f

Monitor a user
Who
Last
W
Finer

Id
Wall is like broaadcast
Write specific user
System utility
Which: I have install java maven and my application need the path of my java
[root@linuxvm ~]# history
```
  1  cd /var/log
  2  ls
  3  cat secure
  4  tail -f secure
  5  history
  6  vi newfile
  7  cat newfile
  8  vi newfile
  9  cat newfile
 10  vi /etc/ssh/sshd_config
 11  adduser john
 12  cat /etc/group
 13  useradd maya
 14  passwd john
 15  visudo
 16  service sshd restart
 17  history
 18  visudo
 19  cd /etc/ssh/
 20  ls
 21  pwd
 22  cat sshd_config
 23  cat /etc/group
 24  cat /etc/cd /root
 25  cd /root
 26  yum install maven
 27  wget  https://dlcdn.apache.org/maven/maven-3/3.8.5/binaries/apache-maven-3.8.5-bin.tar.gz
 28  ls
 29  ln -s apache-maven-3.8.5-bin.tar.gz maven.tar.gz
 30  ls
 31  tar -zxv maven.tar.gz
 32  tar -zxvf maven.tar.gz
 33  ls
 34  history
 35  docker
 36  ansible
 37  kubectl
 38  touch testfile.txt
 39  ln -s testfile.txt linkfile.txt
 40  ls
 41  ls -l linkfile.txt
 42  rm linkfile.txt
 43  unlink linkfile.txt
 44  ls
 45  history
 46  ls
 47  ls -la
```

```
 48  ls
 49  ls -la
 50  chmod 777 testfile.txt
 51  ls -la
 52  chmod 700 testfile.txt
 53  ls -la
 54  chmod g=x testfile.txt
 55  ls -la
 56  chmod og= testfile.txt
 57  ls -la
 58  chmod u=rw,g=r,o= testfile.txt
 59  ls -la
 60  history
 61  touch test
 62  ls -la
 63  adduser jerry
 64  groupadd jenkins
 65  adduser jerry jenkins
 66  usermod -G jenkins jerry
 67  cat /etc/group
 68  addgroup docker
 69  groupadd docker
 70  usermod -G jenkins,docker jerry
 71  cat /etc/group
 72  gpasswd -d jerry docker
 73  history
 74  ls -la
 75  mkdir tomcat
 76  ls -la
 77  adduser tomcat
 78  groupadd tomcat
 79  chown tomcat:tomcat tomcat
 80  ls -la
 81  history
 82  man groupadd
 83  passwd tomcat
 84  usermod -aG tomcat sudo
 85  usermod -aG sudo tomcat
 86  usermod -aG wheel tomcat
 87  visudo
 88  cat /etc/group
 89  history
 90  clear
 91  find . -name test
 92  find . -iname Test
 93  find . -iname ".txt"
 94  find . -name ".txt"
 95  find . -name "*.txt"
 96  find / -type f -name test
 97  find / -type d -name test
 98  find / -type l -name test
 99  file / -user tomcat
100  file / -user john
```

```
101 locate -r test
102 yum install mlocate
103 updatedb
104 locate -r test
105 history
106 clear
107 echo "Jerry seinfield is the main character in the show queen" > jeery.txt
108 cat jeery.txt
109 echo "jerry show wa create in 1989" >> jerry.txt
110 cat jerry.txt
111 history
112 echo "jerry show wa create in 1989" >> jeery.txt \
113 echo "jerry show wa create in 1989" >> jeery.txt
114 cat jeery.txt
115 history
116 clear
117 ls -l
118 ls -l > listing
119 ls
120 cat listing
121 pwd > findpath
122 cat findpath
123 history
124 cd /etc
125 more
126 tail -f
127 cd /var/log
128 ls
129 cat messages
130 cat messages | more
131 cat messages | tail -f
132 history
133 exit
134 exitr
135 exit
136 ls
137 exit
138 yum install finger
139 clear
140 exit
141 adduser spider
142 passwd spider
143 history
144 clear
145 wall
146 writer spider
147 write spider
148 id
149 users
150 history
151 clear
152 ls
153 wall testfile.txt
```

```
  154  date
  155  time
  156  uptime
  157  uname
  158  uname -a
  159  which
  160  cal
  161  bc
  162  s
  163  ps
  164  ps -a
  165  ps aux
  166  top
  167  history
  168  date
  169  which pwd
  170  which java
  171  yum install openjdk
  172  javac
  173  yum install openjdk-11
  174  yum install java-1.8.0-openjdk
  175  which java
  176  history
[root@linuxvm ~]# echo $JAVA_HOME

[root@linuxvm ~]# history
    1  cd /var/log
    2  ls
    3  cat secure
    4  tail -f secure
    5  history
    6  vi newfile
    7  cat newfile
    8  vi newfile
    9  cat newfile
   10  vi /etc/ssh/sshd_config
   11  adduser john
   12  cat /etc/group
   13  useradd maya
   14  passwd john
   15  visudo
   16  service sshd restart
   17  history
   18  visudo
   19  cd /etc/ssh/
   20  ls
   21  pwd
   22  cat sshd_config
   23  cat /etc/group
   24  cat /etc/cd /root
   25  cd /root
   26  yum install maven
   27  wget  https://dlcdn.apache.org/maven/maven-3/3.8.5/binaries/apache-maven-3.8.5-bin.tar.gz
```

```
28  ls
29  ln -s apache-maven-3.8.5-bin.tar.gz maven.tar.gz
30  ls
31  tar -zxv maven.tar.gz
32  tar -zxvf maven.tar.gz
33  ls
34  history
35  docker
36  ansible
37  kubectl
38  touch testfile.txt
39  ln -s testfile.txt linkfile.txt
40  ls
41  ls -l linkfile.txt
42  rm linkfile.txt
43  unlink linkfile.txt
44  ls
45  history
46  ls
47  ls -la
48  ls
49  ls -la
50  chmod 777 testfile.txt
51  ls -la
52  chmod 700 testfile.txt
53  ls -la
54  chmod g=x testfile.txt
55  ls -la
56  chmod og= testfile.txt
57  ls -la
58  chmod u=rw,g=r,o= testfile.txt
59  ls -la
60  history
61  touch test
62  ls -la
63  adduser jerry
64  groupadd jenkins
65  adduser jerry jenkins
66  usermod -G jenkins jerry
67  cat /etc/group
68  addgroup docker
69  groupadd docker
70  usermod -G jenkins,docker jerry
71  cat /etc/group
72  gpasswd -d jerry docker
73  history
74  ls -la
75  mkdir tomcat
76  ls -la
77  adduser tomcat
78  groupadd tomcat
79  chown tomcat:tomcat tomcat
80  ls -la
```

```
 81  history
 82  man groupadd
 83  passwd tomcat
 84  usermod -aG tomcat sudo
 85  usermod -aG sudo tomcat
 86  usermod -aG wheel tomcat
 87  visudo
 88  cat /etc/group
 89  history
 90  clear
 91  find . -name test
 92  find . -iname Test
 93  find . -iname ".txt"
 94  find . -name ".txt"
 95  find . -name "*.txt"
 96  find / -type f -name test
 97  find / -type d -name test
 98  find / -type l -name test
 99  file / -user tomcat
100  file / -user john
101  locate -r test
102  yum install mlocate
103  updatedb
104  locate -r test
105  history
106  clear
107  echo "Jerry seinfield is the main character in the show queen" > jeery.txt
108  cat jeery.txt
109  echo "jerry show wa create in 1989" >> jerry.txt
110  cat jerry.txt
111  history
112  echo "jerry show wa create in 1989" >> jeery.txt \
113  echo "jerry show wa create in 1989" >> jeery.txt
114  cat jeery.txt
115  history
116  clear
117  ls -l
118  ls -l > listing
119  ls
120  cat listing
121  pwd > findpath
122  cat findpath
123  history
124  cd /etc
125  more
126  tail -f
127  cd /var/log
128  ls
129  cat messages
130  cat messages | more
131  cat messages | tail -f
132  history
133  exit
```

```
  134  exitr
  135  exit
  136  ls
  137  exit
  138  yum install finger
  139  clear
  140  exit
  141  adduser spider
  142  passwd spider
  143  history
  144  clear
  145  wall
  146  writer spider
  147  write spider
  148  id
  149  users
  150  history
  151  clear
  152  ls
  153  wall testfile.txt
  154  date
  155  time
  156  uptime
  157  uname
  158  uname -a
  159  which
  160  cal
  161  bc
  162  s
  163  ps
  164  ps -a
  165  ps aux
  166  top
  167  history
  168  date
  169  which pwd
  170  which java
  171  yum install openjdk
  172  javac
  173  yum install openjdk-11
  174  yum install java-1.8.0-openjdk
  175  which java
  176  history
  177  echo $JAVA_HOME
  178  history
[root@linuxvm ~]#
```

