



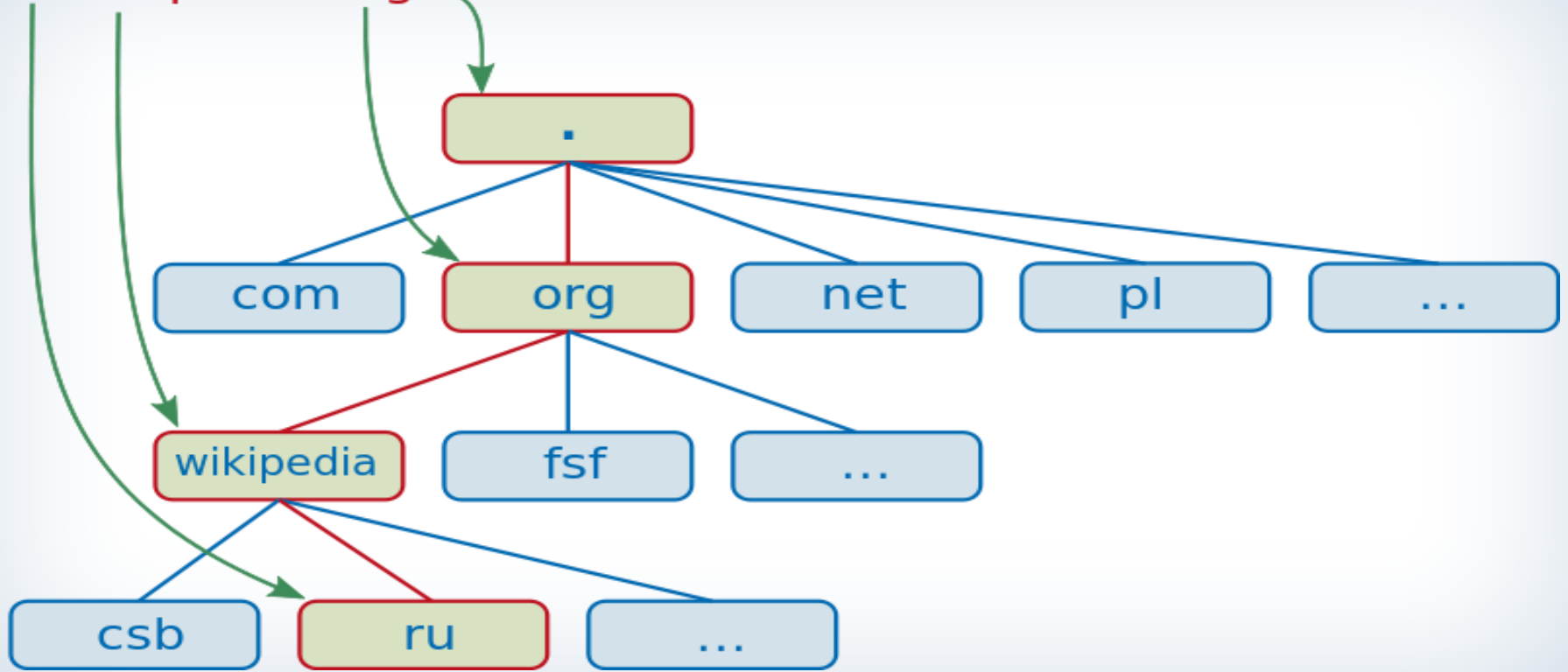
NETWORK CONCEPTS

1.7 Summarize DNS concepts and its components.

- Name Resolution
- Domain Name System (DNS)
- DNS Records
- Dynamic DNS

- Domain Name System (or Service or Server), is an Internet service that translates domain names into IP addresses.
- DNS automatically converts the names we type in our Web browser address bar to the IP addresses of Web servers hosting those sites.

ru.wikipedia.org.



