# DNS

- DNS Server
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- DNS Online Tools

# DNS Server

## Tutorials

DNS over HTTPS (DoH)

- How to install dnscrypt proxy with adblocker on Linux

Secure DNS

- DNS settings to avoid email spoofing and phishing for unused domain - nixCraft (cyberciti.biz)
- How to test and validate DNSSEC using dig command line - nixCraft (cyberciti.biz)

## Adguard Home

- GitHub - AdguardTeam/AdGuardHome: Network-wide ads & trackers blocking DNS server

## NSD

An authoritative-only DNS server

- NSD Tutorial Updated for 2024: Now With Zone Transfers! - LowEndBox
- How To Use NSD, an Authoritative-Only DNS Server, on Ubuntu 14.04 | DigitalOcean

## Pi-hole

Pi-hole - A DNS-based advertisement blocker

- How to Set Up Pi-hole to Get an Ad-free Life

docker-compose.yaml :

```
pihole:
  image: pihole/pihole:latest
  container_name: pihole
  restart: always
```

```
    ports:
      - "53:53/tcp"
      - "53:53/udp"
    dns:
      - 127.0.0.1
      - 1.1.1.1
    environment:
      TZ: 'America/Chicago'
      WEBPASSWORD: 'password'
      PIHOLE_DNS_: 1.1.1.1;9.9.9.9
      DNSSEC: 'false'
      WEBTHEME: default-dark
    volumes:
      - '~/homelabservices/pihole/pihole:/etc/pihole/'
      - '~/homelabservices/pihole/dnsmasq.d:/etc/dnsmasq.d/'
    networks:
      - pihole

networks:
  pihole:
    driver: bridge
    name: pihole
```

# dig - DNS Lookup Utility

The `dig` is a powerful CLI to find out information about domains and IP addresses without using any 3rd party tools or websites.

01. What is the website's IP address?

```
dig apple.com
```

02. How do you identify the name servers(NS) associated with a domain?

```
dig NS apple.com +short
dig NS com. +short
```

03. Which eMail Servers(MX) are responsible for a domain?

```
dig MX apple.com +short
```

04. Finding out the domain name associated with the IP address (reverse IP lookup)

```
dig -x 1.1.1.1 +short
dig -x 8.8.4.4 +short
```

05. Finding out the delegation path for any DNS zone (learn how DNS works)

```
dig apple.com +trace
```

06. Finding out DNS answers from specific cache resolver (e.g. Cloudflare [1.1.1.1], Google DNS [8.8.8.8], IBM and so on for cyberciti.biz domain)

```
dig A cyberciti.biz @1.1.1.1 +short
dig A cyberciti.biz @8.8.8.8 +short
```

07. Finding out the cache expire time (TTL) for DNS

```
# AAAA is for IPv6
dig A www.cyberciti.biz +nocmd +noall +answer +ttlid
dig AAAA www.cyberciti.biz +nocmd +noall +answer +ttlid
```

08. Finding if a zone is synchronized with all authoritative name servers (look for serial number)

```
dig nixcraft.com +nssearch
```

09. What is my public IPv4 or IPv6 address?

```
dig TXT o-o.myaddr.l.google.com @ns1.google.com +short
dig TXT ch whoami.cloudflare @1.0.0.1 +short
```