Sosreport

###we want to collect diagnostic report of your linux system

Linux Commands

Monday, August 22, 2022 1:28 PM

```
[root@linuxvm ~]# history
    1  cd /var/log
    2  ls
    3  cat secure
    4  tail -f secure
    5  history
    6  vi newfile
    7  cat newfile
    8  vi newfile
    9  cat newfile
   10  vi /etc/ssh/sshd_config
   11  adduser john
   12  cat /etc/group
   13  useradd maya
   14  passwd john
   15  visudo
   16  service sshd restart
   17  history
   18  visudo
   19  cd /etc/ssh/
   20  ls
   21  pwd
   22  cat sshd_config
   23  cat /etc/group
   24  cat /etc/cd /root
   25  cd /root
   26  yum install maven
   27  wget  https://dlcdn.apache.org/maven/maven-3/3.8.5/binaries/apache-maven-3.8.5-bin.tar.gz
   28  ls
   29  ln -s apache-maven-3.8.5-bin.tar.gz maven.tar.gz
   30  ls
   31  tar -zxv maven.tar.gz
   32  tar -zxvf maven.tar.gz
   33  ls
   34  history
   35  docker
   36  ansible
   37  kubectl
   38  touch testfile.txt
   39  ln -s testfile.txt linkfile.txt
   40  ls
   41  ls -l linkfile.txt
   42  rm linkfile.txt
   43  unlink linkfile.txt
   44  ls
   45  history
   46  ls
   47  ls -la
```

```
 48  ls
 49  ls -la
 50  chmod 777 testfile.txt
 51  ls -la
 52  chmod 700 testfile.txt
 53  ls -la
 54  chmod g=x testfile.txt
 55  ls -la
 56  chmod og= testfile.txt
 57  ls -la
 58  chmod u=rw,g=r,o= testfile.txt
 59  ls -la
 60  history
 61  touch test
 62  ls -la
 63  adduser jerry
 64  groupadd jenkins
 65  adduser jerry jenkins
 66  usermod -G jenkins jerry
 67  cat /etc/group
 68  addgroup docker
 69  groupadd docker
 70  usermod -G jenkins,docker jerry
 71  cat /etc/group
 72  gpasswd -d jerry docker
 73  history
 74  ls -la
 75  mkdir tomcat
 76  ls -la
 77  adduser tomcat
 78  groupadd tomcat
 79  chown tomcat:tomcat tomcat
 80  ls -la
 81  history
 82  man groupadd
 83  passwd tomcat
 84  usermod -aG tomcat sudo
 85  usermod -aG sudo tomcat
 86  usermod -aG wheel tomcat
 87  visudo
 88  cat /etc/group
 89  history
 90  clear
 91  find . -name test
 92  find . -iname Test
 93  find . -iname ".txt"
 94  find . -name ".txt"
 95  find . -name "*.txt"
 96  find / -type f -name test
 97  find / -type d -name test
 98  find / -type l -name test
 99  file / -user tomcat
100  file / -user john
```

```
101 locate -r test
102 yum install mlocate
103 updatedb
104 locate -r test
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107 echo "Jerry seinfield is the main character in the show queen" > jeery.txt
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110 cat jerry.txt
111 history
112 echo "jerry show wa create in 1989" >> jeery.txt \
113 echo "jerry show wa create in 1989" >> jeery.txt
114 cat jeery.txt
115 history
116 clear
117 ls -l
118 ls -l > listing
119 ls
120 cat listing
121 pwd > findpath
122 cat findpath
123 history
124 cd /etc
125 more
126 tail -f
127 cd /var/log
128 ls
129 cat messages
130 cat messages | more
131 cat messages | tail -f
132 history
133 exit
134 exitr
135 exit
136 ls
137 exit
138 yum install finger
139 clear
140 exit
141 adduser spider
142 passwd spider
143 history
144 clear
145 wall
146 writer spider
147 write spider
148 id
149 users
150 history
151 clear
152 ls
153 wall testfile.txt
```

```
  154  date
  155  time
  156  uptime
  157  uname
  158  uname -a
  159  which
  160  cal
  161  bc
  162  s
  163  ps
  164  ps -a
  165  ps aux
  166  top
  167  history
  168  date
  169  which pwd
  170  which java
  171  yum install openjdk
  172  javac
  173  yum install openjdk-11
  174  yum install java-1.8.0-openjdk
  175  which java
  176  history
[root@linuxvm ~]# echo $JAVA_HOME

[root@linuxvm ~]# history
    1  cd /var/log
    2  ls
    3  cat secure
    4  tail -f secure
    5  history
    6  vi newfile
    7  cat newfile
    8  vi newfile
    9  cat newfile
   10  vi /etc/ssh/sshd_config
   11  adduser john
   12  cat /etc/group
   13  useradd maya
   14  passwd john
   15  visudo
   16  service sshd restart
   17  history
   18  visudo
   19  cd /etc/ssh/
   20  ls
   21  pwd
   22  cat sshd_config
   23  cat /etc/group
   24  cat /etc/cd /root
   25  cd /root
   26  yum install maven
   27  wget  https://dlcdn.apache.org/maven/maven-3/3.8.5/binaries/apache-maven-3.8.5-bin.tar.gz
```

```
28  ls
29  ln -s apache-maven-3.8.5-bin.tar.gz maven.tar.gz
30  ls
31  tar -zxv maven.tar.gz
32  tar -zxvf maven.tar.gz
33  ls
34  history
35  docker
36  ansible
37  kubectl
38  touch testfile.txt
39  ln -s testfile.txt linkfile.txt
40  ls
41  ls -l linkfile.txt
42  rm linkfile.txt
43  unlink linkfile.txt
44  ls
45  history
46  ls
47  ls -la
48  ls
49  ls -la
50  chmod 777 testfile.txt
51  ls -la
52  chmod 700 testfile.txt
53  ls -la
54  chmod g=x testfile.txt
55  ls -la
56  chmod og= testfile.txt
57  ls -la
58  chmod u=rw,g=r,o= testfile.txt
59  ls -la
60  history
61  touch test
62  ls -la
63  adduser jerry
64  groupadd jenkins
65  adduser jerry jenkins
66  usermod -G jenkins jerry
67  cat /etc/group
68  addgroup docker
69  groupadd docker
70  usermod -G jenkins,docker jerry
71  cat /etc/group
72  gpasswd -d jerry docker
73  history
74  ls -la
75  mkdir tomcat
76  ls -la
77  adduser tomcat
78  groupadd tomcat
79  chown tomcat:tomcat tomcat
80  ls -la
```

```
 81  history
 82  man groupadd
 83  passwd tomcat
 84  usermod -aG tomcat sudo
 85  usermod -aG sudo tomcat
 86  usermod -aG wheel tomcat
 87  visudo
 88  cat /etc/group
 89  history
 90  clear
 91  find . -name test
 92  find . -iname Test
 93  find . -iname ".txt"
 94  find . -name ".txt"
 95  find . -name "*.txt"
 96  find / -type f -name test
 97  find / -type d -name test
 98  find / -type l -name test
 99  file / -user tomcat
100  file / -user john
101  locate -r test
102  yum install mlocate
103  updatedb
104  locate -r test
105  history
106  clear
107  echo "Jerry seinfield is the main character in the show queen" > jeery.txt
108  cat jeery.txt
109  echo "jerry show wa create in 1989" >> jerry.txt
110  cat jerry.txt
111  history
112  echo "jerry show wa create in 1989" >> jeery.txt \
113  echo "jerry show wa create in 1989" >> jeery.txt
114  cat jeery.txt
115  history
116  clear
117  ls -l
118  ls -l > listing
119  ls
120  cat listing
121  pwd > findpath
122  cat findpath
123  history
124  cd /etc
125  more
126  tail -f
127  cd /var/log
128  ls
129  cat messages
130  cat messages | more
131  cat messages | tail -f
132  history
133  exit
```

```
134 exitr
135 exit
136 ls
137 exit
138 yum install finger
139 clear
140 exit
141 adduser spider
142 passwd spider
143 history
144 clear
145 wall
146 writer spider
147 write spider
148 id
149 users
150 history
151 clear
152 ls
153 wall testfile.txt
154 date
155 time
156 uptime
157 uname
158 uname -a
159 which
160 cal
161 bc
162 s
163 ps
164 ps -a
165 ps aux
166 top
167 history
168 date
169 which pwd
170 which java
171 yum install openjdk
172 javac
173 yum install openjdk-11
174 yum install java-1.8.0-openjdk
175 which java
176 history
177 echo $JAVA_HOME
178 history
```

Shell Scripting

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Introduction to shell ? Before any configuration management tools exist for linux system ansible or teraform or chef or puppet.
Shell scripting is the primary scripting language for your autmation

It is like a container
Also an interface between user and kernal os
CLI is a shell
Shell
Windows Gui is also a shell
Linux has multiple shell environmet shell sh bash ksh
Mostly commonly you will find that Linux comes with bash shell.
Tech shell
Ksh shell: it is a very light weight shell command. Mostly being used in iot
Zsh : opensuse. Sap deployment.
Fish shell
What is shell script: a shell script is an executable file container multiple shell command that are executed sequentially.

When you write an shell script there is file format

1. Shell(#bin/bashg)_
2. Comments(#)
3. Command(echo cp grep etc)
4. Statement(If while for etc)

Note: when you write down a shell script in a file to execute the shell script you need to provide some permission
(rwx-r-x-r-x)
Shell script need to be called from an absolute path
e.g /home/userdie/script.bash
Or if you shell script is in current directory then ./script.sh

How to define a variable in shell script and call the variable.

How to read user input from the terminal in a script . To read a bash input shell has a built in variable called as **read**
IT TAKES INPUT from a user and assign the same to a varaiable. But it will always read only a single line from the bash she..
Read <nameofthevariable>
Putting the input as one by one
Suppose I want to enter a list of item
And display the same.
Arrays
If then scripts
If this happen = do this
Otherwise do that
Suppose I want to find out some file or to find our some service is running or not
And give an output for the same.
I want to update my kernal.
Before If update a kernal I want to find out that the server some service are running or not if the service

is running it should exit if the service is not running it will update your kernal
When we do kernal upgrade there will be a chance that this service disruption can happen.

How to check next 5 cpu load average. Every has cpu then this cpu containts core. This core load are being stored in a linux file /proc/loadavg
Before I want to process a new workload in my linux system I want to verify the existing cpu load in my linux system.
Notepad
https://www.coding-bootcamps.com/blog/manage-mysql-databases-from-linux-bash.html

1. Create a database using shell script
2. Create a table using shell
3. Insert some data using shell but the data should be in csv format from a file.
4. Extract those data using shell.
   LOAD Data Local Infile: this is an sql syntax what it do it read rows from a text or csv file into an designated table.
   This file you need to give it as literal string.
   Select * from tablename;
   Load data infile '/var/www/abc.csv' into table employee;

Networking

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Ip address
Subnet mask
Gateway
Static vs DHCP

1. When we talk about ip address in cloud there are two different ip address attach to an instance
1. Public: this public ip will allow you to access your server outside cloud provider.
   This public ip is dynamic in nature. When you shutdown and reboot the ip address change
   Why they have given dynamic public. Now a days ipv4 is rare.
   By default the public ip is free of cost. But when you want to reserved an ip address. They will allow you to do it. But if you reserved an ip address and shutdown your system. They will start charging you.
2. Private: this private ip address is being used for internal network of azure. This is dynamic. Azure allocate this private ip with a dynamic range. Never make private ip as static. It can clash. But the lifeline of this private ip. Till your instance is alive it will never change.
   Then in cloud they have eth: ethernet card. This is virtual network
   Once you launch your instance they will give you networking: 10/100MBPS
   You can select accelerated networking: 1to 10GBPS
   In linux the network configuration are being stored in different files
   303 cat /etc/nsswitch.conf : it container network information of how you are login into a server
   304 cat /etc/hostname : contains the hostname of your suyste
   305 cat /etc/sysconfig/network: it containes information about your network you have a dhcp or an static server
   306 cat /etc/sysconfig/network-scripts/: you will find hardware adress for netowkring
   307 cat /etc/sysconfig/network-scripts/ifcfg-eth0: ethernet 0 the network card information you will get here
   308 cat /etc/resolv.conf : it contains the global dns server
   Ip a
   Will give you two adapter
   One is lo: loopback adapter: if you want to check that your netowrk divice is working fine or not you can ping the lo adapter
   Eth0: which is nic card

   Duplex: Full: it can do 5gbps upload and 5gbps download
   Half duples and your nic card speed it 5gb. It will do 2.5gb upload and 2.5gb download
   In linux we want to download a file to do the same., we can use a wget command

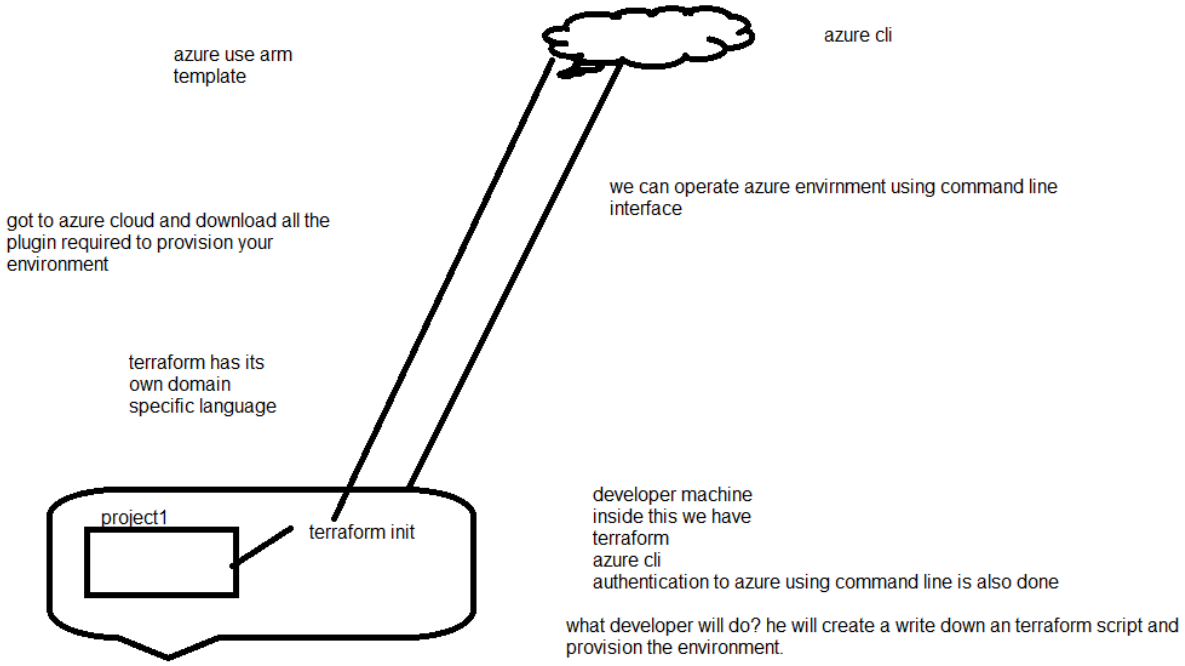
IAC

Monday, August 22, 2022 1:29 PM

What is Infrastructure as code?

