

INTRODUCTION TO DEVOPS : PART - 2

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DEVOPS HABITS



- ▶ DevOps start with getting the two sides (Dev and Ops) to talk to each other. Talking face to face breaks down stereotypes and allows each side to see the other's daily difficulties and struggles.
- ▶ Find out common goals – Stable Production environment- what each team has to do to achieve this?
- ▶ Automate most of the processes. Eliminate human intervention wherever possible. Make use of configuration management tools like Chef, Puppet, Ansible, etc.
- ▶ standardize the Development and Production environments. Revamp server infrastructure as needed.
- ▶ Implement feedback and feed-forward loop. Involve all stake holders from beginning.

INFRASTRUCTURE FOR SUCCESSFUL DEVOPS



DevOps – Team structures.

- Close-knit collaboration between Dev and Ops. Highly collaborative team working side by side.
- Dedicated Dev-Ops team- skilled people with diverse expertise on DevOps tools.
- Cross-functional team – representatives from all disciplines responsible for developing and deploying a service (business Analyst, developers, quality engineer, ops and security, etc.) the team is fully empowered and self-sufficient.

DEVOPS - INFRASTRUCTURE COMPONENTS



DNS optimization— important aspect of your enterprise network for faster performance.

Domain Name service that translates Hostname to IP Address or Domain name to IP address.

Data packets traverse the Internet and reach their destinations on the network of DNS servers. They hop from server to server, asking each server along the way for the correct route towards the target computer. This is called “routing”.

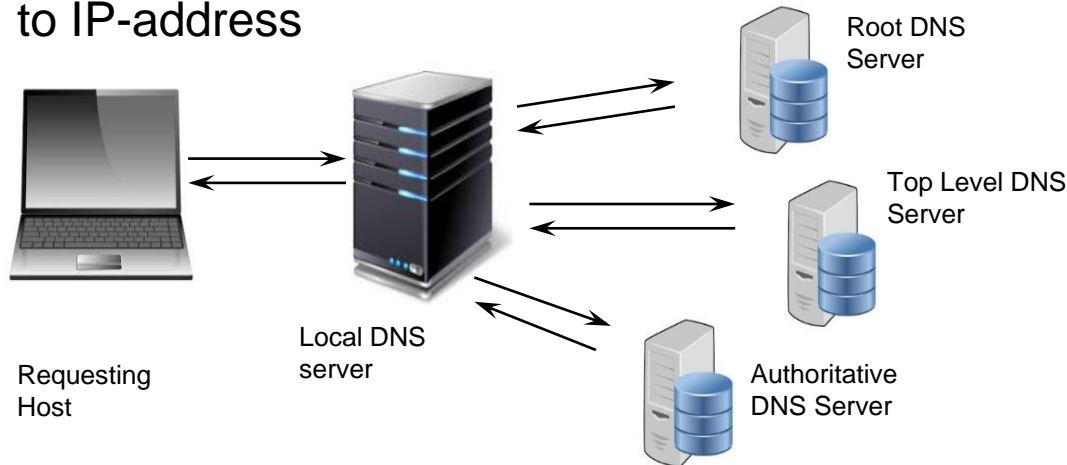
The routing of packets along the most efficient DNS servers is optimization.

DNS servers should be benchmarked and then cleaned up for efficient routing resulting in significantly reduced browsing time

DNS – DOMAIN NAME SERVICE



Helps to Map domain names
to IP-address



- 1) The client asks its DNS server to resolve a host name to an address.
- 2) The DNS server queries and gets hints on where to find the record for the hostname from the Root and Top-Level DNS server which lead to the DNS server with the authoritative host IP Address.
- 3) The DNS server returns the IP Address information to the client and stores the information in local cache.

- On Linux flavor machine, BIND9 is one of the favorite application used for configuring the server / machine as dns server.
- Forwarder and reverse zones are configured on DNS server while configuring the DNS server.

