

Lecture Notes: DNS and Its Types (Example: www.bracu.ac.bd)

1. What is DNS (Domain Name System)?

The Domain Name System (DNS) is like the phonebook of the Internet. It converts human-readable domain names (like www.bracu.ac.bd) into IP addresses (like 103.76.92.1) that computers use to identify each other on a network.

Without DNS: We would have to remember long IP addresses like 103.76.92.1.

With DNS: We just type www.bracu.ac.bd, and DNS finds the correct IP for us.

2. Why We Need DNS

Humans remember names, not numbers. DNS helps map the domain name → IP address automatically.

Analogy: Think of DNS as your phone's contact list – you click a name, and your phone finds the number.

3. Structure of a Domain Name

Part	Meaning	Description
www	Host name / subdomain	Refers to the web service (World Wide Web)
bracu	Second-level domain	The name of the organization (BRAC University)
ac	Second-level domain under .bd	Means academic institution
bd	Top-Level Domain (TLD)	Represents Bangladesh

4. How DNS Works (Step-by-Step)

1. Browser cache: Checks if it already knows the IP address.
2. Operating system cache: If not found, it asks the local DNS resolver.
3. Resolver (usually your ISP's DNS): Starts a lookup process by asking the Root, TLD, and Authoritative servers.
4. Browser connects to that IP and loads the BRACU website.

5. Types of DNS Servers

Type	Role / Function	Example for www.bracu.ac.bd
Root DNS Server	Knows where to find all TLDs	Directs query to .bd server
TLD DNS Server	Stores information about second-level domains	The .bd server knows about .ac.bd

Authoritative DNS Server Contains final IP record for the domain Has the record for www.bracu.ac.bd
Local DNS Resolver Caches queries to speed up future lookups Provided by ISP or Google DNS (8.8).

6. Types of DNS Records

Record Type	Meaning	Example (for bracu.ac.bd)
A Record	Maps domain name → IPv4 address	www.bracu.ac.bd → 103.76.92.1
AAAA Record	Maps domain → IPv6 address	www.bracu.ac.bd → (IPv6 address)
CNAME	Alias for another name	mail.bracu.ac.bd → gmail.com
MX Record	Mail server info	Used for email routing
NS Record	Nameserver info	ns1.bracu.ac.bd, ns2.bracu.ac.bd
TXT Record	Text info, often for verification	Google site verification

7. Summary

Concept	Explanation
DNS Purpose	Converts domain names to IP addresses
OSI Layer	Application Layer (Layer 7)
Domain Example	www.bracu.ac.bd
Server Chain	Root → TLD → Authoritative
Record Examples	A, AAAA, CNAME, MX, NS, TXT

Activity:

Try this command in Command Prompt:

nslookup www.bracu.ac.bd

This will show the IP address and authoritative DNS server — a live demo of DNS resolution!