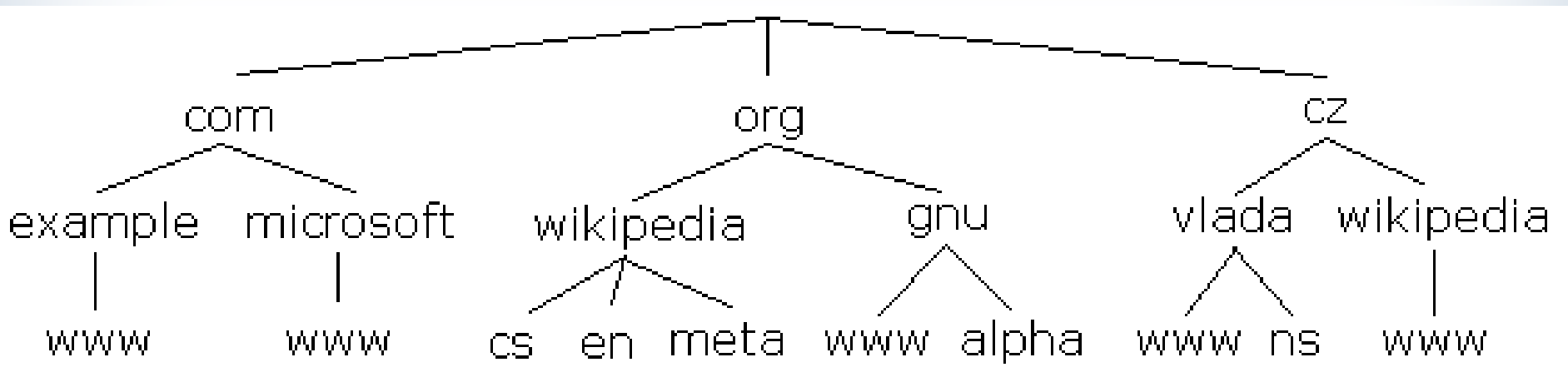
- DNS is an abbreviation for Domain Name System.
- DNS servers will consult their own databases for the requested information.
- DNS server contacts other DNS servers as needed to get the necessary information. This process might involve a large number of queries.

- A system for naming computers and network services that is organized into a hierarchy of domains.
- DNS naming is used in TCP/IP networks, such as the Internet, to locate computers and services through user-friendly names.

- The Domain Name System distributes the responsibility of assigning domain names and mapping those names to IP addresses by designating authoritative nameservers for each domain.
- Authoritative name servers are assigned to be responsible for their supported domains, and may delegate authority over subdomains to other name servers.

- This mechanism provides distributed and fault tolerant service and was designed to avoid the need for a single central database.
- The Internet maintains two principal namespaces, the domain name hierarchy and the Internet Protocol (IP) address spaces.

- DNS additionally includes support for caching requests and for redundancy.
- Most network operating systems support configuration of primary, secondary, and tertiary DNS servers, each of which can service initial requests from clients.
- Internet Service Providers (ISPs) maintain their own DNS servers and use DHCP to automatically configure clients, relieving most home users of the burden of DNS configuration.



- Internet name servers and a communication protocol implement the Domain Name System.
- A DNS name server is a server that stores the DNS records for a domain name.
 - Name server (NS) records
 - mail exchanger (MX) records
- DNS name server responds with answers to queries against its database.

- DNS protocol: query and reply messages, both with same message format msg header
- Identification 16 bit for query, reply to query uses same flags
 - query or reply
 - recursion desired
 - recursion available
 - reply is authoritative

- Authoritative name servers are sufficient for the operation of the Internet.
- However, with only authoritative name servers operating, every DNS query must start with recursive queries at the root zone of the Domain Name System and each user system would have to implement resolver software capable of recursive operation.

- To improve efficiency, reduce DNS traffic across the Internet, and increase performance in end-user applications.
- The Domain Name System supports DNS cache servers which store DNS query results for a period of time determined in the configuration (time-to-live) of the domain name record in question.

- Typically, such caching DNS servers, also called DNS caches.
- Also implement the recursive algorithm necessary to resolve a given name starting with the DNS root through to the authoritative name servers of the queried domain.
- With this function implemented in the name server, user applications gain efficiency in design and operation.

- A non-recursive query is one in which the DNS server provides a record for a domain for which it is authoritative itself, or it provides a partial result without querying other servers.
- A recursive query is one for which the DNS server will fully answer the query (or give an error) by querying other name servers as needed.
- DNS servers are not required to support recursive queries.

- A reverse lookup is a query of the DNS for domain names when the IP address is known.
- Multiple domain names may be associated with an IP address.
- The DNS stores IP addresses in the form of domain names as specially formatted names in pointer (PTR) records within the infrastructure top-level domain arpa.

- For IPv4, the domain is in-addr.arpa. For IPv6, the reverse lookup domain is ip6.arpa.
- The IP address is represented as a name in reverse-ordered octet representation for IPv4, and reverse-ordered nibble representation for IPv6.
- Dynamic DNS allows clients to update their DNS entry as their IP address changes, as it does, for example, when moving between ISPs or mobile hotspots.

A Record

These records map a FQDN (fully qualified domain name) to an IP address. This is usually the most often used record type in any DNS system that maps domain names to IP addresses.

A mail exchanger record (MX record)

is a type of resource record in the Domain Name System that specifies a mail server responsible for accepting email messages on behalf of a recipient's domain, and a preference value used to prioritize mail delivery if multiple mail servers are available

A CNAME record

is an abbreviation for Canonical Name record and is a type of resource record in the Domain Name System (DNS) used to specify that a domain name is an alias for another domain, the "canonical" domain.

PTR record

resolves an IP address to a fully-qualified domain name (FQDN) as an opposite to what A record does. PTR records are also called Reverse DNS records.