1. Everything is virtualized.
2. All the virtual environment expose there application using some standard API.
3. Aws azure gcp or vmware.
4. The problem in exposing this api is that every has there own coding format
5. GCP: use go lang to expose
6. Azure : arm templates
7. Amazon use : cft: cloud formation template.
8. You need to well aware of multiple languages.
9. You need a single language to manage all this infra.

Infrastructure as code
There are two format
One is used for provisioning
Another is used for configuration.
Provisioning : it is like building an environment from scratch. terraform
Configuration: already you have environment running. You update those environment on frequent basis.
Ansible chef puppet.
To download any package we have utility like yum or apt
In windows we have a package manager called as chocololaty



6/7/2022 10:45 AM - Screen Clipping

Terraform validate will verify the code. It is not going to check that when you provision an environment using terraform the code is correct or not. Syntax. It is not going to compare your code with the resource you are going to provision.
Terraform plan: it will show you an dry run. As per the configuration script what it is going to provision for you.
Terraform apply: it will also give you an dry run plus when you say yes it is going to create the environment for you.
When we do terraform apply. It store your configuration in an state file.
When we run terraform destroy it will pickup the state file.
Terraform destroy: once your environment get created if you want to destroy
How terraform destroy will know what resource it is going to destroy

By default the state file get created in current directory.
You need azure blob storage
Aws you have to use s3 and dynamodb

They have there own language. There is format for those language.
Terraform : follow json
Ansible: yaml

Chef/puppet: ruby
Terraform has its own Domain Specific Langauge.,
But where we will find the resource.
Do you modify your house on daily basis.
Simlar to that windows
Ram processor
SSD
Icecream: vanila
Choco
Once you are through with IAC. Same thing will be there for longer duration.
Terraform ansible version mens they provide more functionalty

Terraform autmatically do versioing of your state file. You need it for audit purpose.
Particulage forlder it keep two version the previous one and the current one.
You need to use azure blob storage.

6/7/2022 2:22 PM - Screen Clipping

Terraform depend_on metaargumenbt.
Any terraform script I execute it run from top to bottom and left to right
Depends_on: it will explicitly stop creating the resrouce before virtual network or subnet to be created.
Public ip will not be created . Public ip will be created once your virtual network or subnet is being created

Next we want to launch multiple instance.
This instance will have a unique name
Also we need to create two public ip two nic card
Count =2
Once the vm get launch I want to install some package
We will use userdata
A domain name should be also createrd for this vm using the random string.

Meta argument called as count
This count argument accept a whole number. Not only that it will create that many number of instance or whatever reseource we have provided
When you give count.index this is an index number start(0)

To do the same terraform has a function
Element : retrieve a single element from a list.
Element(list,index)
Element(["a",b",c],1)

Local : it is also calles as local values. It is expression : what is accept….,.
Which accept an input value. Not only that it can accept argument as output value.
But they function like temporary value.
When should we use local.
I want to integrate multiple values together.
I have define a key and value and I want to use the same in a for loop
Like I want to open a port in nsg
Priority: port number
100:80
110:443
Like we are define local expression in key value format
Inside my subnet I want to create a security group
Assocaite the sg with subnet
Azure network security rule

Questions

Monday, August 22, 2022 1:29 PM

Which language is being to build terraform: go lang
Terraform what laungage
Programing
Coding
Terraform use declarative configuration to desired the final state:
I write down a code to build and environment in terraform. All the terraform configuration are declarative in nature.
While building my environment using terraform when we give a command terrafomr apply. It is going to create my environment.
Terraform is not only used for building. We want to do audit purpose. Some log files . Tfstatefile.
Terraform destroy: it should have an previous log file which it is going to use to destroy your environment.
To do terraform destroy it will use the tfstate file which is being used to create
Terraform version changes every 6 month.
I have build an application using terraform 12 version.
Someone download the code and they have terraform 14 version.
And they try to run the previous script. They will get plenty of error.
But I want to run it with a downgraded version of terraform.
When you share your terraform always share the terrafomr.lock.hcl file.

Local value in terraform
Local value are like expression. Main purpose of the local value is to concatenate multiple values together.
Once your vm created vm-sap-dev-randomstring
You can provide local value as input and output.
When we create security group rule : there will be multiple rule I need to define 80 22 443

Local value : to concatenate two value together and use the same as single value. Multiple times.

```
"${local.resource_name_prefix}-${var.resource_group_name}-${random_string.myrando
m.id}"
```

Sap-dev-rg-randomstrgin

```
"${local.resource_name_prefix}-${var.vnet}-${random_string.myrandom.id}"
Sap-dev-vnet.randomg
Repetation-prefix with concatinated value agains your project.
Don’t use local too much it create confusion.
Naming : for any resource it has limitation.
##3 it should some comman name.
Naming convention
Pl;us some tagging
Open to work
Open to hire
Gopal das
#azure-trainer aws-trainer-aks-trainer-gcp-kubernetes
Someone try to search a aks-trainer
Tag in cloud services it is use to identify: sap-dev
Not only if you want create a budget- so using the tag
Tags: it accept
Key and value
```

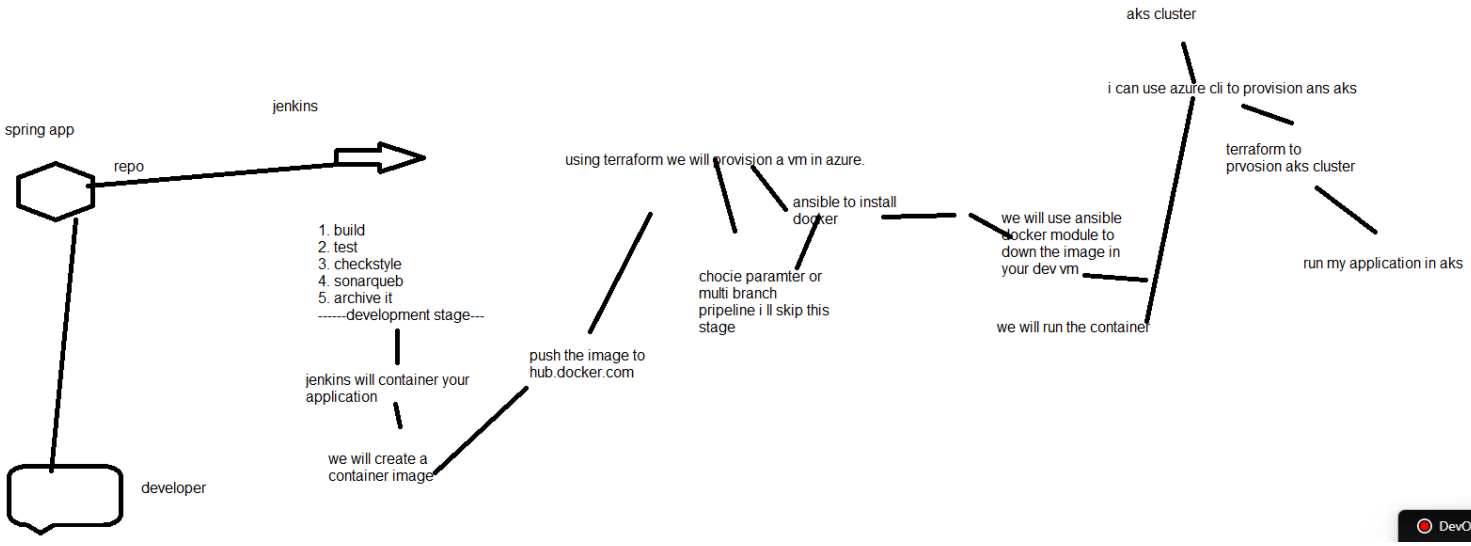
I want to provision an infra using the same code
But for a devision called as hr. thye want the server to be deployed in timbaktu

How do we define key and value in locals
Gopal = das #if your key start with a character you need to use =
If you key stat with numeric :
And nsg you are create it required two argument
Port number: priority number
You have multiple stages dev test pre prod uat
Your organization has build an application which can be deploy in multiple dept.
Socail network
Document share app.
Path.module: the project folder or terraform. Sometime it is also called as module in terraform

Terraform Cloud

Monday, August 22, 2022 1:30 PM

We have seen terraform using the same we provision our environment in the cloud.
I share my code with everyone.
Using some git
Other than me someone download the code.
They also will try to provision the same envrionment. There will be clash
If othen then me try to run the same terraform script at the same time.
I want to lock him.
Using terraform I am working on a project for hr department
You can give access to other but it will only read only.
If other person want to provision an environment for it department. He can use your code but he cannot . Use your state file.
In comment section your need to define a comment that change your storage location.
Terraform is an provisiong tool. We can provision an environment
Ansible chef or puppet is an configuration management tool.
Using ansible I have created a playbook.
Using terraform I ll provision my environment and terraform will use ansible to configure your environment installing docker or toimcat



6/13/2022 9:54 AM - Screen Clipping

Remote state file contains the final state. By default we store the remote state file. It contains the final content
Sometime I run terraform plan. That generate an state file. Terraform validate it also generate some kind state file.
Terraform apply it will generate an state file terraform destroy it will generate an state file
Terraform is open source
Terraform enterprise

Terraform plan	Terraform apply	Terraform destroy

State file	State file	statefile

Modules

Monday, August 22, 2022 1:31 PM

There are three types of modules which is there in terraform

1. Root Module : the current directory where your terraform script are stored.
2. Child Module
3. Published Moule (Terraform registry)
4. The terraform azure static web site will create a rg storage account and container . But I have not defined any value which will create the same.
   Anyone who wish to do remote work must be in office for a minimum of 100 hour.

Azure service principal is an identity. But when you create service principan it give you control on azure using cli while creating service principal it will allow you to create resource using cli
Terraform ee it run on top of aws. Different identity
Using the same I ll provision my server in azure.

By default to login to azure.
Az loging: it open a port an allow you to login to azure.

You are running a windows system
They don't give you gui access. Command line access.
Login through command line.
Az login
I don't want to login with username and password
I want to generate some access key and secreat access key using that I want to loging to azure.
Az sp create access key and secresate key. Not only we need to provide a role based access to this key "contributor"

Sentinals

Monday, August 22, 2022 1:31 PM

Sentinal-prime: he is the prime his job is to create policy for all the robots. He also ensure that everything is allocates as per the need.

