

Session - 6

3-tier architecture.

Desktop applications

Web application.

Disadvantages of Desktop app

- ① manual installation
- ② " upgrade
- ③ storage
- ④ Compatibility
- ⑤ if system crash we will lose data.
- ⑥ more system resources.

Web applications

popular because it does not have any above disadvantages
so we need to know the architecture

road side Cant

1 person \rightarrow 10 persons

- ① Cooking
- ② Bill collection
- ③ Serving
- ④ Querying

50 people → we ^{with} hire extra resources

2 persons → hotel

① Cook → Cooking and Serving

② Owner → tokens issue, bin collection

500 people → restaurant

Captain → welcome and Show the table

Waiter → take the Order, placing

Chef → Cook the Order.

advantages

① responsibilities are shared so everyone, they can focus only on their work.

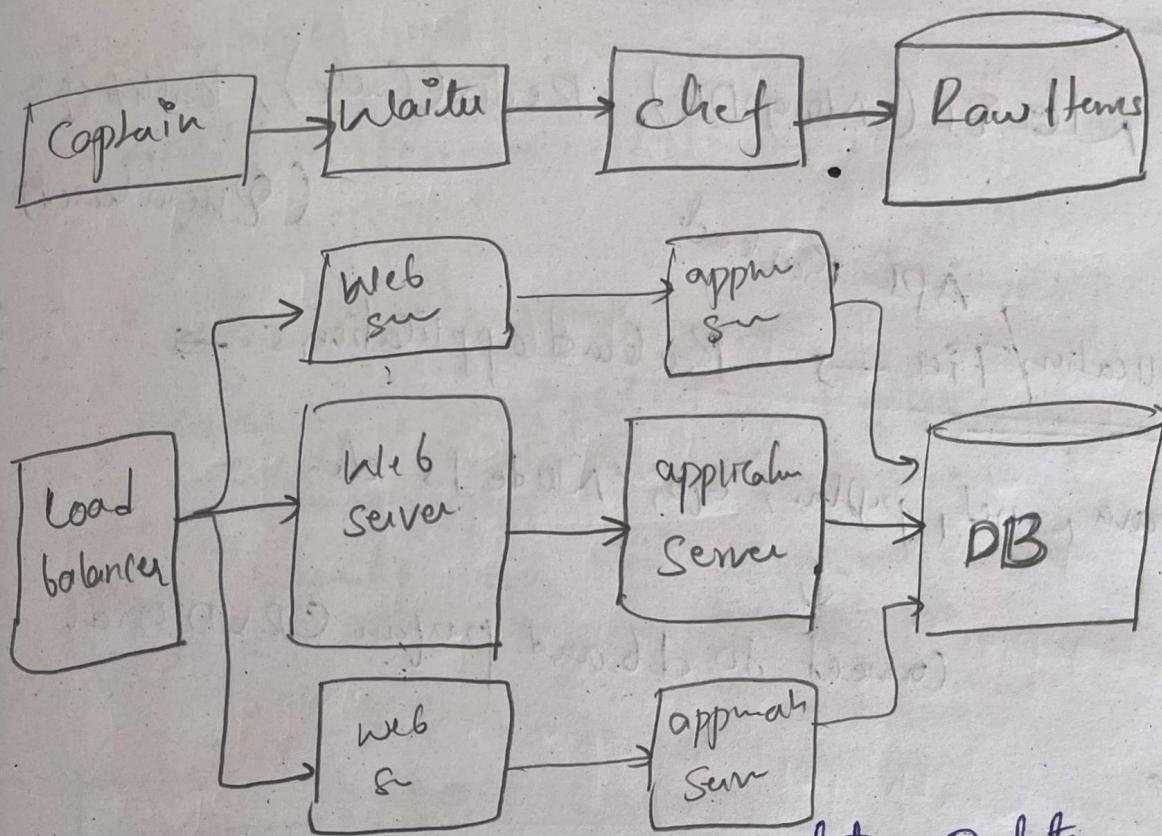
② Security

③ quieting

if only one serve → DB, Janappu, HTML app

if internet traffic more One server cannot handle everything

then 3 tier Architecture comes in.



CRUD → Create, read, update, Delete

DB → Raw data

application server → Connect to DB and do

CRUD operations.

Web server: → Queue the requests, take the

requests, forward the request to application server, format the data.

