Networking

what is network ?

why we use ?---------->data sharing---content--static/dynamic

internet

intranet

IP address/mac address

IPV4/IPv6

how packet flow from local to website ?

nic card/ethernet/optical cable

network layers(l4/l7)

laptop components ----data center components

region (aws)

lab: ping /traceroute /tracepath/tracert

lab : DNS demo

netoworking troubleshooting commands

What is network ?

Group of devices connected for the Communication

Why we use network?

data sharing---content--static/dynamic

static content/assets

images

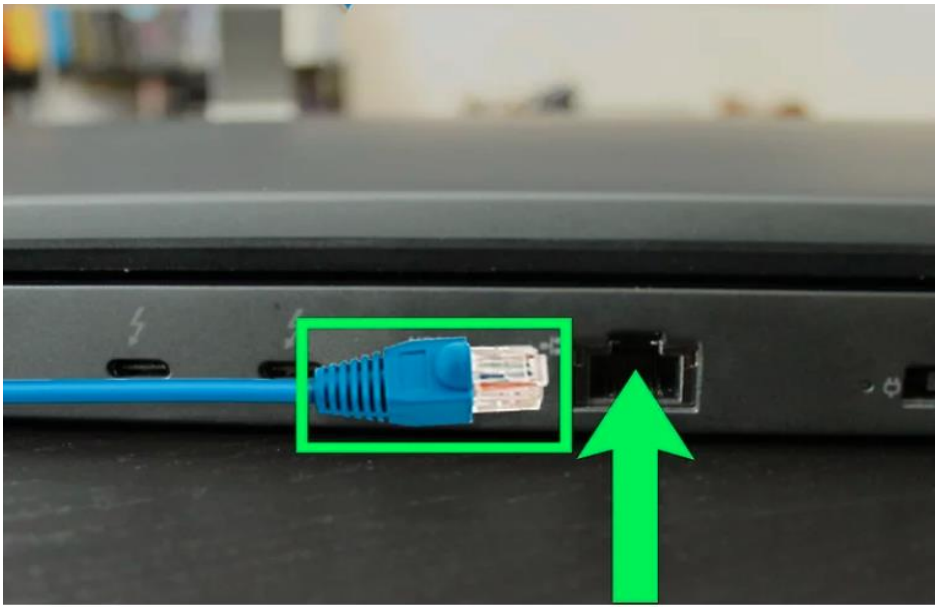
videos

documents

dynamic content/assests

user input --process--data will change

What is ethernet card ?



Ethernet cards are essential parts of a network. They connect a computer to another computer or to a server by using a cable.

eth card----nic card----mac number-----ip address---names---DNS names(Domain name service)

What is IP ?

An Internet Protocol (IP) Address is the number assigned to a network equipped piece of hardware by which other devices identify it.

Ip address : Internet Pro

ip address----ipv4(numeric) and ipv6(alpha numeric)

ipv4

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0.0.0.0

xx.xxx.xxx.xx

255.255.255.255

private IP:-

192.x.x.x

10.x.x.x

172.x.x.x

in public ip(static ip)---elastic ip

static public ip --EIP

IP Allocation : Static allocation and Dynamic allocation

internet ---anywhere ---public--fb.com,goog

intranet ---zone ----private---banking,atm

Reverse proxy

The component in between public(internet) and private.

If you want to connect private websites , your request will be travelled via reverse proxy.

public network (internet)-----router(reverse proxy)---private network (laptops)

Forward proxy

The component between private and internet

When you want to connect internet from private , your request has to be traversed via forward proxy.

private -----forward proxy-----internet

subnet mask : how many IPs can connect/allocate

our data getting transferred using cables

machines always needs IP

machine never understand names, it need IP

IP will get assigned to eth or nic

Browser -------www.google.com

http client = Browser

How my machine knows www.google.com ip ?

DNS(Domain name service)

give me name i will give you ip

http request format:

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protocal://websitename(hostname):<port>/Contextroot

https://www.google.com/

protocal: https

websitename: www.google.com

port : 443

context root: / http://www.facebook.com/test

protocal: http

websitename(hostname): www.facebook.com

port : 80

context root: /test https://eenadu.net/

protocal: https

host: eenadu.net

port: 443

context root: /

what is name server?