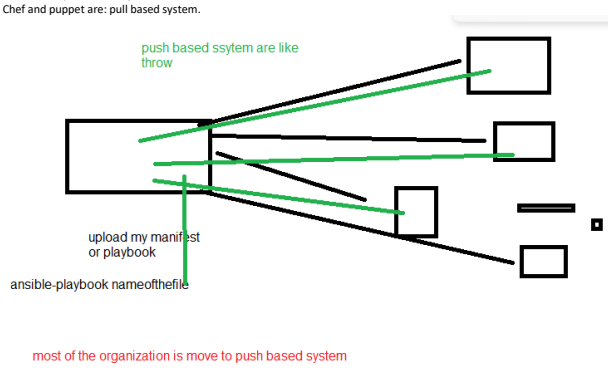
Security
Role Based Acess Control
Allow provider: backend/null/random-someone has written a script to provision the environment- but I want to see that he don't use this random provider.
Provider version
Azure-linux-vm-: polixy D2s3vm
Azurevnet: we want he cannot do peering
Azurerm_public: when he launch an instance he will only launch instance with dynamic ip
Azure_network
Resize the vm
Cost limit to be added

Policy limit :
Advisory
Soft limit
Hard limist

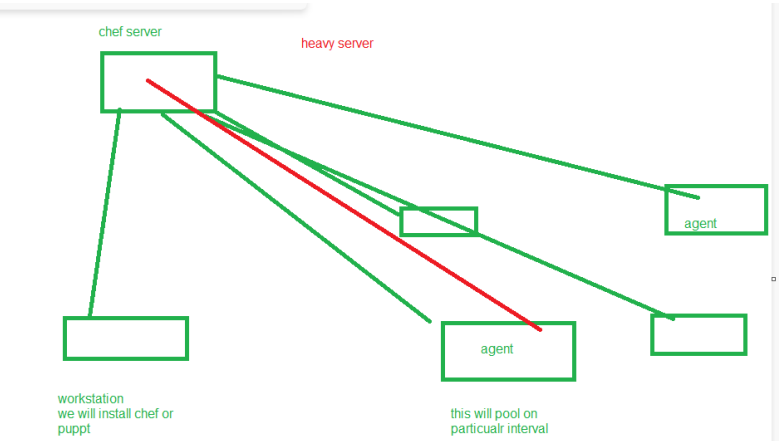
Confg. Management Tool

Monday, August 22, 2022 1:31 PM

What is configuration management?
What is the need of configuration management tool?
Provisioning: you are creator. You build your environment. So that I can destroy it.
Now a days your application move from one stage to another stage frequently.
Once we finish testing our dev environment we can destroy it and making changes in the files we can provision the environment.
Once the environment is provision. We are going to deploy my application. We will use a configuration management tool.
Because we are going to frequently make changes in the app. And redeploy the app. I need to reconfigure my environment.
Different type of configuration management tool. Ansible chef puppet saltstack.
Why ansible become popular
Ansible: are push based system
Chef and puppet are: pull based system.



most of the organization is move to push based system



i cannot apply and immediate.

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To communicate with linux system: ansible use ssh
To communicate with windows it use : winrm.

6/14/2022 12:36 PM - Screen Clipping

Null provider: it implement null resource but takes no further action.
But you can provided argument using triggers
The primary use case of null-resource is not to do anything but use the provisioned to do some thing.
Local-exec and remote exec file
It is not possible for terraform to have all the module related to cloud is avaialbe.
There is new tech which is added in azure platform for machine learning.
I weant to provision the same. But shell script is avaialbe to do.
Using null provisioned you can do the same.
By default all the resource you create
Mostly it is used to run scripts. On a specified trigger.
Any resource which is not supported by terraform you can make it support using null resource and its trigger.

Ad-hoc Command

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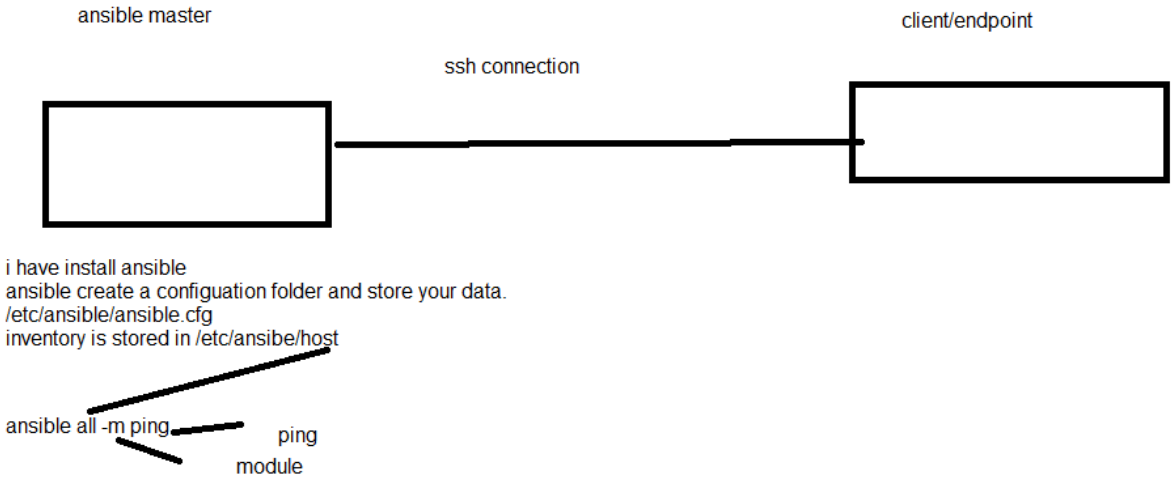
Ad hoc command in ansible are being used to do a work in a single line
I want to see the uptime of all my server
Or I want to install a package immedaitely
Ntpd or vim

Ansible	Hostgroup	Module	Argument to the module

Ansible all -m ping



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The inventory file contains all the endpoint or node which is going to be manged by this ansible server.

Db1
Db2
Db3
They are same database with same package installed
[sapientdb]
Db1
Db2
Db3

Using ansible we will create a group
We will also create a user with home directory
Try to recreate the user and see that it will allow you to create or not
Then we will create a directory with default permission
Then change the directory user and group permission

```
root@ansiblemast:/etc/ansible# ansible client -m group -a "name=weblogic state=present"
client | CHANGED => {
   "ansible_facts": {
      "discovered_interpreter_python": "/usr/libexec/platform-python"
   },
   "changed": true,
   "gid": 1001,
   "name": "weblogic",
   "state": "present",
   "system": false
}
root@ansiblemast:/etc/ansible# ansible client -m group -a "name=weblogic state=present"
client | SUCCESS => {
   "ansible_facts": {
      "discovered_interpreter_python": "/usr/libexec/platform-python"
   },
   "changed": false,
   "gid": 1001,
   "name": "weblogic",
```

```
    "state": "present",
    "system": false
}
root@ansiblemast:/etc/ansible#
```

When you see yellow output in ansible: some changes has happen
When you see green output: it try to make changes. But ansible has indopetent. It already know that I have already created a group why I should try to recreate it.

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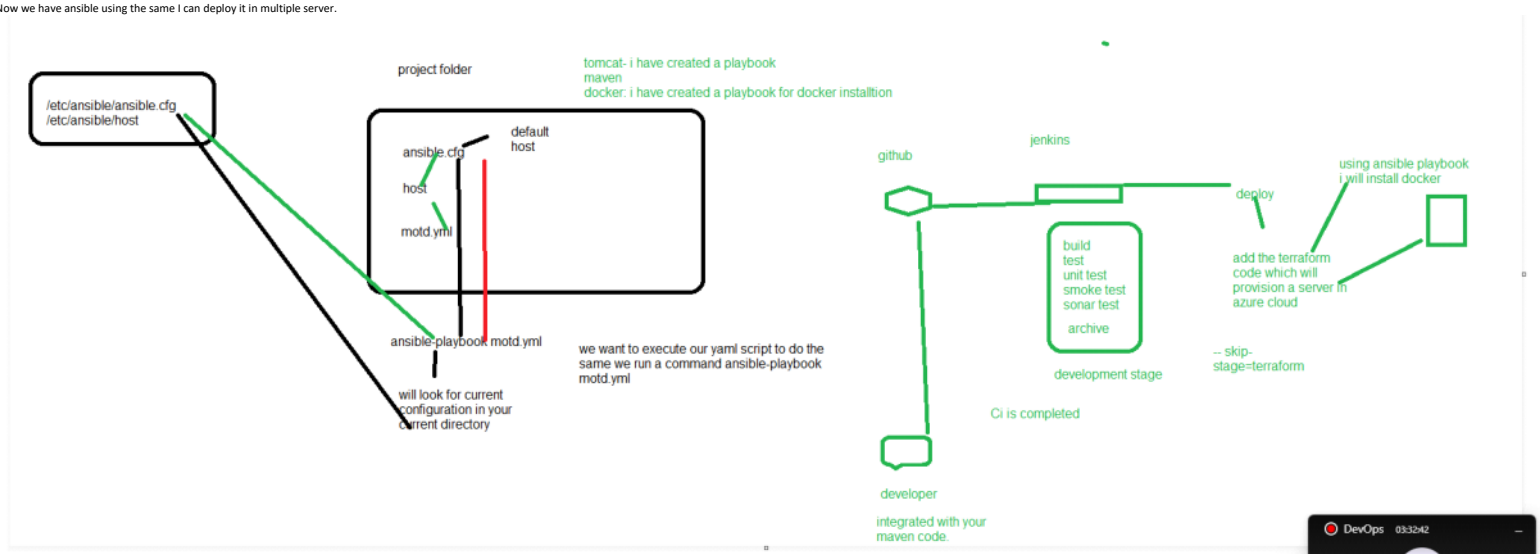
Weblogic user has most previlage account: admin or root permission.
Web logic left your organization: 1000 server

Playbooks

Monday, August 22, 2022 1:33 PM

You have multiple task to be done
I want to install maven package on my server.
Or I want to install tomcat.
To install maven you need to go through multiple stage
Previously to do this exercise we used to have something called as shell script and run the same in individual machine.
Now we have ansible using the same I can deploy it in multiple server.



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By default in ansible when you run the command
Ansible all -m ping
Ansible gather fact about your server.
I have created a playbook which will make changes in my configuration file. In my play I can have multiple task.
Whoever will have access to playbookk they can run the playbook.
You want that this playbook will be run by multiple user

It cannot be done.
It can done. For that you need to take something called ansible tower. Which is an enterprise edition.
Where you can create workflow. Authentication and authorization.
We need to understand a concept called as handler in ansible
Handler are specific task that only get executed when trigger via notify directive. Handler will executed at the end of the playbook one all your task are executed.

Suppose I have created a task to start a web server or stop some service.
Or make some changes in the file.
But I have almost more than dozen of server
Some of the server already the service is running and I give a start command.
It will not execute for the service where already the service is running
It will only execute as we have given start condition and in my server group there only one single server where it is in stop state
Once your playbook finished you want to send the playbook result to an email id or generate an ticket .