Load balancer: takes request and send to free

web server

DB tier → RDBMS (MySQL, Oracle, PostgreSQL, etc.)

NoSQL (MongoDB), Redis (Cache), RabbitMQ
(Queue based)

Application Tier → Backend applications →
API Backend

Java, .NET, Python, Go, Node.js etc.



Connect to db and perform CRUD operations

{

"username": "Grahame",

"dob": "01 Jan 2000",

"addr": "Sarah nagar"

}

Web tier / frontend tier → Load Balancer, Frontend Server

→ HTML, CSS, JS,

Web application are deployed in Web Server

Background appn are deployed in app server

Databases ~~are~~ one installed on database servers

practical work

→ ec2 instance

→ AMI → Community AMIs → Devops-practice

username password
ec2-user , DevOps321

↓
joindevops
(RHEL based)

[after launching no key-pairs required.]

pass login (git bash)

ssh ec2-user@ipaddress

→ password DevOps321 ✓

Install database.

Sudo su -

→ dnf install mysql-server -y

→ installed

→ next enable

systemctl enable mysqld

→ start

systemctl start mysqld

to check whether a service running or not

→ `systemctl status mysqld`

running

→ `ps -ef | grep mysql`

↓ ↓
gives all Search mysql
running process

Check whether port is open or not

`netstat -lntp.`

mysql port is 3306 ✓

installed

Defaut no pass for Db

started

We set pass

(ExpenseApp)

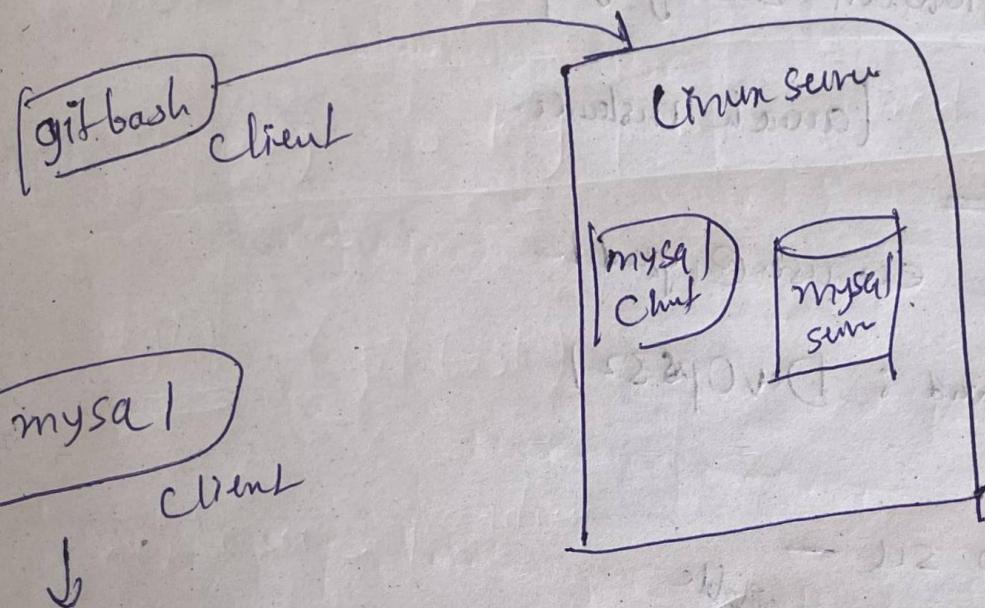
checked status

ExpenseApp@1

Vereinfachung

mysql server comes without pass, so we set the
pass.

mysql-secure-installation → set -root-pass ABCD.