10. Getting help about the dig command

```
man dig
```

11. Finding out the IP address associated the domain name.

```
dig yahoo.com +short | sort -V
```

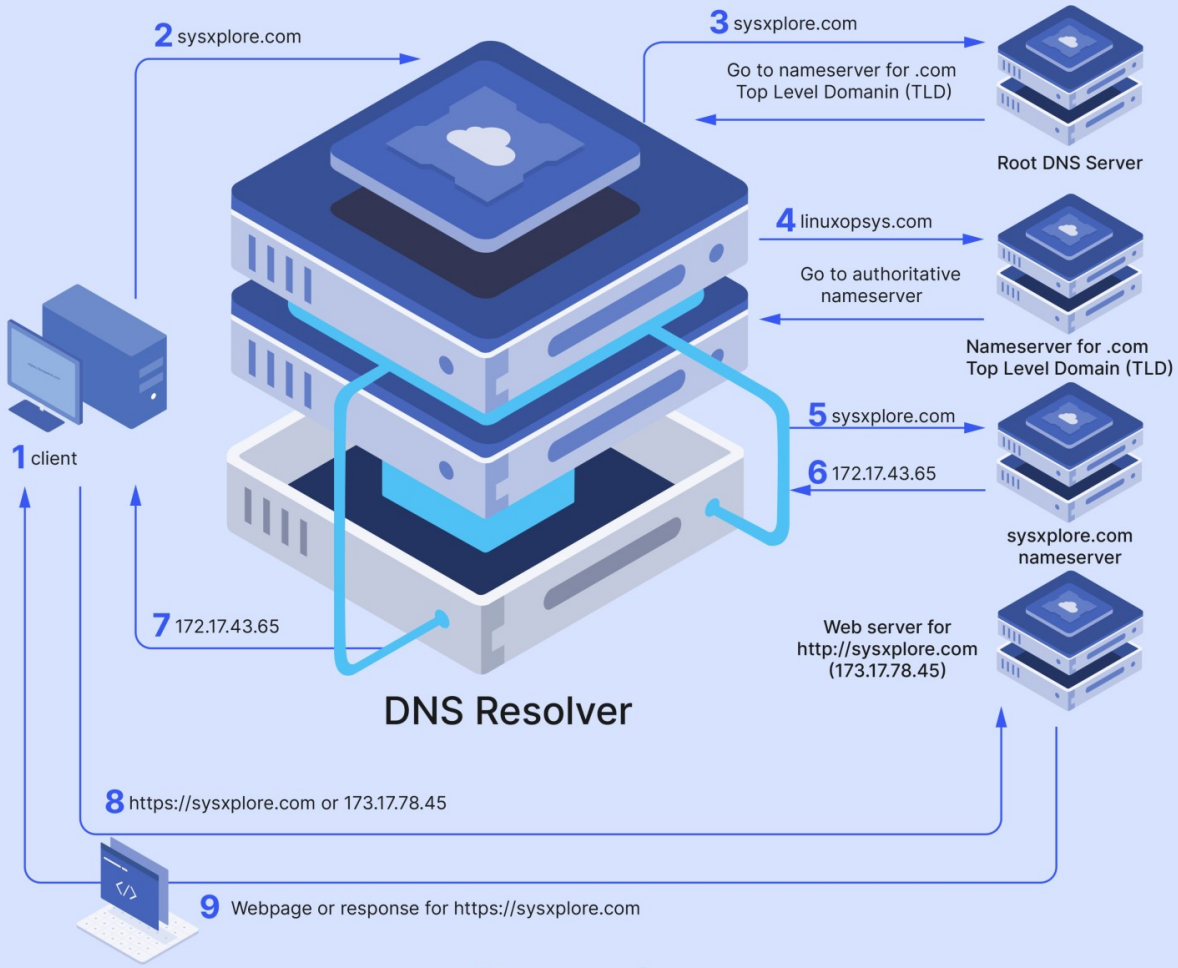
# What's DNS

## Tutorials

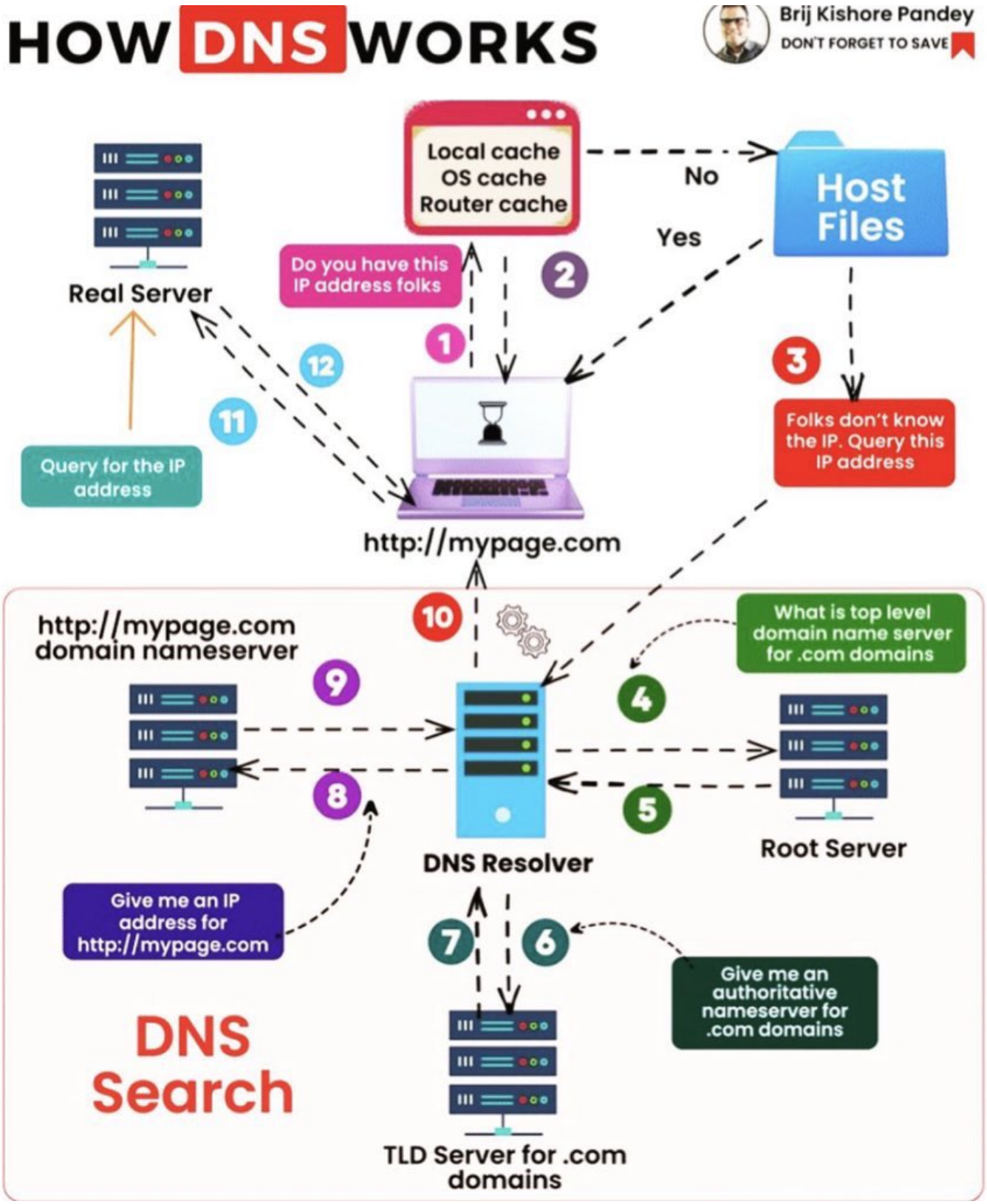
- What is Round-Robin DNS? - GreenCloud
- What is a DNS Amplification Attack? - GreenCloud
- DNS Failover: How does it work? - GreenCloud

## How DNS Works

# How DNS works?




@sysxplore




DNS Record Type

# DNS record types

## A (address)


- Most commonly used to map a fully qualified domain name (FQDN) to an IPv4 address and acts as a translator by converting domain names to IP addresses.

## AAAA (quad A)


- An AAAA record is the IPv6 equivalent of an A record, responsible for mapping a domain name to an IPv6 address.

## CNAME (Canonical Name)

- An alias that points to another domain or subdomain, but never an IP address. Alias record mapping FQDN to FQDN, multiple hosts to a single location. This record is also good for when you want to change an IP address over time as it allows you to make changes without affecting user bookmarks, etc.

## MX (Mail eXchange)

- A mail exchanger (MX) record stores the domain names of mail servers responsible for receiving emails on behalf of a domain. These records can be helpful to identify authorized mail servers. An MX record is sometimes called an MX entry, particularly in configuring mail servers.

## PTR (pointer)


- A reverse of A and AAAA records, which maps IP addresses to domain names. These records require domain authority and can't exist in the same zone as other DNS record types (put in reverse zones).

## NS (name server)

- A name server (NS) record provides a list of the authoritative DNS servers (also called name servers) responsible for the domain that you're querying. At the end of the DNS query chain, an authoritative name server is the final arbiter for DNS resource records.

## SOA (Start of Authority)

- Every DNS zone requires a start of authority (SOA) record. The SOA record stores important information about the zone, such as its primary authoritative name server and the administrator's email address.

## TXT (text)


- Allows administrators to add limited human and machine-readable notes and can be used for things such as email validation, site, and ownership verification, framework policies, etc., and doesn't require specific formatting.

@sysxplore

# DNS Online Tools

## DNS Check

- DNS Check
- DNSChecker
- Google Admin Toolbox Dig
- Google Admin Toolbox Check MX
- Nslookup.io

## SPF/DKIM/DMARC Check

- Postmaster Tools (google.com)