Install epel release: by default all the packages are not avaialbe with any of the linux system
I want to install a mariadb or mysql db. The package is now days maintained by mysql. So I need to add repo.my.sql.
We will install nginx webserver
We will install patch
We will restart our nginx server.
Create a rule in my firewalld
Verify the http service using a handler
And we will reload the firewall.
By default in redhat linux it will install a firewalld

If I want to install a package in redhat based linux
It may be redhat or centos or fedora
Yum install package name

If I want to install in debian based system
Ubuntu arch linux
Apt-install packagename.
Now the problem is I need to create two task
One task to use yum module
Is use the apt module
When statement.
Ansible: merge this package installtion module together and created a new module package

Ansible

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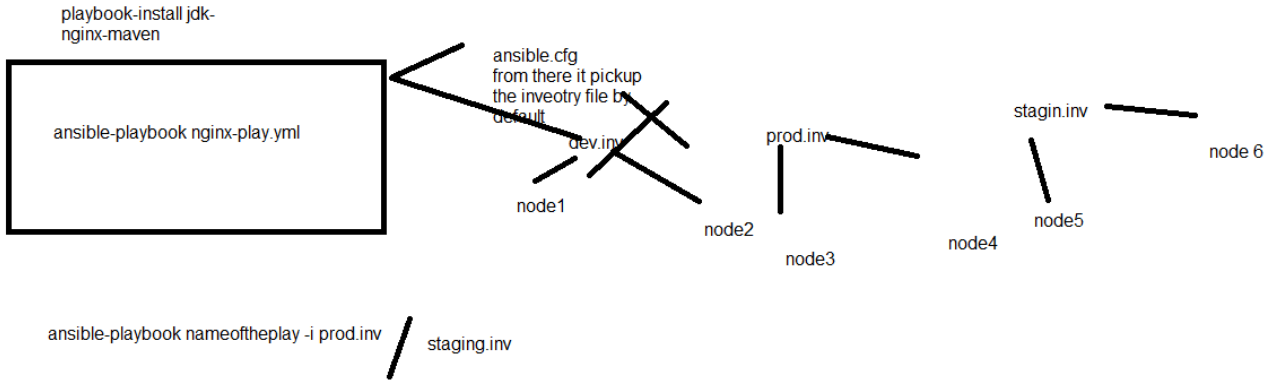
What is difference you found between ansible and terraform?
By default once you install ansible where did the ansible configuration is stored.
Fork:
What is indopentance in ansible.
Why:
Ansible playbook what is the need for the same
Reusability. Automation.
We have download maven untar it in a particular folder
If I want to run maven I need to always in that particular folder and run it.
I can run maven from anywhere



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Final exercise
Install tomcat on a ubuntu system
8080

I will create a single playbook
Roles tomcat
Nginx
Patching
Later on we will use this role to install packages together.
Roles will create a directory structure in ansible

Firewalld

Monday, August 22, 2022 1:33 PM

It is not the concept related to ansible or terraform.
This is core feature in your linux system.
It enable a inbuilt firewall in your redhat like system.
You launch an instance in cloud by default all the incoming port are block.
You launch a web server and try to access it. Web server run on http or https port.
Open port 80 and 443 then only I can access.
By default it is running a firewall
There are some rule. Which is defined in every firewall.

1. Drop: it is the lowest level of trust. All incoming connection are droped
2. Block: they look similar. Drop will drop the connection. But block will also drop the connection and give a request time reply
3. Public: we make our server accessable to public network
4. External: exteral gw
5. Home
6. Trusted network

By default this firewalld is installed in redhat based system only.
Whenever we create a firewall it will always attache to a device in your vm

```
 57  systemctl status firewalld
  58  firewall-cmd --state
  59  firewall-cmd --get-default-zone
  60  firewall-cmd --get-active-zones
  61  firewalld-cmd --list-all
  62  firewall-cmd --list-all
  63  firewalld-cmd --zone=public --add-service=https
  64  firewall-cmd --zone=public --add-service=https
  65  firewall-cmd --zone=public --list-services
  66  firewall-cmd --zone=public --permanent --add-service=https
  67  firewall-cmd --zone=public --permanent --list-services
```

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But when you run a micro service or k8s this goes away there will uncommon port.
32000

```
 70  firewall-cmd --zone=public --permanent --add-port=5000/tcp
  71  firewall-cmd --zone=public --list-ports
  72  firewall-cmd --zone=public --permanent --list-ports
  73  firewall-cmd --zone=public --permanent --add-port=30000-32000/tcp
  74  firewall-cmd --zone=public --permanent --list-ports
  75  firewall-cmd --zone=public --permanent --add-port=32000/udp
  76  firewall-cmd --zone=public --permanent --list-ports
  77  firewall-cmd --get-services
  78  firewall-cmd --reload
```

Cronjobs

Monday, August 22, 2022 1:34 PM

It is like a schedule in windows
It is avaialbe in unix like system. It will run a job as background process. But on a particular time.
How to control access to crons
Suppose you want to create an cron job.
****
Minutes: 0-59
Hours: 0-23
Day: 1-31
Month: 1-12
Wekkday 0-6

50*8*: this job will run 00:05 in august
54**6: at 04:05 on Sunday
We will create a shell script

Ansible Roles

Monday, August 22, 2022 1:34 PM

We have created a tomcat manifest. It is a single file
And share the same with someone else.
When you create an spring app. Why do we use spring intializer
Ansible role will create an skeleton for your manifest and you can deploy your project using the roles.
Share it.

```
.
└── tomcat
    ├── README.md: it contains information about your project
    ├── defaults: it stored the varaibles that are required by the role to erxecute.
    │ └── main.yml
    ├── files: all the files you can store it. Nginx.conf nginx.conf.patch
    ├── handlers
    │ └── main.yml: handler
    ├── meta
    │ └── main.yml
    ├── tasks
    │ └── main.yml
    ├── templates
    ├── tests
    │ ├── inventory
    │ └── test.yml
    └── vars: the vars directory contains all the varible you need to use and you need to put it inside
main.yml but this varaible will be used by task
        └── main.yml
```

I want to install tomcat on bunch of server. But you need different version of tomcat in couple of server.
You need to also run the same ad different user.
Var-main.yml var: tomcat:9.0
Inside default-main.yml: tomcat 9.0
tomcat_user: gopal

Role will create a directory structure it will not be executable
Ansible-playbook required an yaml to execute.

```
 295  mkdir roles
 296  cd roles/
 297  ansible-galaxy init tomcat
 298  tree
 299  history
 300  tree
 301  vi tomcat/README.md
 302  vi tomcat/meta/main.yml
 303  vi tomcat/tasks/installjdk.yml
 304  tree
 305  ls
 306  ansible-playbook tomcat
 307  vi ansible.cfg
```

```
308  vi gopal.inv
309  ls
310  vi iac.yml
311  ansible-playbook iac.yml
312  tree
313  cat tomcat/tasks/main.yml
314  vi tomcat/tasks/main.yml
315  cat tomcat/tasks/installjdk.yml
316  ansible-playbook iac.yml
317  vi tomcat/tasks/main.yml
318  ansible-playbook iac.yml
319  vi tomcat/tasks/installjdk.yml
320  ansible-playbook iac.yml
321  git init
322  git add .
323  git commit -m "ansible role for tomcat"
324  git remote add origin  https://github.com/gopal1409/sapient-ansible-role.git
325  git push -u origin master
```

Dynamic Inventory

Monday, August 22, 2022 1:35 PM

Most of the infra you can manage using custom inventory. Or for the cloud you can use there cloud inventory script. But there are situation where you need more control on the inventory. For e.g I have few system which provisioned earlier withought ansible or terraform any configuration management tool.

I want to manage those host or devices using ansible.

we use terraform any other provisioning tool. Using the same we provision our environment and DE provision. Once I provision it. I want to install some packages like docker container or want to run a tomcat server or may be I want to run a kubernetes node infrastructure.

But I want to install some patches.

The inventory will always be in dynamic state. I want to capture those inventory and store it.

Nmap: it is a utility in linux which used to scan your system for open port.

376 nmap -v -n -p- -sT -sV -O --osscan-limit --max-os-tries 1 -oX $HOME/home_scan.xml 10.0.0.0/24

-v: verbose

-n : never do dns resolution

-p: it should look for all the open port in your system

-sv: determine which port are open and there version number

-: max os limit detection

- -oX- once it detect the values we have given store those result in an xml file. Plus the 10.0.0.0/24 it going to scan all the 255 network.
- Ip addres the port number and os name.

git clone git@github.com:josevnz/ExtendingAnsibleWithPython.git

Nmap: will give you that all this vm has port 22 open.

You need to ensure that we can loging to all those vm using either password based or keypair based authentication.

We know that using nmap I can gather the port number also other inforamtion hostname or os information.

Now we can write down a code which can help us to save the inventory in a file. In xml format.

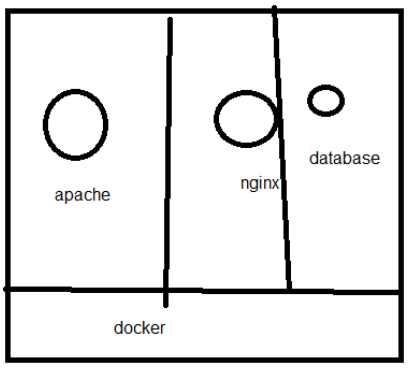
1. Nmap runner it execute the nmap command with the desired flag and capture the XML output
2. But from the xml put put we just need the ip address.

What is ansbile which language it use. Python.

Container

Monday, August 22, 2022 1:35 PM

What is containerization ?



by default we can run one single application.
either i run tomcat
or i run nginx webserver
or database run on single server.
you can multiple app on top of vm.
but it is not recomnded

how docker makes them
run as an isolation

isolated from each other.

what is unqiue in a linux or windows system.

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Process: any app you are running everying is running as process.
Process id will be alwAys unqiue
How to check container logs
We will launch an mysql database and try to login inside mysql db.
docker exec -i(interactive)t(terminal) db(nameofthecontainer) bash(bash terminal)

Docker Network

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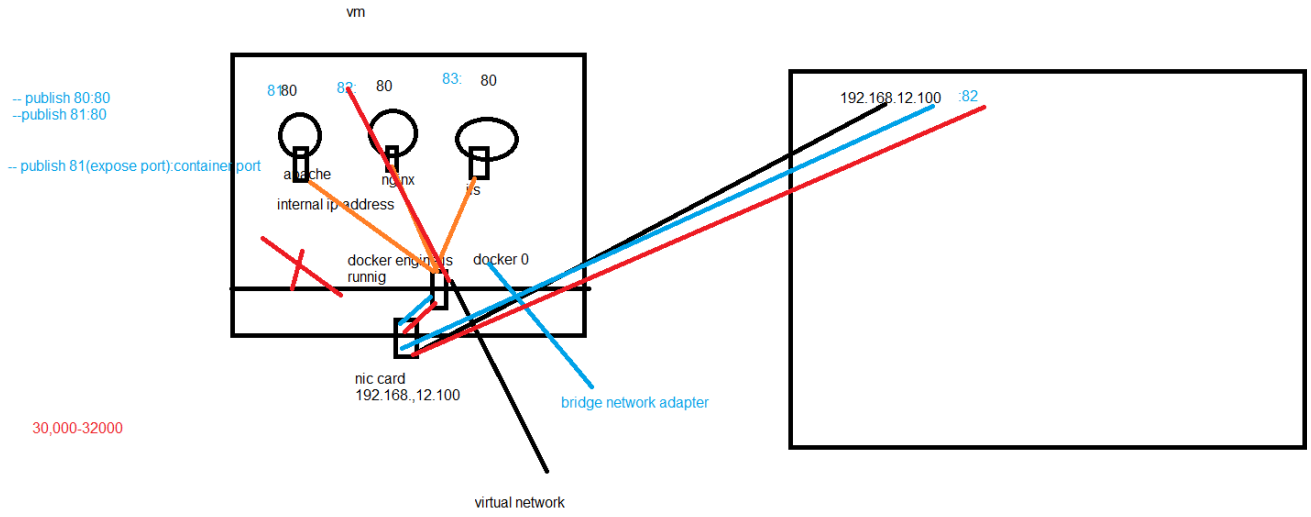
It is one of the complex network that has been created till know. Because everything is software defined network.
every container are running as web based application. If it is a webbased app they will always run on a port number.
--publish 81:80

When we are learning docker.
Do not need to go too much deep dive in docker.
How to create images.
How to optimzed the image.
You need an autmated tool
Data center solution for you vm networking storage. Logs
To manage precisely container k8s data center solution



it will alos give all this contains an ip address also it will network card

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Host adapter
-- network host

Routing
Ingress routing
Egress routing.
To do networking we required a driver
Docker use a driver overlay2.
Used for networking
Main purpose of this driver is to store your data.

