How DNS Achieves Location and Access Transparency

Location Transparency

DNS achieves **location transparency** by allowing users and applications to access resources using domain names instead of IP addresses. A domain name identifies a resource without revealing its physical or network location. The mapping between a domain name and its IP address is stored in DNS servers.

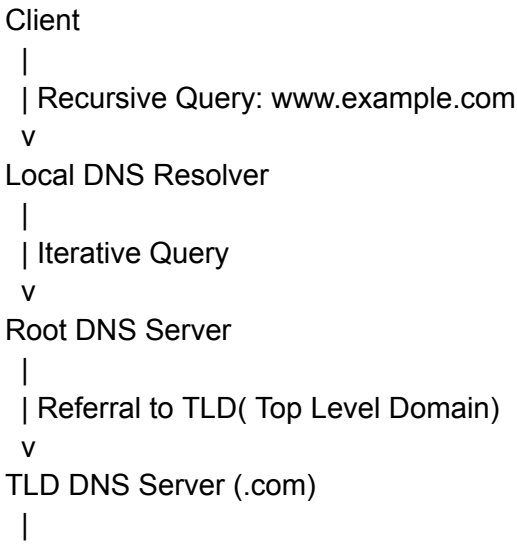
If a resource is moved to a different server or network, only the IP address stored in DNS needs to be updated. The domain name used by users remains the same. As a result, users are unaware of changes in the location of the resource, which demonstrates location transparency.

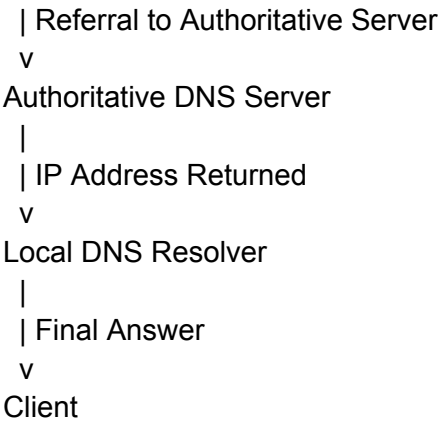
Access Transparency

DNS achieves **access transparency** by providing a uniform method of accessing resources regardless of where or how they are implemented. Applications request name resolution using the same interface, and DNS handles the resolution process internally.

The application does not need to know which DNS servers are contacted or how many steps are involved. Whether the result comes from a cache or from remote DNS servers, the access method remains identical. This hides the complexity of resource access from users and applications.

DNS Resolution Diagram (Iterative vs Recursive)





Recursive resolution occurs between the client and the local DNS resolver.
Iterative resolution occurs between the resolver and the DNS hierarchy.