



# LOCALROOT SERVE YOURSELF THE ROOT+

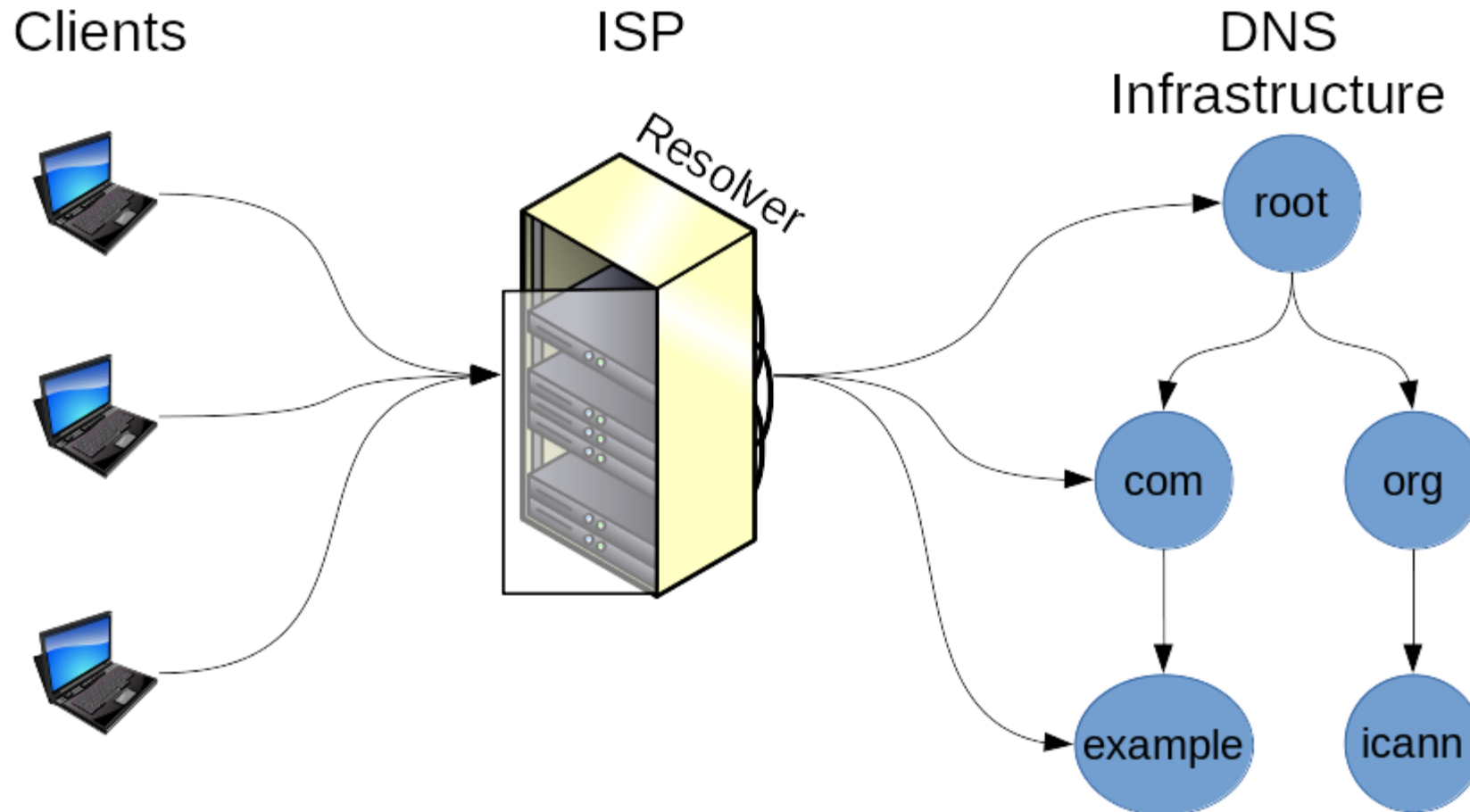


Wes Hardaker