menu

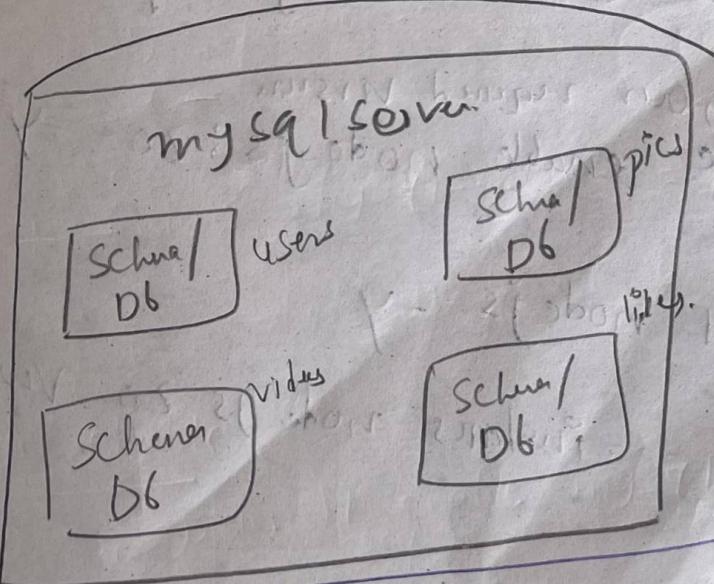
mysql command line

intuitiv

Show databases;
use database;

Show tables;

Select * from table;



Done Database Server running fine



② Backend server (Node.js)

→ ec2 instance

→ AMI DevOps-practice.

→ no key pairs

→ allow all security group

Launch instance.

ssh ec2-user@yadda

password : DevOps821

→ sudo su -

→ dnf list available | grep nodejs

nodejs 16 will

disabling already installed nodejs version

→ dnf module disable nodejs -y

enabling our required version

→ dnf module enable nodejs:20 -y

→ dnf install nodejs -y

instance nodejs 20 version

add application user

~~user add~~

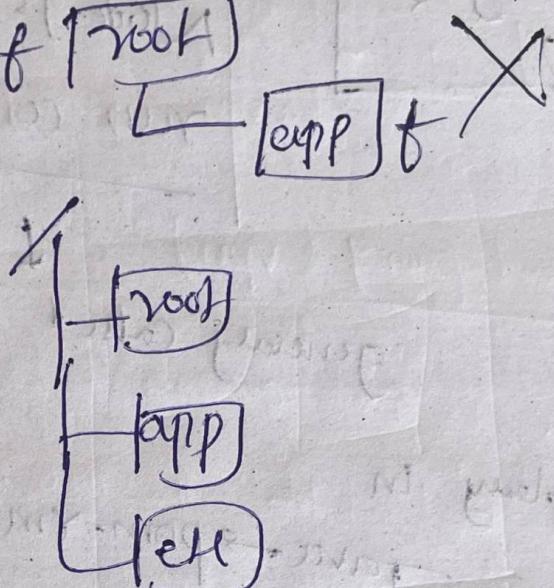
→ useradd expense

* to put my code I will create a new direct

inside root folder of /root

→ mkdir /app

absolutepath



→ download application code using curl.

zip file

curl -O ^{online} "location"

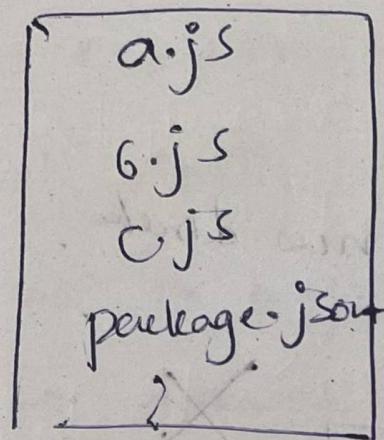
→ got to app and unzip

cd /app

→ unzip /tmp/backend.zip

→ puts them in current directory.

Node.js project



is a configuration file that defines a Node.js project, its dependencies, and run commands

generally called `build` file

Similarity in

java → pom.xml

python → requirements, pyproject.toml

→ now install all required dependencies in nodejs

`npm install`

→ node_modules

to connect application server with database
app server should have detail of database (like ipaddr)

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Systemd Service?

If you want your application to run as a service, create a file with extension .service in

/etc/systemd/system

→ vim /etc/systemd/system/backendservice

Desri

use

≡

DB=Host = "

✓ public (or) private

Sam laptop

cmd (ipconfig) → 192.168.1.6 → private IP

browsr = 49.204.161 → public IP

Connected Backend Server with

Database Server

front end tier / application

Nginx → popular web server and Reverse proxy
Server.

proxy → forward proxy
→ Reverse proxy.