Group of record sets which will have the

DNS Commands

nslookup

1)your record stored dNS server

2)original name and ip address

nslookup --check host ip or dns server ip

Dig -- Get the DNS response time

protocal://host:<port>/ctx

www.example.com

protocal:http

host: www.example.com

port :80

infrastructure(IaaS)

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storage

compute

network

security

operation

laptop---hard disc

compute+network-------external storage

data center(infra)

RACK/Blade server---compute+network

Storage server ---SAN/NAS

SAN=Storeage Area Network

NAS = Network Attached Storage

Computing = RAM + CPU + OS

Networking = Ethernet ports

Storage = Hard discs

Security = Firewalls

Operatins = Upgrade/Installation/Uninstall/Maintainance

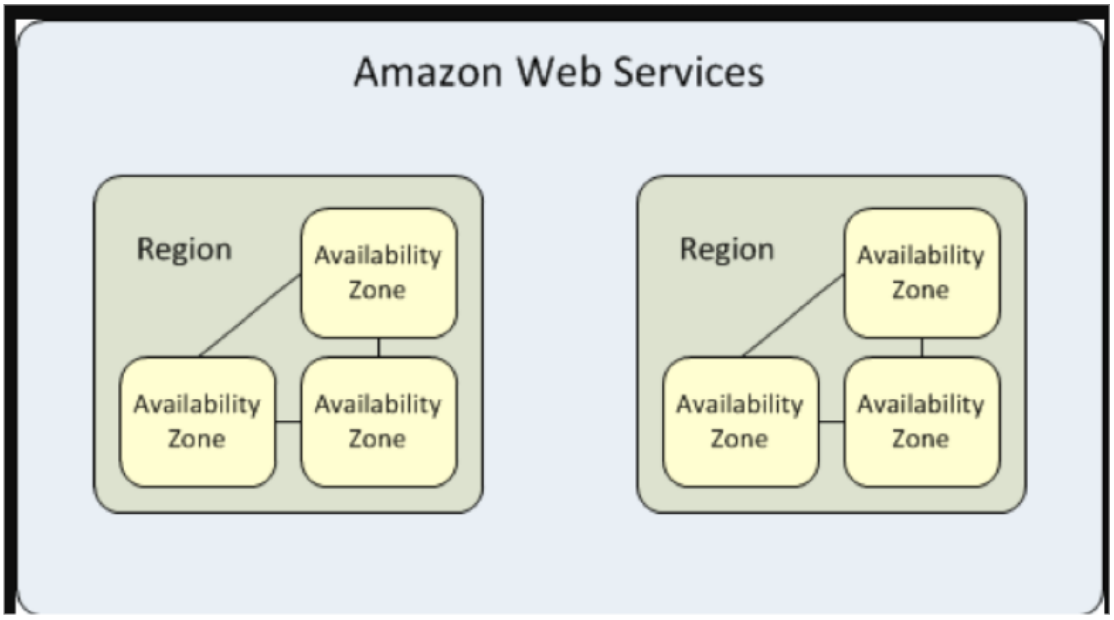
What is Data center ?(DC)

A data center or data centre is a building, dedicated space within a building, or a group of buildings used to house computer systems and associated components, such as telecommunications and storage systems.

What is Region ?

AWS has the concept of a Region, which is a physical location around the world where we cluster data

centers. We call each group of logical data centers an Availability Zone. Each AWS Region consists of multiple, isolated, and physically separate AZ's within a geographic area



Global Network of AWS Regions

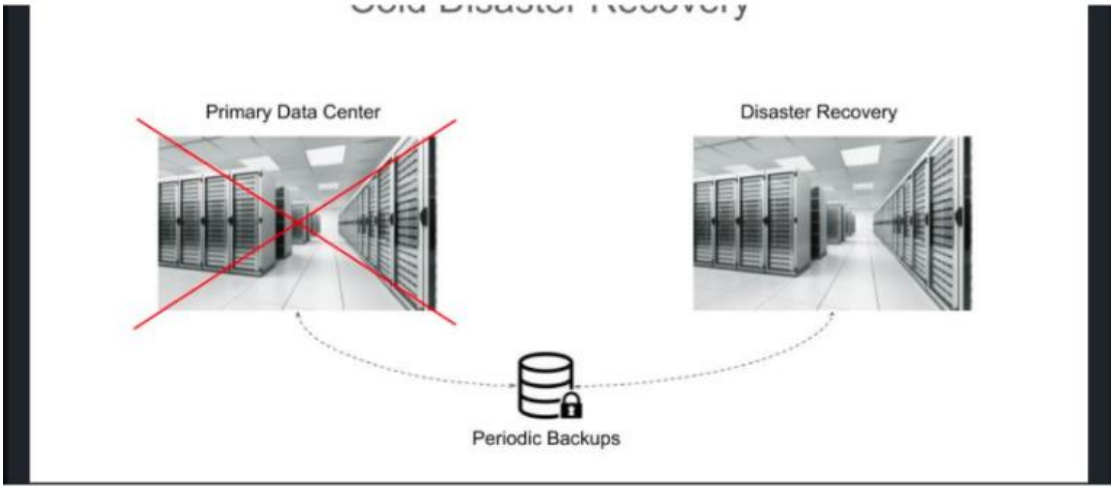
The AWS Cloud spans 77 Availability Zones within 24 geographic regions around the world, with announced plans for nine more Availability Zones and three more AWS Regions in Indonesia, Japan, and Spain