Docker Storage

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Container are running as process or they are short leave.
If you delete your container storage will also get deleted by default.
Ephermal storage. Not an presistent volume.
If you delete your container the storage will also not deleted.

docker run -d --name mysql1 -e MYSQL_ALLOW_EMPTY_PASSWORD=true -v(volume) mysql-db(labelof your volume):/var/lib/mysql(path inside your container) mysql(image)
105 docker volume ls

Docker will autmatically create a folder in your vm and store your data.
We cannot manage quota in storage in docker.
Access write: readwriteonce
Read write many
Read
Pvc and pv
Storage is challenge in organization.
Ssd
Standard: 300 IOPS
Premium : 5000
magnetic
Azure blob storage:
ebs

Docker Images

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We build an spring app. Mvn package.
Java -jar nameofthejar file.
Apllication is ready., convert the same in container based image.
When do deploy it will spin up the contianer for me.
When I talk about image. Did I tell you image is readonl
Docker image are read only template.
We will download an spring app
Install jdk and maven
Compile the spring application
Once we got the jar file
We will convewrt into an docker image.

```
root@dockervm:~/springboot-chat-app# docker build -t chatapp .
Sending build context to Docker daemon  28.36MB
Step 1/7 : FROM openjdk:11
11: Pulling from library/openjdk
e756f3fdd6a3: Pull complete
bf168a674899: Pull complete
e604223835cc: Pull complete
6d5c91c4cd86: Pull complete
5e20d165240e: Pull complete
1334d60df9a8: Pull complete
16c2728dcd90: Pull complete
Digest: sha256:9e7c69c03498e710294d7bdefe6f69df64d84c3500302dc6e01aaecdc29e563e
Status: Downloaded newer image for openjdk:11
 ---> 72d6966f5c18
Step 2/7 : MAINTAINER John Cena<john@gmail.com>
 ---> Running in beaeeb6abf38
Removing intermediate container beaeeb6abf38
 ---> 943e3dc33567
Step 3/7 : VOLUME /tmp
 ---> Running in 1cacd231e75b
Removing intermediate container 1cacd231e75b
 ---> 3839cb96ca0a
Step 4/7 : EXPOSE 8080
 ---> Running in 500550b634f0
Removing intermediate container 500550b634f0
 ---> ba0aef94c912
Step 5/7 : ARG JAR_FILE=target/websocket-demo-0.0.1-SNAPSHOT.jar
 ---> Running in bf363c05e536
Removing intermediate container bf363c05e536
 ---> f2c97bca9b35
Step 6/7 : ADD ${JAR_FILE} websocker-demo.jar
 ---> 3b89fd71fdee
Step 7/7 : ENTRYPOINT ["java","-jar","/websocket-demo.jar"]
 ---> Running in b8e435178b96
Removing intermediate container b8e435178b96
```

---> da6f0cc0e7ac
Successfully built da6f0cc0e7ac

When you develop your application inside your application folder you need to have a file with no extension but the file name should be dockerfile

Inside your docker file we provide instruction

ADD ftp:/google.com dest add insturction allow you to download file from a remote destination also
COPY src dest
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Docker prune volume images storage network
All the unused container/image/storage will be deleted.
But images if you see some of them don’t get deleted

Commands on Docker file

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Volume
Entry point
Optimized of Docker file.
Publishing port
ADD: src can be local machine plus an url ftp http
COPY: src dest
Source is your local machine dest inside your container
COPY accept only local machine as source
To run this docker file . It should in your root directory of your project
root@dockervm:~/springboot-chat-app# cat dockerfile
FROM openjdk:11 : it will go to hub.dockr.com and download the base image.
MAINTAINER John Cena<john@gmail.com>
VOLUME /tmp
EXPOSE 8081
ARG JAR_FILE=target/websocket-demo-0.0.1-SNAPSHOT.jar
COPY ${JAR_FILE} websocket-demo.jar
ENTRYPOINT ["java","-jar","/websocket-demo.jar"]

Build you image with docker file with openjdk 11 image
Upload it in github
Build another image openjdk11 alpine release
Upload it
First we will learn the difference between command and entrypoint
How to build images what are three different appoch to build your image

Command vs Entrypoint

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Command it is an containerized setup which is pass to your os for a desired output.
When we use command it will give you an desired result it is similar to shell comamnd
Whenever we use command it is always ignored by docker demon. But you can use the same using docker run
Entry point instruction they are not ignored but instead appeadn as command line parameted they are like argument.

Lets look into a command.
I want to build a docker image .
I will use default binary for running a container over the image.

If you want to write a CMD instruction
Exec
Shell

root@dockervm:~/command# cat dockefile
FROM centos:7
RUN apt-get update
RUN apt-get -y install python
CMD ["echo,"Hello,Gopal"]
ENTRYPOINT : it will not allow you to add additional instruction. It will used to set executable that will always run when the container is initiated.
Entrpoint what is command java-jar jar file. It cannot be ignored or overriden

Cmd instruction in the file above echoes the message when the container is started without a cli argument
We didn't give any input so whatever is there in the command line it will display

If we add an argument with run command it will override the default instruction

When should you use command.
When you don't want an user to do input value that time you can use command instruction.
The instruction give you extra capability. You have python application . Before you run the app. You want some ssh key need to be input.
CMD and EnTRYPOINT together we will see which one execute first.
How to use CMD
FROM openjdk:11
RUN apt-get update -y
Entrypoint java
-jar new.jar

root@dockervm:~/pytest# cat dockerfile
FROM python - download python
RUN apt-get update - update
ADD hello.py /home/hello.py - inside your python contains it will copy the hello.py
ADD a.py /home/a.py
CMD ["/home/hello1.py"]

```
CMD ["/home/pip."]
ENTRYPOINT ["python3"]
```

#entrypointy will help you to create an executable container and the command and argument provided in entrypoint key is not overridden

Cmd define default command or parameter for your container. It is best to use if you need a default command which user and override. To overwride using entry point.
If you have given multiple cmd. Docker will execute only the last CMD
When should you use cmd and entrypoint together. . If you need a container with a specific executable and a default parameter which can be easily modifiable.
You want to set some environment-specific variable.

Diff way to create Docker Image

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Long before docker file. Java developer do they used to work with single deployment (war jar ear)but this approch is monolothical.
Then we start working on micro service deploy a small deployment unit per JVM. Instead of a giant monolothical app.
This is where docker comes in . Docker allow you to redeploy your jar ware ear file.

First way is package only build.
Wherer we will put maven to build my project.
Pro: you get an light weight docker image
You don't need maven to build your image
You don't need to add any dependencies or packages.

Second way: normal docker build
In normal docker build docker will control the build process.
Inside my docker container I ll run mvn clean package

Benefit:
Docker is controling your build process, you don't need to install any build tool.
Cons : compare to previous image this image size will be bigger

IDEAL way Multi-stage build(this is the ideal way)
With multi stage build we use multiple from statement for each build state. And every from statement created a new base layer and discrad everything which we don't need from the previous stage

To push an image to an registry first we need to tag our image with the name of registry

```
 400  docker tag imageid registryname/image:v1
  401  docker images
  402  docker push gopal1409/chatapp:v1
  403  history
```

```
root@dockervm:~/springboot-chat-app# docker push gopal1409/chatapp:v1
The push refers to repository [docker.io/gopal1409/chatapp]
2ec2ef0cd608: Pushed
e5ce43743a3d: Mounted from library/openjdk
d744b7303bde: Mounted from library/openjdk
817e710a8d04: Mounted from library/openjdk
ee509ed6e976: Mounted from library/python
9177197c67d0: Mounted from library/python
7dbadf2b9bd8: Mounted from library/python
e7597c345c2e: Mounted from library/python
v1: digest: sha256:5bc054bb21ebe6cf764edfb790346b2831ac0c700e84eef2add72ecada9f1d8b size: 2007
```

Version control we don't have only github. Bitbucket svn perforce
Azure also give you a contianer registry acr: azure contianer registry

Docker image scan

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When we upload an image. Today I have upload the image.
After one month again I upload an image
By default ecr do vulnerability scanning in your image.
How to scan a docker image.
Vulnerability: CVV content vulnerability.
Docker scaning image for vulnerability.
Same thing I want to scan docker image for vulnerability.
Nexus: also provide container registry.
When we create ci/cd pipeline using jenkins.

Docker Image

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How do we created a docker image?
When we talk about docker-compose…
Docker file is to how to build an image.
So the content of the docker file describe how to create and build docker image.
But when we talk about docker-compose. It is used to run your docker container.
Problem with docker run command is we can run single container.
But docker compose is used for running multiple container.

Docker-compose is a command which is used to run a docker container based on seeting describe inside an yaml file.
But the yaml file you need to create it should in docker-compose.yml
Suppose I want to build an docker image that host your website on nginx web server. . To do this you code a dockerfile that instruct to use offcial nginx image from a docker hubn. Then you add a line your dockerfile that copies all your website files in t an nginx image web hosting directory
Port 8080:80
--publish 8080:80

Next
GE 2008: software defined network. Cisco. I didn't join it.

Docker Swarm

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It allow you to distribute your application inside a cluster
Autoscaling
No proper management of storage
No security
No rbac
Those organization which cannot operate k8s they used to run there workload in docker swarm.

Persistent Volume

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Persistent Volume and Persistent Volume claim.

In k8s there are two api which is used to manage your storage.
Persistent Volume: when we talk about pv it means we are telling kubernetes that there is an storage., which is like an resource allocation to your k8s cluster.
Like node is a resource which can be used by k8s cluster. Similar to that when we want to add an storage server in k8s we need to use pv.
But this storage is being attached to your k8s cluster. But pod cannot use the same.
To make use of the storage in pod we need to invoke another api called as Persistent Volume Claim.
Thin provisioing: 10Gi. It will not like that it will consume 10g of storage directly. If I am using 1gb it is going to use 1gb.
accesModes:

- Read write once or read write many read

Configmap

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Suppose I want to provide some configuration file before my pod get launched.
Like gaming application:
Single player or multiplayer.
Similar to that before I deploy my database.
It should create some database inside it.
When we deploy a mysql image. What is inside it. Nothing blank image. When it get spin up as container.
I want that if my database get deploy it should take some configuration.
But configmap in k8s support max you can put 1Mb of data.
Second whatever data your are going to put in config map it will be stored as non encrypted.
If you store anything inside config map it will be stored as volume. 1MB

Statefulset

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Statefull application save data to a persistent disk storage. Which can be used by server client and some other application.
Eg. Of statefull app is database or an key value store where you store your data and retrive by other application.
To deploy an application in k8s
If you want to deploy and state full app in k8s you need to use state full set.
The benfit you get is that order and uniqueness of the pod.
Like deployment where we give replicaset. It create multiple pod but there is no orderding of thos pod.
But when you deploy it as statefulset it will be in order. Not only that it will have an identifier.