Forward proxy (vpn) ex vpn connect to USA network

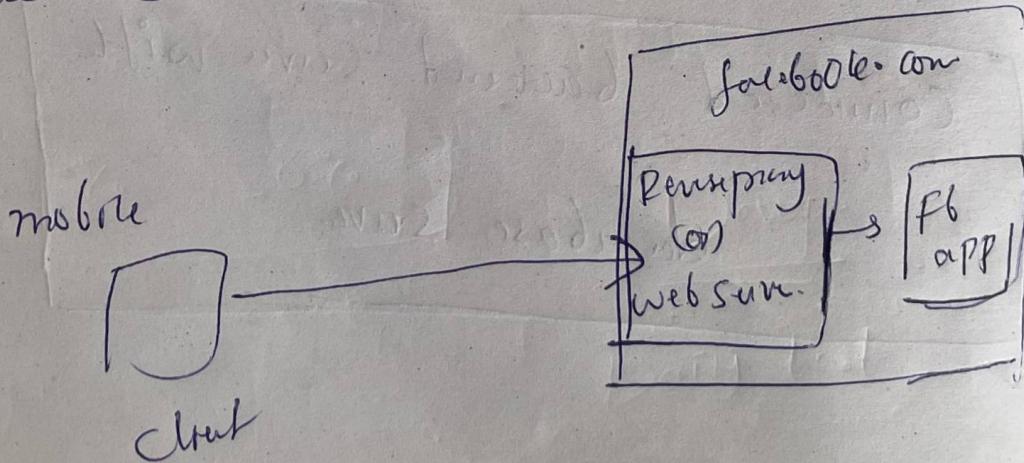
Server is not aware that Client is using VPN,
~~but~~ but Client is aware of VPN.

Traffic restricted, traffic monitoring, Geolocation hiding,
anonymous Client identity

Reverse proxy

Client is not aware of proxy but Server is
aware of proxy.

Backend apps are behind RPS for Security & Queuing
Cache Servers



Session-7 Continue.

- nginx home directory : /etc/nginx
- html directory : /usr/share/nginx/html
- nginx configuration : /etc/nginx/nginx.conf

default nginx port number 80

how do you change default port in
nginx.

by editing port number is /etc/nginx/
nginx.conf
file

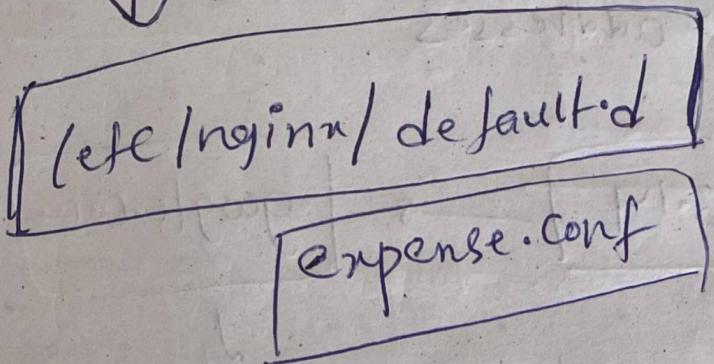
total number of ports.