What is the Availability Zone (AZ) ?

An Availability Zone (AZ) is one or more discrete data centers with redundant power, networking, and connectivity in an AWS Region.

Region : Combination of AZ(min 2 AZs per region)

DR(Disaster Recovery)



Build the Data center :

England

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Place

Power

RACK+Network(eth0)+Storage

32.87.98.101

OS ----website

Hardware-----OS----application

Bare metal = Hardware

setup the website

install the OS on top of bare metal server(hardware), next install the OS and later install the website.

access the website:

India

Laptop---Browser---enter the ip

EX:-32.87.98.101

To capture the packet flow from local to the destination

traceroute

tracepath

tracert

ping ---check server responding or not.

DNS will use UDP protocal.

http

https

icmp

udp

ping

traceroute

tracepath

tracert

nslookup

dig

host

tcpdump --to capture the ethernet packets

wireshark--to analyse the tcp dumps

protocal://hostname:port/ctx

laptop ---hardware---infra

raw machine

OS ---Windows and Unix

port(socket) : numerical number assigned to a application by OS.

max port numer

65k

one port --one service--one application

zero port : Dynamic port number(random)

65k

What is port number ?

A port number is a way to identify a specific process to which an Internet or other network message is to be forwarded when it arrives at a serve

Important port Numbers:-

Number	Assignment
20	File Transfer Protocol (FTP) Data Transfer
21	File Transfer Protocol (FTP) Command Control
22	Secure Shell (SSH) Secure Login

23	Telnet remote login service, unencrypted text messages
25	Simple Mail Transfer Protocol (SMTP) E-mail routing
53	Domain Name System (DNS) service
67, 68	Dynamic Host Configuration Protocol (DHCP)
80	Hypertext Transfer Protocol (HTTP) used in the World Wide Web
110	Post Office Protocol (POP3)
119	Network News Transfer Protocol (NNTP)
123	Network Time Protocol (NTP)
143	Internet Message Access Protocol (IMAP) Management of digital mail
161	Simple Network Management Protocol (SNMP)
194	Internet Relay Chat (IRC)
443	HTTP Secure (HTTPS) HTTP over TLS/SSL

What is Cloud ?

Cloud computing is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user. The term is generally used to describe data centers available to many users over the Internet.