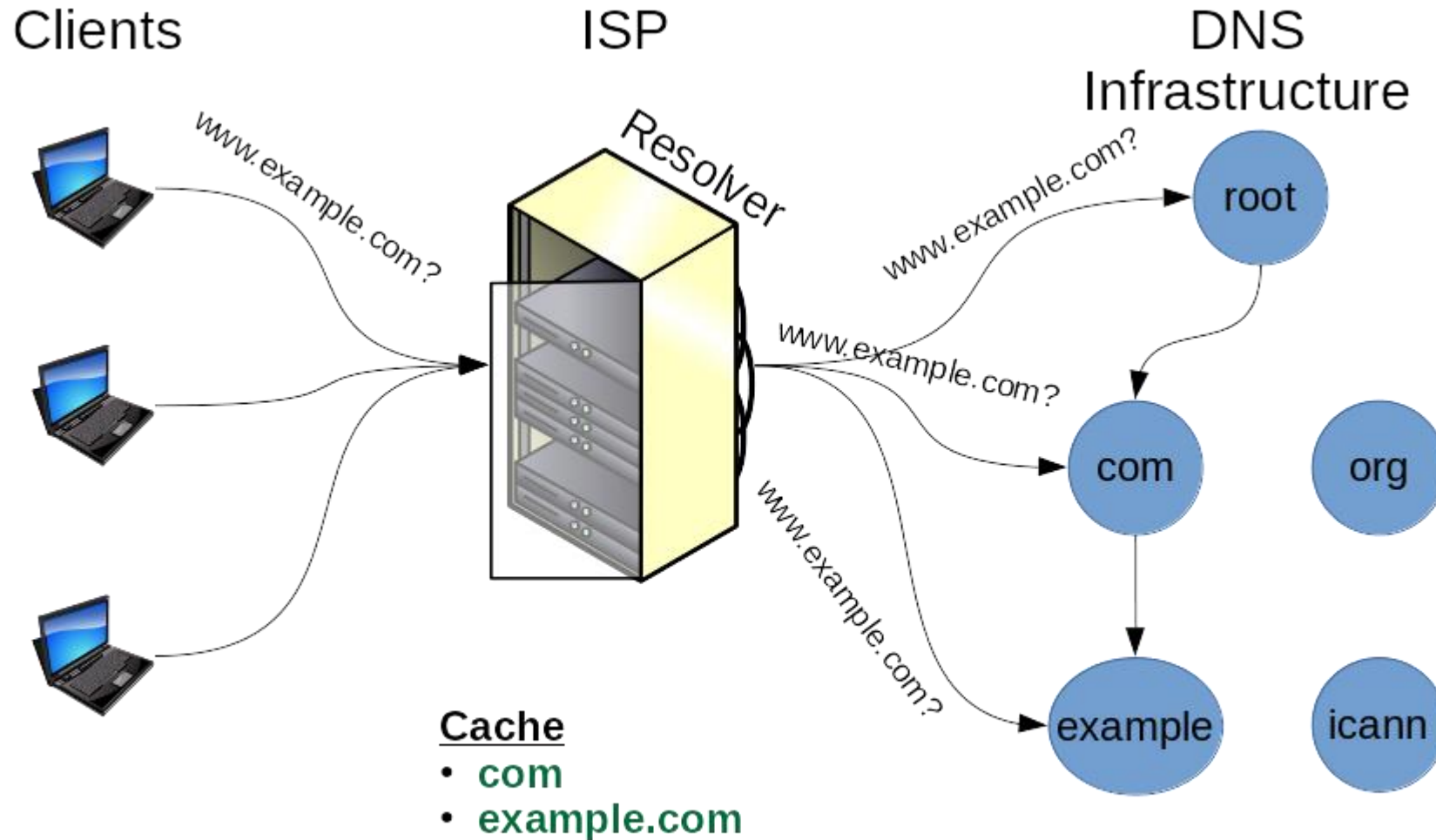
[hardaker@isi.edu](mailto:hardaker@isi.edu)