$$0-65,535 = 65,536 \text{ ports}$$

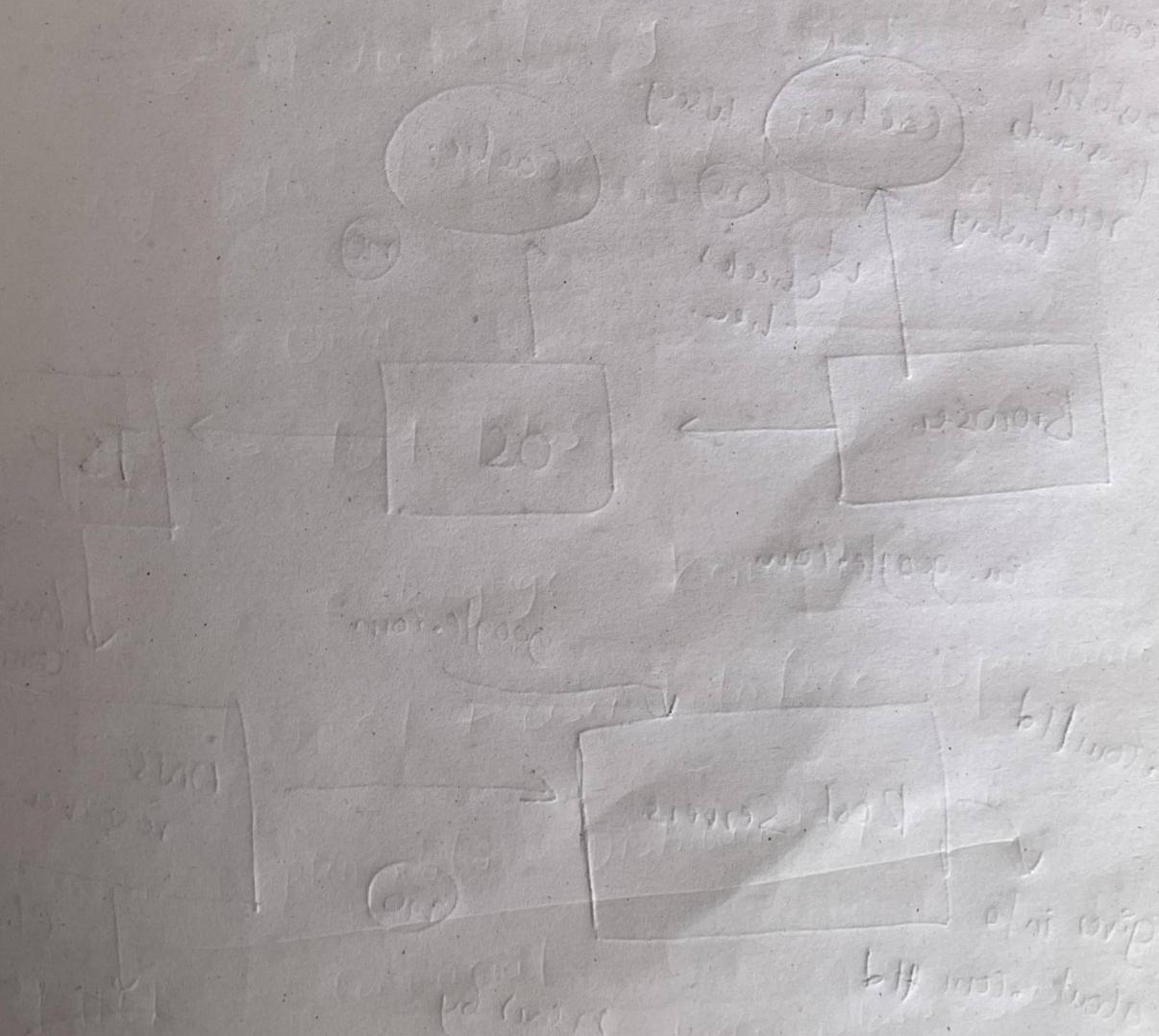
if listens to port 80 but app does
not work because we did not
connect to backend.

~~so~~ ~~we~~

we need to add extra configuration
to send traffic from Nginx to Backend



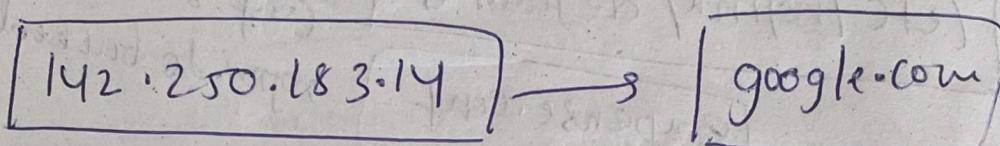
conf to connect
nginx to backend



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① DNS (Domain Name System)

② Is used to convert human-readable domain names into IP addresses.



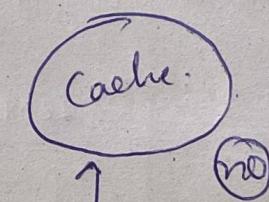
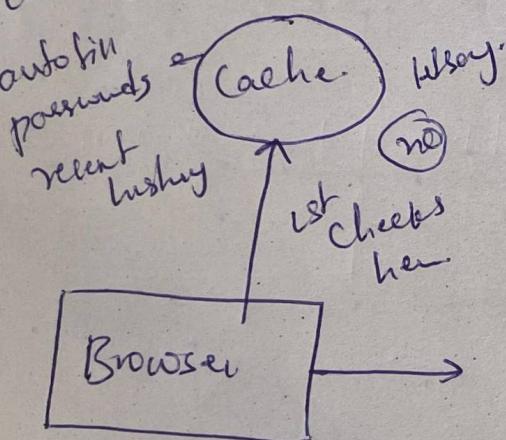
↓
difficult to remember ↓
easy to remember

1 website easy → 1000s of websites.

cookies,

auto fill
passwords

recent history



Browser

OS

ISP

en: google.com.

google.com

has
compon.

