What Is DNS?

A complete beginner's guide to the internet's phonebook — and how it finds the right website in a fraction of a second.

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Inside this guide

01 — INTRODUCTION

Knowing a restaurant's name isn't the same as knowing where it is

Unless someone tells you the address, you can't visit it. The same thing happens on the internet.

When you type a website name like google.com or haas.dev, your computer knows the name but doesn't know where the website is actually located. This is where the Domain Name System (DNS) comes in.

```
// THE INTERNET'S DIRECTORY SERVICE
```

DNS converts easy-to-remember domain names into IP addresses that computers use to communicate. Without it, every website visitor would need to remember long strings of numbers instead of simple names.

02 — WHAT IS DNS?

A distributed system that translates names into addresses

DNS stands for Domain Name System. It's a distributed system that translates domain names into IP addresses.

```
haas.dev
↓
Server IP Address
↓
Your browser connects to the correct server.
```

Think of DNS as a translator. Humans speak in names. Computers communicate using IP addresses. DNS bridges the gap between them.

03 — WHY IS DNS IMPORTANT?

Without it, the internet would be far harder to use

- Websites would be difficult to access.
- Users would have to memorize IP addresses.
- Browsers would not know where websites are hosted.
- The internet would be much harder to use.

DNS allows billions of devices to find websites quickly and efficiently.

04 — WHY COMPUTERS NEED DNS

Computers don't understand names

Computers don't understand names like google.com, github.com, or haas.dev — instead, they communicate using numerical IP addresses. DNS converts the human-friendly name into a machine-friendly address, automatically, every time you visit a website.

05 — HOW DNS WORKS

Simple, but critical — seven steps in a fraction of a second

1. You type: haas.dev
2. Your browser checks whether it already knows the IP address.
3. If not, it asks a DNS server.
4. The DNS server searches for the correct IP address.
5. The IP address is returned.
6. Your browser connects to the website's server.
7. The website begins loading.

06 — DNS LOOKUP PROCESS

Several systems, checked in order, until an answer is found

1. **Browser cache** — checks whether it has recently visited the website. If the answer exists, no lookup is needed.
2. **Operating system cache** — if the browser doesn't know, the OS checks its own cache.
3. **Recursive DNS resolver** — usually provided by your ISP, it searches for the correct answer.
4. **Authoritative DNS server** — stores the official DNS records for the domain and returns the correct IP.
5. **Browser connects** — once the IP is received, the browser establishes a connection and the webpage begins loading.

// GO DEEPER

The complete loading process is explained in **"What Happens When You Type a URL?"**

07 — TYPES OF DNS SERVERS

One system, four cooperating server types

RECURSIVE RESOLVER

Receives your request and searches for the answer.

ROOT SERVER

Helps direct requests toward the correct top-level domain.

TLD SERVER

Knows where domains ending in .com, .org, .dev, etc. are managed.

AUTHORITATIVE NAME SERVER

Stores the official DNS records for a domain and returns the final answer.

These servers work together every single time a browser performs a DNS lookup.

08 — DNS RECORDS EXPLAINED

Five record types you'll configure often

A RECORD

Maps a domain name to an IPv4 address.

AAAA RECORD

Maps a domain name to an IPv6 address.

CNAME RECORD

Points one domain or subdomain to another domain.

MX RECORD

Specifies which mail server receives emails for a domain.

TXT RECORD

Stores additional information such as domain verification or email security settings.

As you build websites, you'll frequently configure these records.

09 — DNS CACHING

Repeated lookups would slow down the whole internet

To avoid unnecessary requests, DNS responses are temporarily stored in caches. Caching can occur in browsers, operating systems, routers, and ISPs — improving website loading speed and reducing server traffic.

// THE TRADEOFF

Sometimes cached information becomes outdated, which is why DNS changes may take time to appear worldwide — this delay is known as DNS propagation.

10 — REAL-WORLD EXAMPLE

Typing https://dev-roast-app.vercel.app

Your browser:

- Checks its cache
- Asks a DNS resolver if needed
- Receives the server's IP address
- Connects to the server
- Sends an HTTP request
- Downloads the webpage

// WITHOUT DNS

Your browser would never know where haas.dev is actually hosted — the name alone tells it nothing.

11 — COMMON BEGINNER MISTAKES

Where most beginners get stuck

- × Thinking DNS stores website files.
- × Confusing DNS with web hosting.
- × Believing DNS and domains are the same thing.
- × Assuming DNS changes happen instantly worldwide.
- × Thinking browsers always perform a new DNS lookup.

12 — PRACTICAL ACTION PLAN

Trace the DNS path for three websites

- Identify the domain name.
- Think about which DNS lookup steps occur before the website loads.
- Research which DNS records the website might use.

Then draw the DNS lookup process on paper — explaining it visually is one of the best ways to remember it.

13 — KEY TAKEAWAYS

What to carry forward

- DNS stands for Domain Name System.
- DNS converts domain names into IP addresses.
- Browsers depend on DNS before contacting a website server.
- Multiple DNS servers cooperate during every lookup.
- DNS records store important information about a domain.
- DNS caching improves internet performance.

// THE TAKEAWAY

Next time a freshly-pointed domain "isn't working yet," you'll know to check propagation before panicking.

// 14 — SUMMARY PAGE

Cheat sheet

The whole guide, compressed to seven lines.

dns
Domain Name System

translation
Domain Name → IP Address

browser
Checks cache first

recursive resolver
Searches for answers

authoritative server
Stores official records

dns records
Define domain information

dns caching
Speeds up website loading

15 — DNS TROUBLESHOOTING CHECKLIST

Before you move to Part 8

- [ ] I understand why DNS exists.
- [ ] I know how DNS converts names into IP addresses.
- [ ] I can explain the DNS lookup process.
- [ ] I understand the purpose of DNS records.
- [ ] I know why DNS caching is useful.
- [ ] I understand why DNS updates may take time.

If you can check all six honestly, you're ready for the next PDF in this series.

// 16 — RELATED RESOURCES

Keep going

why read it

What Is a Domain Name?

Learn why websites use human-readable names instead of IP addresses.

why read it

How the Internet Works

Understand how devices communicate across networks before DNS comes into play.

why read it

What Happens When You Type a URL?

See where DNS fits into the complete webpage loading process.

why read it

HTTP vs HTTPS

Learn what happens after DNS finds the correct server.

why read it

What Is Web Hosting?

Understand where websites actually live after DNS points users to the correct server.

// 17 — RECOMMENDED NEXT LEARNING PATH

Where to go from here

1. What Is a Website?
2. Website vs Web Application
3. How the Internet Works
4. What Happens When You Type a URL?
5. HTTP vs HTTPS
6. What Is a Domain Name?
7. **What Is DNS? — you are here**
8. What Is Web Hosting?

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Engineering mindset over syntax memorization. Learn to think like a systems builder, one fundamental at a time.

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