But there are limitation in k8s to deploy an statefull pod.

1. You need to first provision an presistent volume. Then only you can deploy an statefull set.
2. If you delete your pod or scale down your pod it will do not delete the volume associated with it.
3. If you delete your deployment. All the related pod are deleted. But in statefulset it do not provide guarantee that pod will be deleted. To get an order shutdown or graceful terminateion of the pod in stateful set. You need to ensure that the replicaset need to 0.
4. With statefull set you can do rolling update. But there may be a chance that you have broken state. Then you need to manually repair it.
5. To manage your statefull set you need to create an headless service in k8s.
6. Whenever we create a service in k8s what it do. It create a ip address. Which is attached with clusterip or nodeport or load balancer.
   I have databases: like maraidb or mongodb or mysql. Where there is no need of load balancing or single service ip address.
   So in k8s when you want to create an headless service. You can do the same using explicitly setting cluster ip to None. It will not allocate any cluster ip.
   I create an headless service in kubernetes how front end can discover the backend.

Satefull app : are type of application that store data and keep tracking it.
Where as stateless application on the other hand do no keep the data.

All the modern application will be stateless but they are connected with state full application to server the user request.
For.eg a spring app is an stateless application that recive new data on each user request. Then it is get connected to stateful application such as database to process the data.

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Whenever we deploy an statefull application k8s will create an identity
Pod-1
Pod-2
Pod-3
It will be in order
Till the time pod-1 didn’t complete intialization
It clone pod1 data to pod2 data.
But when you delelte the statefullset it is going to happen in reverse order.

First of all I replicase mysql database multiple times. What will happen.

Assume that you deploy a mysql database in k8s cluster and scale this to three replicas. And front end want to access the mysql cluster to do read write data.
It will make your data inconsistent.
But when you deploy mysql as statefull set.

Helm Chart

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Helm chart

Helm is an client/server application and similar to rpm or deb package manager. But it is by default not avaialbe in kubernetes it is like an binary I need to install

We have done a project where we have use

1. Pv and pvc
2. Secret
3. Configmap
4. Mysql
5. Service mysq
6. Frontend
7. Service for front end

I am deploying all this manifest one by one.

If I want to uninstall I need to do it one by one.

Suppose I want to change the image version.

Or I want to change the service type

Or I want to increase the replica count.

There are few attribute which changes frequently.

I have go inside the file and modify it.

But in place of that helm chart will allow you to make changes using command like and values.yml

We have promothus and grafan :

Promothus log collector grafan give you a dashboard.

Namespaces

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You have multiple teams. And multiple environment. Where user are spread across multiple team and project.
It is a single cluster.
You want hrms crm or ecommerce. They will be having there own namespaces.
On top of your kubernetes cluster we are creating virtual cluster. Which will divided according to your project.
kube-node-lease Active 2d16h: it contains information about node associate with your k8s cluster
kube-public Active 2d16h: this also created autmatically and it will be readable by all the user. If you want any project to be accessable to the entire cluster.
kube-system Active 2d16h: this is the namespace where all your k8s system resource are running
Default: by default if you deploy anything on k8s withought any ns

Namespace apply to deployment , service quota. But it will never apply to nodes. Prersistent volume also cannot define inside a name space

We will create a namespace.
We will allocate rs to the namespaces
Finaly deploy two pod inside the namespace

You create a product. Something called as family bike.
Shark tank aman gupta vineeta
1 million valuation they pay you 2000 rupees
Request : you gurantee to get.
Cpu request: it will give you gurantee

Pod Security

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Security context
Pod security policies
Scenarios

In linux system upto 999 all are system defined groups.
I want to run my pod using different group. But the group number be stared after 999
By default any container or pod you are running in kubernetes they run as root user
But in my linux system I know that from 0 till 999 all are system defined user.
Now I want to run my container as a normal user
After giving the permission we create a new pod.
Now this pod is being started as normal use not an root user.
We login inside the pod and try to create a file using touch command. But the 1000 do not have permission to create file in any directory
Except temp directort
We go to the temp directory
Create a file
Using ls we check the file permission.
----first thing we know that container run as root user.
By default this is a huge security risk
So avoid this in securioty cointent . We put that my container will run after 999 user.
By default in pod defination or deploy defination: used: 1000
Groupid: 3000

Also I have put that if any user try to login inside my container . And as a root user. We will never allow him to run my container.
runAsNOnRoot: true

Service Mesh

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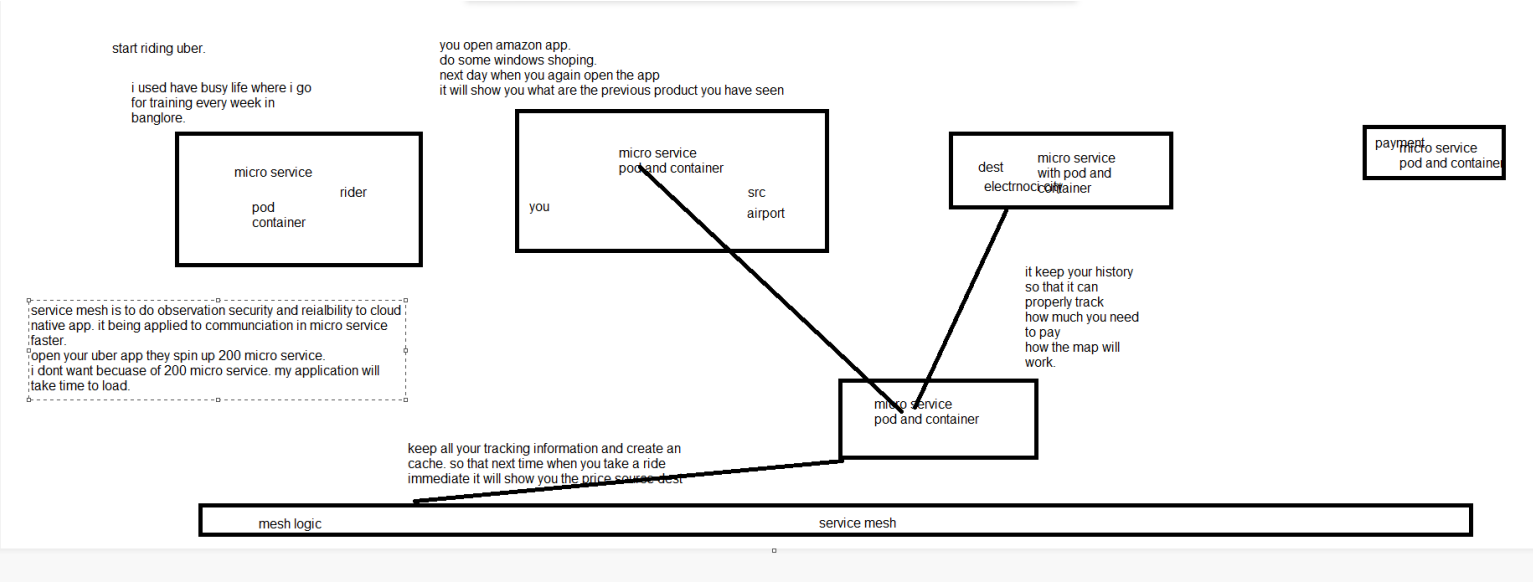
It is an additional layer. In k8s
What is the use



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It control the delivery of service request to other platform load balancing encrypt data and discover other service.
We can code this logic in micro service . Service mesh will autmatically abstract or cache those logic .
Why you need service mesh. No need.
If you have large scale application compose of many micro services. Ecommerce, block chain, bitcoin mining.
Mesho.
Amazon:
We need not to worry about the communication between this services.
All the communication in service mesh happen through TLS encryption.
Service mesh is to work as a communication layer.
Once you deploy a pod in your namespace: where already I deploy service mesh.
Once your pod deploy it create another pod automatically and try to gather information about your pod.
Like telemetry.
Inject a pod it contains all the logs from your contianer.
Then you will use additional layer which will process your logs and see how the communication between other pods are happen.
Google lyft uber.
Service mesh is to network funct.
Istio is the first service mesh which has come into picture.
Traffieker
Kong

ECS

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Elastics container service.
Container service.
By default what we do we launch ec2 instance. Launch an windows or a linux system.
One you launch your instance I want to deploy containerized application on top of it.
What we will do. We will install docker on top of it.
But what amazon has done it. They have created a fully managed cluster using the same. Once your launch an ecs service. It will launch an vm and install docker on top of it.
Not only that you can later on launch your kubernetes cluster using the ecs.
I need ha in the containerized application. I don't want to go through the process of installting and managing docker service.
Everything will be managed by aws.
Your job is to deploy your container app

Project

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```
root@jenkinsvm:~# history
    1  apt-get update
    2  javac
    3  apt install default-jdk
    4  apt install maven
    5  apt-get install    ca-certificates    curl    gnupg    lsb-release
    6  sudo mkdir -p /etc/apt/keyrings
    7  curl -fsSL  https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o
/etc/apt/keyrings/docker.gpg
    8  echo   "deb [arch=$(dpkg --print-architecture) signed-
by=/etc/apt/keyrings/docker.gpg]  https://download.docker.com/linux/ubuntu \
  $(lsb_release -cs) stable" | sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
    9  sudo apt-get update
   10  sudo apt-get install docker-ce docker-ce-cli containerd.io docker-compose-plugin
   11  usedmod -a -G docker jenkins
   12  usermod -a -G docker jenkins
   13  usermod -a -G docker jenkin
   14  usermod -a -G jenkinscurl -fsSL  https://pkg.jenkins.io/debian-stable/jenkins.io.key | sudo
tee   /usr/share/keyrings/jenkins-keyring.asc > /dev/null
   15  curl -fsSL  https://pkg.jenkins.io/debian-stable/jenkins.io.key | sudo
tee   /usr/share/keyrings/jenkins-keyring.asc > /dev/null
   16  echo deb [signed-by=/usr/share/keyrings/jenkins-keyring.asc]   https://pkg.jenkins.io/debian-
stable binary/ | sudo tee   /etc/apt/sources.list.d/jenkins.list > /dev/null
   17  sudo apt-get update
   18  sudo apt-get install jenkins
   19  usermod -a -G docker jenkins
   20  systemctl restart jenkins
   21  cat /var/lib/jenkins/secrets/initialAdminPassword
   22  mvn --version
   23  docker pull sonatype/nexus
   24  docker build –rm –tag sonatype/nexus oss/
   25  vi docker-compose.yml
   26  docker compose up -d
   27  docker compose logs --follow
   28  docker ps
   29  sudo docker exec -it ubuntu_nexus_1 cat /nexus-data/admin.password
   30  sudo docker exec -it root_nexus_1 cat /nexus-data/admin.password
   31  sudo docker exec -it root-nexus-1 cat /nexus-data/admin.password
   32  docker volume create sonarqube-conf
   33  docker volume create sonarqube-data
   34  docker volume create sonarqube-logs
   35  docker volume create sonarqube-extensions
   36  mkdir /sonarqube
   37  ln -s /var/lib/docker/volumes/sonarqube-conf/_data /sonarqube/conf
   38  ln -s /var/lib/docker/volumes/sonarqube-data/_data /sonarqube/data
   39  ln -s /var/lib/docker/volumes/sonarqube-logs/_data /sonarqube/logs
   40  ln -s /var/lib/docker/volumes/sonarqube-extensions/_data /sonarqube/extensions
   41  docker run -d --name sonarqube -p 9000:9000 -p 9092:9092 -v sonarqube-
```