.com & d

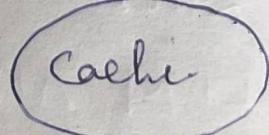
Root Servers

give info
about .com & d

near by
root &

DNS
resolver

Check
Cache



Community that maintains DNS

ICANN

Internet Community for assigned names & numbers.

top level domains

→ .com, .in, .uk, .net, .edu, .gov, .us

Sub level domain.

.gov.in, .co.in (two dots)

Suppose .telugu

anyone
might search
google.com.

called

1st) Register ICANN

2nd) Domain registrars (mediators)



① Go daddy

② hostinger

③ aws, gcp, azure.

What they do

Search
Joindevops → joindevops.com (not available)
try .joindevs.telugu.

hostinger has cheap domains

registered new domain

brahme.me

namecheap.com updates Montenegro

about brahme.me

→ who bought this domain

→ & what are name servers.

Name Servers = ~~who~~ who managed this domain.

records to the DNS

a record = IP address

Browser Cache

google.com no

OS Cache

no

DNS Resolve

DNS record

provided by ISP no

Root Server

when is .com handled

↓ → ask .com TLD server.

TLD Server (.com TLD Server)

where is google.com.

→ ask name servers ns1.google.com
ns2.google.com

Name Server

what ip of google.com

↓ @name server checks its A record
and replace

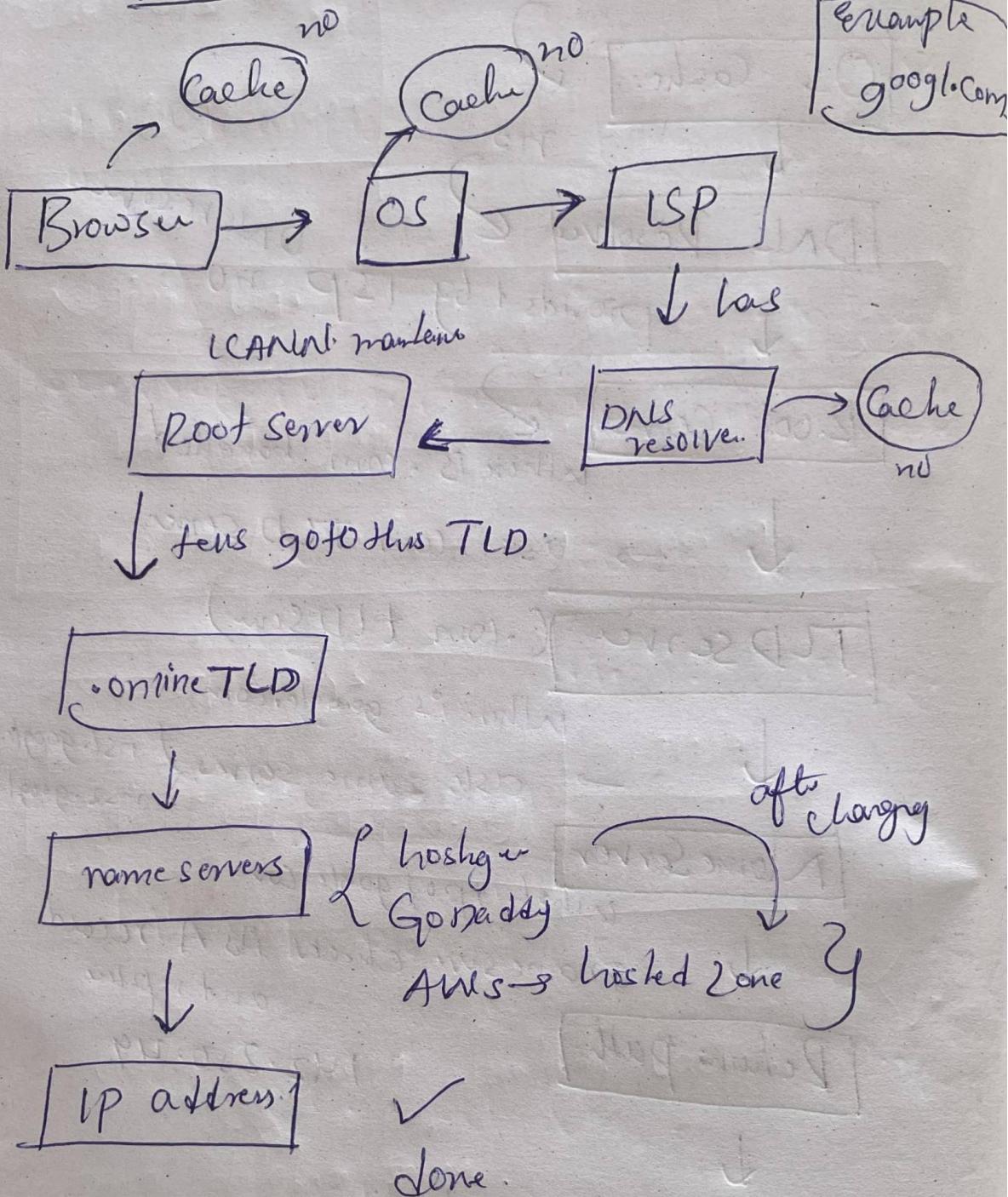
Returns path.