Advantages:

- Improves network query speed, caching feature helps in reducing repeated network trips.

LOAD BALANCER



! Possibilities of failure

No Load
Balancing



User



Internet



Web Server



Database Server

Layer -4 –
Transport
Layer



Load Balancer



Web Servers



User



Load Balancer



Web Servers

LOAD BALANCER



- Application level Load Balancer
 - Dynamic ratio – connection are distributed as per ratio derived based on real time server performance.
 - Observed – this method tracks the number of connection to each node over the time and creates a ration of load balancing.
 - Predictive – this method analyses the trend of ranking of servers rated upon number of connection over the time.
- Classic Load Balancer.
 - Round Robin – default load balancing mechanism – used when all servers have equal processing speed and memory.
 - Ratio – connection are distributed as per defined 'ratio of connections' per node.
 - Fastest node – Server selected based on least number of connection of the session.
 - Least connections – passes the connection to the node having least number of active connection.
 - Weighted connection – the connections are established depending upon the weighted server capacity.

HARDWARE OR SOFTWARE-BASED LOAD BALANCERS



- F5 BIG-IP** – Major feature - WAN optimization manager. enables traffic between data-centers to be optimized, encrypted and highly available. This feature makes creating a WAN-based disaster recovery (DR) solution easy and almost automatic.
- CISCO** – Hardware routers and CISCO IOS has every possible load balancing feature available.
- CITRIX NetScaler** – NetScaler ADC (application delivery controller) helps to automate network provisioning and control based on app requirements and policies for data-centers and enterprise environments.
- KEMP** – offers hardware and virtual (software) load balancers. Offers a freeware version of software based load balancers (LoadMaster).
- Radware** – hardware load balancers - Some notable features of 'Radware' devices are easy updates and upgrades, application-aware services, and improved application response time through smart caching.
- Zen Load Balancer** – Software based Load Balancer.
- HAProxy** – Software based Load Balancer
- NGINX** – Software based Load Balancer.
- Amazon ELB (elastic Load Balancing)** - Software based LB.



Most commonly used open source
Load balancer solution

NGINX – LOAD BALANCER



NGINX provides three options with load balancing. This needs to be mentioned in the configuration file for NGINX.

- round-robin
 - default
- Least-connected
 - least_conn;
- ip-hash
 - Use for sticky session
 - ip_hash

The default configuration file resides at ['/etc/nginx/sites-available/default'](#)

```
upstream web_backend {  
    ip_hash;  
    server 10.11.12.51;  
    server 10.11.12.52;  
}  
  
server {  
    listen 80;  
  
    location / {  
        proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;  
        proxy_pass http://web_backend;  
    }  
}
```

```
worker_processes 1;  
events {  
    worker_connections 1024;  
}  
  
http {  
    upstream servers {  
        server 192.168.1.101;  
        server 192.168.1.102;  
    }  
  
    server {  
        listen 80;  
  
        location / {  
            proxy_pass http://servers;  
        }  
    }  
}
```

HAPROXY – LOAD BALANCER



High availability Load balancer, Fault Tolerance

Highlights:

- Software based load balancer.
- Used for load balancing only, unlike NGINX, which is used as webserver as well.
- Works on TCP layer-4 and HTTP layer-7.
- Has faster performance as compared to similar Apps.
- Has advanced routing and load balancing features.
- Works / support native SSL
- Works only with open source (Linux flavors), no Windows Support.
- Has Admin console to manage.
- Used with some well known web sites as, GitHub, Reddit, Tumblr, Twitter etc.