```
conf:/opt/sonarqube/conf -v sonarqube-data:/opt/sonarqube/data -v sonarqube-
logs:/opt/sonarqube/logs -v sonarqube-extensions:/opt/sonarqube/extensions sonarqube
  42  docker ps
  43  history
root@jenkinsvm:~#
```

Jenkins

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Build you micro service

1. Once you build your micro service.
2. Contianerized it
3. Finally you need to create a manifest file and deploy the same in in k8s.

But how you are going to stream the line the same.
Bcz the problem with microservices is that you need to build multiple services.
And frequent updAte will go on in this services.
If you try to do the same manually. It will be difficult to do it.
you need to create an cicd pattern using jenkins. Create the whole pipeline.

What are this tools and what is the use of this tool.
We discuss a little bit about micro services.
Where know that every service will be an individual service.
You need to build a container: which can be automated
For every microservice to be deployed we need an deploy and service file.
When we are deploying I want zero down time deployment.
To do the same.
CICD: it is culture now a days operating principal or set opf practice that application development team use to deliver code more frequently and reliabile.
The purpose of cicd is meeting business requirement. Software code quality and software security.
DevOps
When we do frequent development and frequent changes in the code.
Security is a concern.
Most of the organization has move to devops
Now they are moving toward DevSecOps

A developer create code with in a version control system
Changes are commited to the vcs
Another developer retive the code from vcs and carried our analysis. He will static code analysis and find out bugs
Then an environment will be created
A test autmation sutie is then executed
If you applicatioin pass the test it will be deploy.
And we need to finally montor the prod enviuronment.
Test driven development plus automated and continues integration part of the workflow. We can increrase code quality and enahanced security and compliance.
We do automation
We put bug fiz or valunarable code in prod.
SAST
And DSAT
Static code analysic and dynamic code analysis
Static code analysic. We find out logs and technicquens. Xunit.
Dynamic to anlysic our dynamic code and examine the outcomes.
Regex
Sql injector.
95% of flaws you will find it in sql database.
Static code analysis is an white box testing where you can idnetify security issue in your source code.
Dynamic code analysic is like an black box vulnerability scanning. Which help you to identity security risk

in running code.

1. SQL queries. Injection.
2. Long input string. It can oveflow. Buffer overflow,.
3. Negative and large posistive number.
4. Unexpected input data.

Jenkins

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Discard old build: when you create an application. A build file get created automatically.
It consume space. I want to keep the build for this many data or this many number of build you can define here.
Parameterized project: we can pass any data we want. Git branch name or secret credentials hostname or ports. Once you pass this parameter it can be used my jenkins
I have an stage where I need to build my app test my app.
Testing app. Regular interval.
If you press building multiple times. In that type of scenario we can use throttle build.
If you do multiple there may be a chance of that build lock can happen.
Sometime one build go for infinte loop.
What is the difference between poll scm and build periodically.

Both are given as cron job.
Build periodically: every 15 if there is any change in your code or not it is going to build it every 15 min.
Poll SCM: source code management: every 15 minutes it will check for any change in your code., it is going to build it.
If no changes are there it is not going to build it.
Testing job which we do it at midnight. We can put it in build periodically.

It should execute my test job regression testation integration testing. Or load testing.
I want to test my code with robo framework.
Or I want to test my job using selenium web driver.
Workspace:
Whenever you create a job and run it in jenkins what it will do it will create a folder download all your file and run your job.
Second time when you run your job it is again going to download all your depdnecy code. And create a folder and store it.
If someone hack in your jenkins server.
Why git lab is popular.
Whenever you run your job. It will create a container and execute your job. Once completed it is going to destroy the container.
Not valunarable
Performance is too slow.
You can make it faster by creating artifact also cache.

Job

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1. We will integrate a private git repo with jenkins
2. How to access the private repo using jenkins
3. Using maven we are going to build our jar file
4. We will test our code
5. Display the test result of your code
6. Deploy our jar locally
7. Archite the last successful artifact
8. Email we can do it. \

   I will show you from where you can do the email settings.
   We will move to jenkins pipeline.
   To do the same I ll use my own repo.
   This is also called as declartive pipeline. Where we declare our job one by one. And pipeline get execute.
   And this pipeline is configured using UI of a cicd tools.
   The drawback of this pipeline is that it don't give you any view which show me I am in which stage.
   If due to some reason the pipeline fail you reboot your system. The pipeline will start executing from the scratch.
   It is not quite flexible.

   To overcome the declarative pipeline challenges they come up with something called as scripted pipeline with Groovy.
   This scripted pipeline use the same format.
   But when we talk about jenkins pipeline it is stack of tools which help you implement and do ci and cd.
   Pipeline has it own DSL domain specific lanageue.

   But there is an structure you need to follow before you build your pipeline
9. Any: the agent where your pipeline will run. Wherever the resource is avaialbe it is going to run your pipeline
10. Node {} this is the block where your pipeline will execute
11. Stage block: stage block are single stage or multiple state with task goer.
12. In stages you will deinfe clone a repo
13. Build the project
14. Deploy the code
15. Do unit testing
16. Other functional performance tesing
17. Stage {}
    Checkstyle in maven: it generate a report regrding the code style used by the developer
    When you write your code they need to follow a format.

    Checkstyle: do static code analysis.

Pipeline

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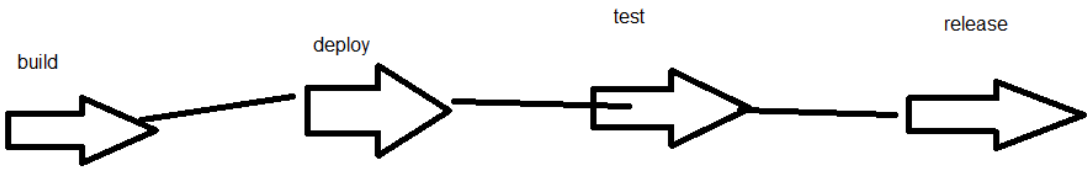
It is a cobination of plugin that supportws integration and implementation of continues deliver pipeline.
In jenkins pipeline every job or event has some sort of dependency on at least one or more event.



all this event are interlinked with each toher. every state will have an event. but everythign work in sequence

7/5/2022 11:23 AM - Screen Clipping

There are two type of pipeline you can create one is declarative. Where we using an UI to build our pipeline. It contains a predefined hierarchy
It don't give you a proper view. Every time I have to go to console and find the event we have trigger in every stage. It will be always slow.
Scripted pipeline it run on Jenkins master but with light weight executer. It use very few resources. All the command as atomic command
Jenkins 100 plugin which help you to diplay our result.

Testing

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Code coverage. How much your source code is being tested.
It will help you to test the quitality of your code.

But there are parametedr

1. Functional coverage: how many function you define have been called.
2. Statement coverage: how many statement you have define have they been executed
3. Branch coverage: how many branch are executed
4. Condition coverage: how many boolean expression have been tested for a true or false value
5. Line coverage: how many line of source code have been teste.

Integration Testing

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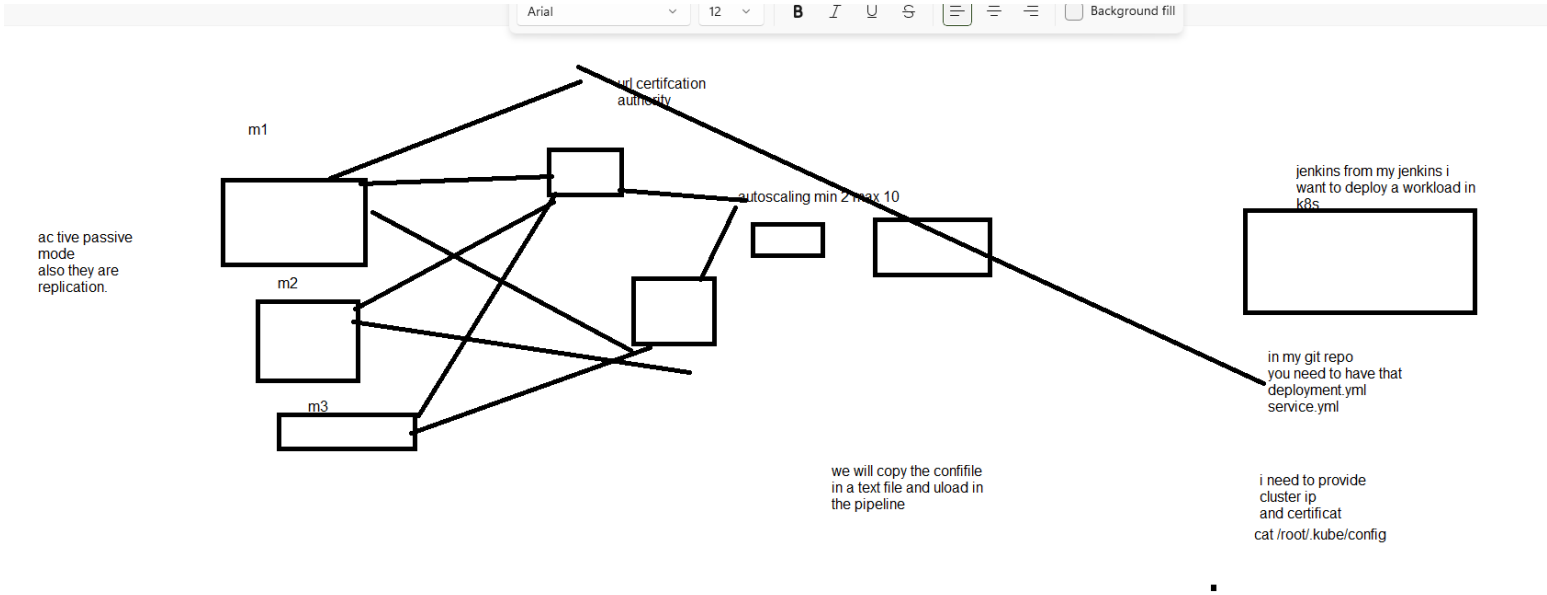
It is a type of testing in which the different unit module or component of a software application are test as a combined unit.
Every software has there integration testing done by different type of programming language.

To install k8s
We first deploy two vm
Install containerd on both the vm
Install k8s on both the vm
Open port
Intailized one vm as master
Added some configuration. Kubeadm init
Master get intialzied.
Using the join command we attache the node
Install calico cni plugin.
We deploy our workload in k8s

But azure I am paying to microsft for the cluster
438 az login: (from my vm I do login into azure)
439 az group create --name aks-rg --location eastus(we create a resource group)
440 az aks create -g aks-rg -n aks-kubernetes --node-count 2(this will create master and two worker node in azure) azure deploy the kubernetes tempaltes.
441 az aks get-credentails aks-rg --name aksdemo1
442 az aks get-credentials aks-rg --name aksdemo1
443 az aks get-credentials --resource-group aks-rg --name aksdemo1



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You have to upload it in acr
Then only the private repo integration happen
Or if you uploading in nexus make your image public with ssl certificat
http://nexu.com/Mysql:5.9

```
gcloud container clusters create \
   --binauthz-evaluation-mode=PROJECT_SINGLETON_POLICY_ENFORCE \
   --zone us-central1-a \
   test-cluster
```