142.250.49.

Website loads

2nd time.

finding IP address of an Domain



NameSrvs (has diff records)
types

NLS → NameServer
SOA → who is the authority of this domain

A → IP address

CName → points to another domain

MX → mail records

TXT → Domain Ownership validation purpose

Get the domain from any registrars
{ godaddy, hostinger, aws,
namecheap }.

brahma.me → domain name

→ Namecheap has 2 name servers

Now Create a hosted zone in aws

with domain name (brahma.me)
and gives

4 Servernames.

↓
add in hostinger or Godaddy or Namecheap

Before → hostinger control / manage et

DNS

after → Aws (hosted zone) manager

DNS

internet won't ask domain info anymore
to hostinger / Godaddy it asks to
newly created nameservers (aws)

Logs

SSH logs

/var/log/secure

Nginx logs

who visits site

/var/log/nginx/access.log

/var/log/nginx/error.log (Error log)

MySQL logs

/var/log/mysql/error.log

Buy a domain name from Registers (Washing, GoDaddy, Namecheap etc.)
Create Hosted Zone in AWS with Brahmone

Brahmone

Create Hosted Zone in AWS with Brahmone

if giving F name servers.



Paste them in Namecheap nameserver

↓ after 3-24hr

after that your hosted zone controls

your domain. values Brahmane

record type.

created by default

Brahmone NS

Brahmone SOA

Brahmone A

Brahmone A

Brahmone A

Brahmone A

Brahmone A

Now manage host address with

DNS

Complete practical flow

Inode, Symlink / softlink and hardlink

What is inode?

inode stores the file type, permissions, ownership, file size, timestamp, disk location (memory location)

`ls -li` → complete inode information

`stat filename`

`Soft link`

`ln -s DbConfig.js` DbConfig1.js

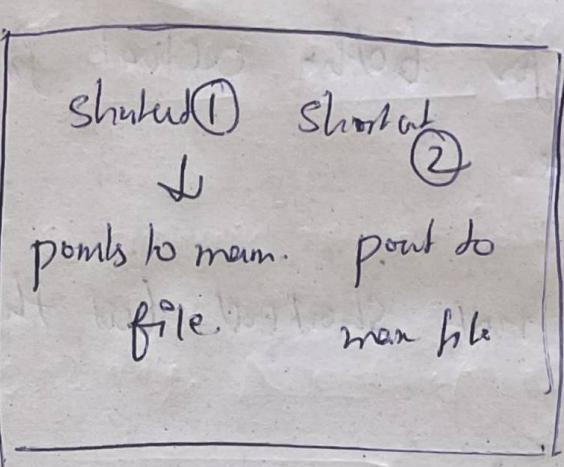
`ls -l`

① `drwxrwxrwx` `DbConfig1.js → DbConfig.js`

② represent link file

Symlink / softlink is like shortcut pointing

to original file



Windows
laptop

Softlink is similar to it

cat D:\config1.js (short cut)

↓
it bring data from D:\config.js (actual file)

Important

- inode for simlile and actual file is different
- Symm^o Breaks When actual file is deleted

Main purpose short cut.

hard link

In hello.txt hi.txt
actual file hard link file

→ inode is same for both actual file
and hard link file

→ Because this is not shortcut but this
is another copy

ls -li

859006	-rw-r--r--	2root root	12 Dec 2011	height
859006	-rw-r--r--	2root root	12 Dec 2011	hi.txt

→ used for backup of the file.

