

DNS 101

The Domain Name System (DNS) ensures the availability of Web sites, email and Web systems by mapping domain names to Internet Protocol (IP) addresses, represented as a series of numbers and letters, for example, 123.45.67.254 (IPv4) or 2001:503:A83:0:0:2:30 (IPv6). The DNS uses specialized servers to translate names such as www.verisign.com into IP addresses that allow data and information to reach its destination. This process, called DNS resolution, allows people to type more memorable domain names into a browser to reach Web sites and send email messages.



ANATOMY OF A DOMAIN

Today there are nearly 300 million registered domains. Domain names allow people to organize, navigate and understand the Web. They provide a literal address that directs Internet users to the area of the Web to which they want to go. There are a few different parts of what we consider a “domain name” described below.

WWW.VERISIGN.COM

THIRD-LEVEL DOMAIN

Also called the subdomain, this is the portion of the domain name that appears before the second-level domain name. The most common third-level domain name is `www`, but can take many other forms, for example, `blogs.verisign.com`

SECOND-LEVEL DOMAIN

This is the unique part of the domain name that appears to the immediate left of the TLD. People register for the second level domain to differentiate themselves or their offering from other sites.

TOP-LEVEL DOMAIN

Top Level Domains (TLDs) are the highest level of organization on the Web. There are typically two kinds: Generic TLDs such as `.com`, `.net`, and `.org`; and Country Code TLDs, two-letter codes approved for use by specific regions, such as `.uk`, `.au`, and `.de`.

HOW THE DNS WORKS

The DNS uses the following steps to map domain names to IP addresses, allowing people to search for web sites and send email using familiar names instead of strings of numbers and letters. The process of translating a domain name into an IP address is called DNS resolution.

Step 1: You type a domain or web address, let's go with `www.verisign.com`, into a browser. What your browser does is send a message to the network asking for help (this is called a query)



Step 2: Your computer queries (contacts) one of the machines that your ISP gave to your computer, called recursive resolvers, which should either have the IP address cached, or be able to go out and “recursively” find it.

Step 3: If your ISP's recursive resolvers don't have the address, they query the DNS root name servers for the IP address.



Step 4: The root name servers direct (or “refer”) your ISP's recursive resolver to appropriate TLD name servers by examining the top level domain.

Step 5: Each TLD has its own set of name servers, and after the resolver asks them for the IP address, they refer it to another (more appropriate) set of authoritative DNS servers by reviewing the second level domain of the query.



Step 6: Your ISP's recursive resolver then queries the referred authoritative DNS name servers for the IP address. Each domain has an assigned set of authoritative DNS name servers that are responsible for knowing everything about the domain, including the IP address(es).



Step 7: Your ISP's recursive resolver retrieves the A record (which is the DNS record for mapping IP addresses) for `www.verisign.com` from the authoritative name servers and stores the record in its local cache in case anyone else queries it.



Step 8: Finally, your ISP's recursive server returns the A record to your computer, which reads and passes the IP address to your browser. The browser then opens a connection to `www.verisign.com`. The entire process generally happens in a few tenths of a second and is transparent to the end user.

For more information about the DNS visit Verisign.com/DNS

