For the name www.cs.ucsd.edu, what does the "ucsd.edu" is an example of what type of DNS name?

- Zone
- TLD
- Authoritative
- Root

For the name www.cs.ucsd.edu, what does the "ucsd.edu" is an example of what type of DNS name?

- We know it's not "TLD" because it's not the last string segment after.edu
- We also know it's not "root" as those will respond with resources pointing to a TLD
- But what is the difference between a an "Authoritative" nameserver and a DNS "Zone"?
  - An authoritative nameserver administers an entire namespace, which may be subdivided into multiple DNS zones
  - A "Zone" is a distinctly managed area in DNS; it may include something as large as an entire TLD, or as small as a sub-subdirectory of an authoritative nameserver

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- Zone
- TLD
- **Authoritative**
- Root

The .edu TLD name server knows the IP address of the authoritative name server for ucsd.edu.

- True
- False

The .edu TLD name server knows the IP address of the authoritative name server for ucsd.edu.

What happens when you try to browse ucsd.edu for the first time (assume no caches)?

1. Your web client doesn't have a valid cache entry, so it requests an IP from the recursive DNS server (e.g., that of your ISP)
2. The **recursive server** will send a request to the **root server** requesting the record for the Top-Level Domain nameserver (TLD in this case, .edu)
3. The **TLD nameserver** will respond with the **authoritative nameserver** for ucsd.edu. At this point the recursive DNS resolver will *usually* have an IP address for the requested website.

The .edu TLD name server knows the IP address of the authoritative name server for ucsd.edu.

- **True**
- False

A hostname can correspond to several IP addresses.

- True
- False

A hostname can correspond to several IP addresses.

Round-Robin DNS, in its simplest implementation, works by responding to DNS requests with a list of potential IP addresses corresponding to several servers that host identical services in order to allow:

- Load distribution or load balancing
- Fault-tolerance

A hostname can correspond to several IP addresses.

- **True**
- False

An IP address can correspond to several host names.

- True
- False

An IP address can correspond to several host names.

Shared Web Hosting

- In name-based virtual hosting, also called shared IP hosting, ***the virtual hosts serve multiple hostnames on a single machine with a single IP address.***
- This is possible because when a web browser requests a resource from a web server using HTTP/1.1 it includes the requested hostname as part of the request.
- The server uses this information to determine which web site to show the user.

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- **True**
- False

getaddrinfo() is a library call involving DNS. One of its arguments is the hostname to lookup (e.g. www.cs.ucsd.edu). It's "in/out" result parameter is a linked list of results, rather than a single result. Why is that?

- As we've learned, one name can map to multiple IP addresses, so that's part of the answer.
- Also, a name can have both:
  - IPv4 address (A record)
  - IPv6 address (AAAA record)

Note from Prof. Porter: DNS will be important later in the quarter (for Content Delivery Networks, for instance)

You're implementing a protocol using RPC to remotely log into a text-only terminal. For each key the user types on a keyboard, your client issues the "sendKeystroke(byte k)" RPC with a 1-byte parameter k. Which of these network properties will likely limit the performance of the client to server part of this protocol?

- Network bandwidth
- Network latency
- Number of network hops between the client and the server
- Whether the link between the client and server is wireless
- The type of OS on the client vs the server (e.g. Windows vs Linux)

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Now imagine the keystrokes from the above-mentioned RPC protocol generate a significant amount of output in response– gigabytes of text are generated in response to the short commands the user issues. Which of these network properties will likely limit the performance of the server to client part of this protocol?

- Network bandwidth
- Network latency
- Number of network hops between the client and the server
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Continuing this example, and based on what we discussed in class, which network property below is used to select the route taken by packets in the Internet between the client and server?

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Continuing this example, which of the following properties could potentially effect the implementation of the RPC stub compiler?

- Network bandwidth
- Network latency
- Number of network hops between the client and the server
- Whether the link between the client and server is wireless
- The type of OS on the client vs the server (e.g. Windows vs Linux)

RPC Stubs

- A client-side stub is a procedure that looks to the client as if it were a callable server procedure
- A server-side stub looks to the server as if a client called it
- The client program thinks it is calling the server
  - In fact, it's calling the client stub
- The server program thinks it is called by the client
  - In fact, it's called by the server stub
- The stubs send messages to each other to make the RPC happen "transparently"

Continuing this example, which of the following properties could potentially effect the implementation of the RPC stub compiler?

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- Whether the link between the client and server is wireless
- **The type of OS on the client vs the server (e.g. Windows vs Linux)**