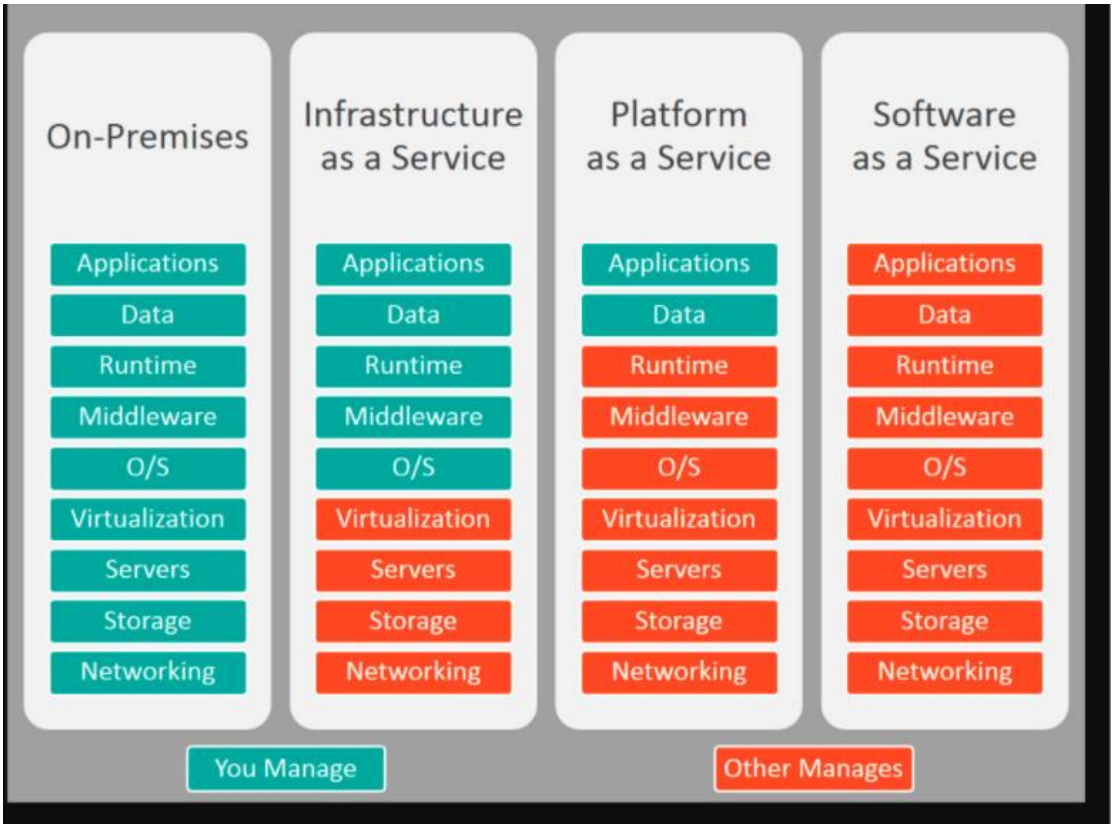
What is AWS cloud ?

Amazon Web Services is a subsidiary of Amazon providing on-demand cloud computing platforms and APIs to individuals, companies, and governments, on a metered pay-as-you-go basis.

AWS Plans
https://aws.amazon.com/premiumsupport/plans/

	BASIC	DEVELOPER	BUSINESS	ENTERPRISE
Cost	Free	$29/mo	$100/mo	$15,000/mo
Use Case		Experimenting	Production use	Mission-critical use
Tech Support	NO	Business hour via e-mail	24x7 via email, chat & phone	24x7 via email, chat & phone
SLA		12-24 hrs at local business hours	1 hr response to urgent support cases	15 min to critical support cases w/ priority
TAM & Support Concierge	NO	NO	NO	YES
Support Cases	None	1 Person, Unlimited Cases	Unlimited contacts/cases	Unlimited contacts/cases

Cloud Models:-



how to login to the aws console ?

Registration

https://portal.aws.amazon.com/billing/signup

admin flow

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admin also use clients to connect to the OS(server)

server -------client

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Unix(linux)--putty/gitbash/mobxterm

Windows server--rdp client

if you want to login to the server as a admin

we need to have credentials.

1)username/password

2)pem file --private key

3)without password

Total servers protected by firewall/security groups(SG)

what is firewall ?

it will have rules on what port number what ip address allowed/blocked(whitelist/blocklist)

0.0.0.0--internet

80------0.0.0.0/0-----what this rule says ?

80 port opened to internet

22-----26.45.87.92/32 --- what this rule says ?

22 port is allowed to particular IP.

what is security group ?

firewall outside the os .

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. ... For each security group, you add rules that control the inbound traffic to instances, and a separate set of rules that control the outbound traffic.

vpn - virtual private network

A virtual private network extends a private network across a public network and enables users to send and receive data across shared or public networks as if their computing devices were directly connected

to the private network.

Compute-Launch the EC2

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Ec2 - Elastic Compute Cloud --Server(Linux/Windows/Ubuntu/CentOS)

steps of installing the EC2:-

*Choose the AMI or OS or Servers

*Choose instance type

*Configure the instance

*Add storage

*Configure the sequrity group

*Review and Launch

after that we connect the Mobaxtream

Connecting the Mobaxtream:-

*Choose session

*after SSH

*Remote host(Public IP Address)

*Click on Specify user name---EC2-USER

*Click on Advanced SSH Setting

*Click on use private key (choose pem file)

*Click on OK

Steps of creating the VPC:-

*Create VPC with CiDR range ex:-10.0.0.0/16

*Enable the host name

*Create subnets (only for public subnets need to do---modify auto assign ip setting--enable the public IP)

*Create Route tables

*After associate the subnets

*Create Internet Gate Way

*Create Nat Gate Way

*If we need means create the VPC Peering

CIDR range formula:-