→ Same inode number if hard link.

how do you find hard links for a particular file

copy original file mode number

23062

find / -inum 23062

]

all files

→ If original file deleted hard link remains
Same.

→ Symbolic softlinks can be used to
folder structures

→ Note Cannot Create hardlnk to folders /
directories.

find / -inum <inode-number>

Root 53 = hosting / GoDaddy etc

Session - 9 [Troubleshooting]

① Reasons if backend is not connecting

① ping <ip-address>

is that Server reachable over network or not

②

is it alive

② telnet <db-ip> 3306

is port 3306 open

is MySQL running

is firewall allowing the port

Check in ~~Backend~~ Backend Server.

① ping mysql.brahme.me

✓

② telnet mysql.brahme.me 3306 ✓

Same server = localhost = 127.0.0.1

Check health

curl http://localhost:8080/health ✓

first check in UI browser

Check on Inspect and check network

HTTP methods and status codes

CRUD

get / → read from server. ↗ safest

post → posting / Create the information

L

amount : 200,

dex : hero

y

PUT → update the information

Delete → Delete the information.

HTTP Status codes:

100 = 1xx = informational

200 == 2xx == Success Status code.

300 = 3xx = redirection

400 = 4xx = Client side error (some times frontend
times gathered)

500 = 5xx = Server side error

Example.

frontend - Server

Configuration to contact backend

[backend.grahme.me] ✓

but you gave [backend.grahn-me.] X



404 ~~not found~~

client side error [frontend error bcz
conf is wrong]



here Client frontend → Server Backend

401 → Unauthorized → you should login

405 → Method not allowed

http post, but if you use get

400 → Bad request → check the
payload once again

L "email": "breh@gme.com"

L "email": "bu", "y"

500 → Internal Server Error → Server side error

502 → Bad Gateway → Frontend not able
to connect backend

503 → Service temporarily unavailable.

Simple:

Client side error (4XX)

- problem is in the request you sent
- Server is working, your request is wrong

Server side error (5XX)

- Request is correct
- Server failed while processing

4XX → mostly frontend

500 → Backend

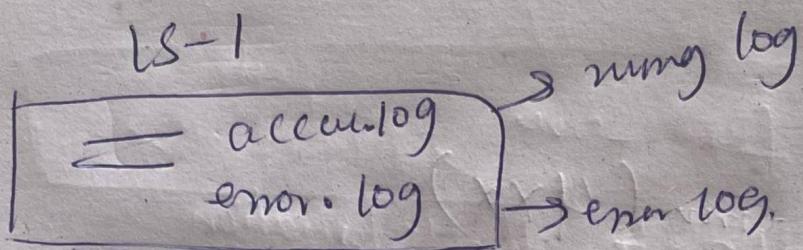
502 / 503 → Down's

504 → Backend perf issue

Cheating logs

frontend nginx logs

① /var/log/nginx/



→ cat → dum/shar enough (best for small file)

→ less → view page by page

↓ (change file, scroll, search)

q for quit

→ tail -f accm.log (only shows last
10 logs)

follow

↓

new logs keep showing

Backend logs

① cd /var/log/messages.

→ tail -f messages. ★★☆

How to check memory of Linux Server

1

RAM

dnf install htop -

① free

htop

② free -h , ③ top cat /proc/meminfo

RAM vs ROM

Hard disk → RAM → User

swap (Reserved RAM for HD)

how do you list top 10 high memory processes?

ps aux --sort -%mem | head -n 10

Ram usage

Disk Usage.

df -hT → rootvol

~~du~~ du -sh /*

{ ≡

du -sh /usr /*

{ ≡

Under osr dir by all.

gives us the disk usage of files and folders
in root directory

Cpu utilization

cat /proc/cpuinfo

Linux folder structure

cd /

ls -l

df -s

app

bin → usr/bin

boot

:

usr
var

/bin

→ basic commands

cat, ls, etc

which is

/boot

System on, power on
procedure.

/dev

attached device
keyboard, mouse, etc..

/etc

all configuration files

/opt

optional software

/home

personal directories for
each user

/proc

system interface

/lib

depends for bin

/tmp

temporary files

/var

frequently changed files