haproxy.cfg

```
global
    log dev/log local0
    log

defaults
    log                    global
    mode                  tcp
    option tcplog
    option dontlognull
    timeout connect 5000
    timeout client 50000
    timeout server 50000
    errorfile 400
    /etc/haproxy/errors/400.http

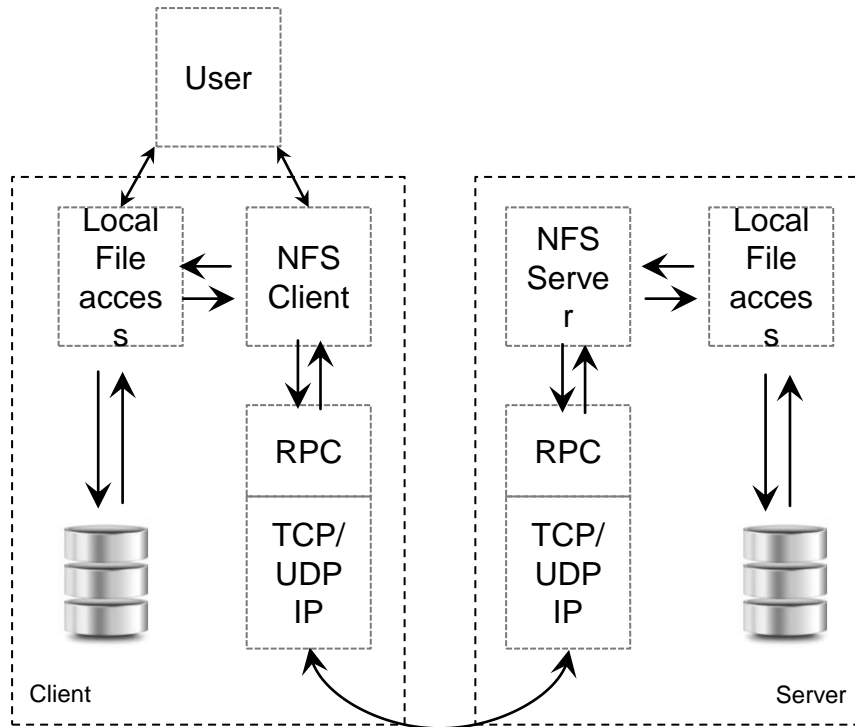
frontend myfrontend
    bind *:80
    default_backend haproxy_http

backend haproxy_http
    balance source
    mode tcp
    stick-table type ip size 20k peers

mypeer
    server web1 192.168.33.30:80 check
    server web2 192.168.33.31:80 check
    server web3 192.168.33.32:80 check

peers mypeer
    peer ha1 192.168.33.101:1024
    peer ha2 192.168.33.102:1024
```

NFS – NETWORK FILE SYSTEM



- Uses Distributed file protocol
- Used with Unix flavor machine. Also implemented for other Oss like, Mac OS, Windows, AS-400, etc.
- Allows users to share file and directories
- RPC Based
- Simple crash recovery –
 - Each RPC from client all necessary information for the operation
 - Server doesn't maintain any client related information.
 - Server doesn't keep track of past access records.

NFS – NETWORK FILE SYSTEM



Points to note:

For sharing files between Unix flavor machines.

- Install NFS package
- Modify configuration file located at /etc/exports.
- Start services
 - 1) nfs
 - 2) nfs lock
 - 3) portmap

In order to use the nfs share the client should also be installed with nfs package.

On client run command,

```
$ yum -y install nfs*
```

And then mount the 'nfs public' folder,

```
$ mount <ip address of nfs server>:<share_name> /mnt
```

Check the /mnt folder, and you will see the files inside the public share folder.

Install 'nfs' using below commands,

```
$ yum -y install nfs-utils nfs-utils-lib
```

Create a share repo.

```
$ mkdir pubshare
```

Create few file inside the directory.

Update file /etc/exports

```
/public * or, <ip address> (ro,sync) ... save the file
```

```
$ service rpcbind status
```

To start the NFS service when the system boots, use the command,

```
$ chkconfig nfs on
```

Start the nfs service

```
$ service nfs start
```

To check the nfs file share, use command,

```
$ showmount -e
```



THANK YOU