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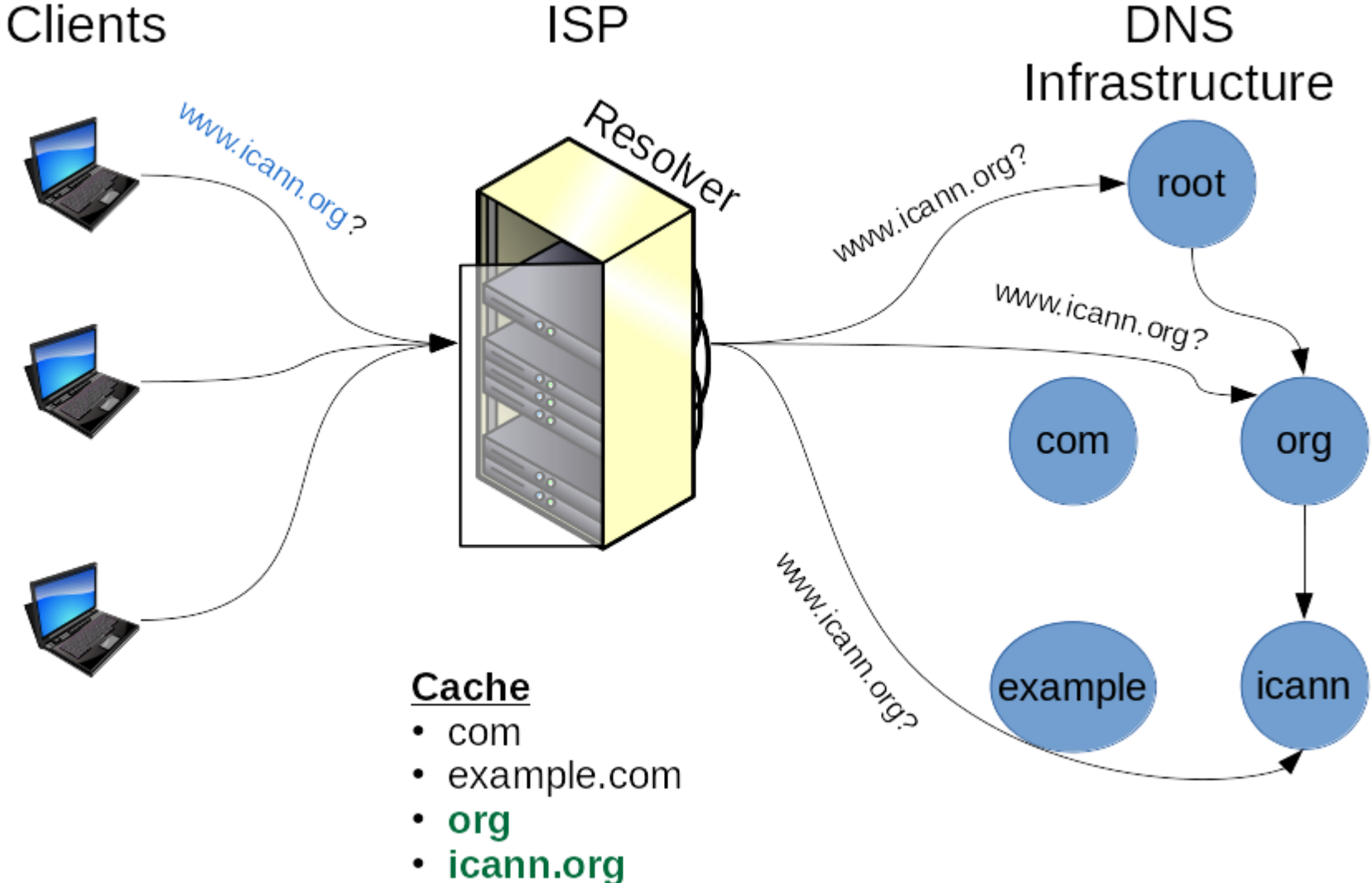
# Classic DNS Resolution



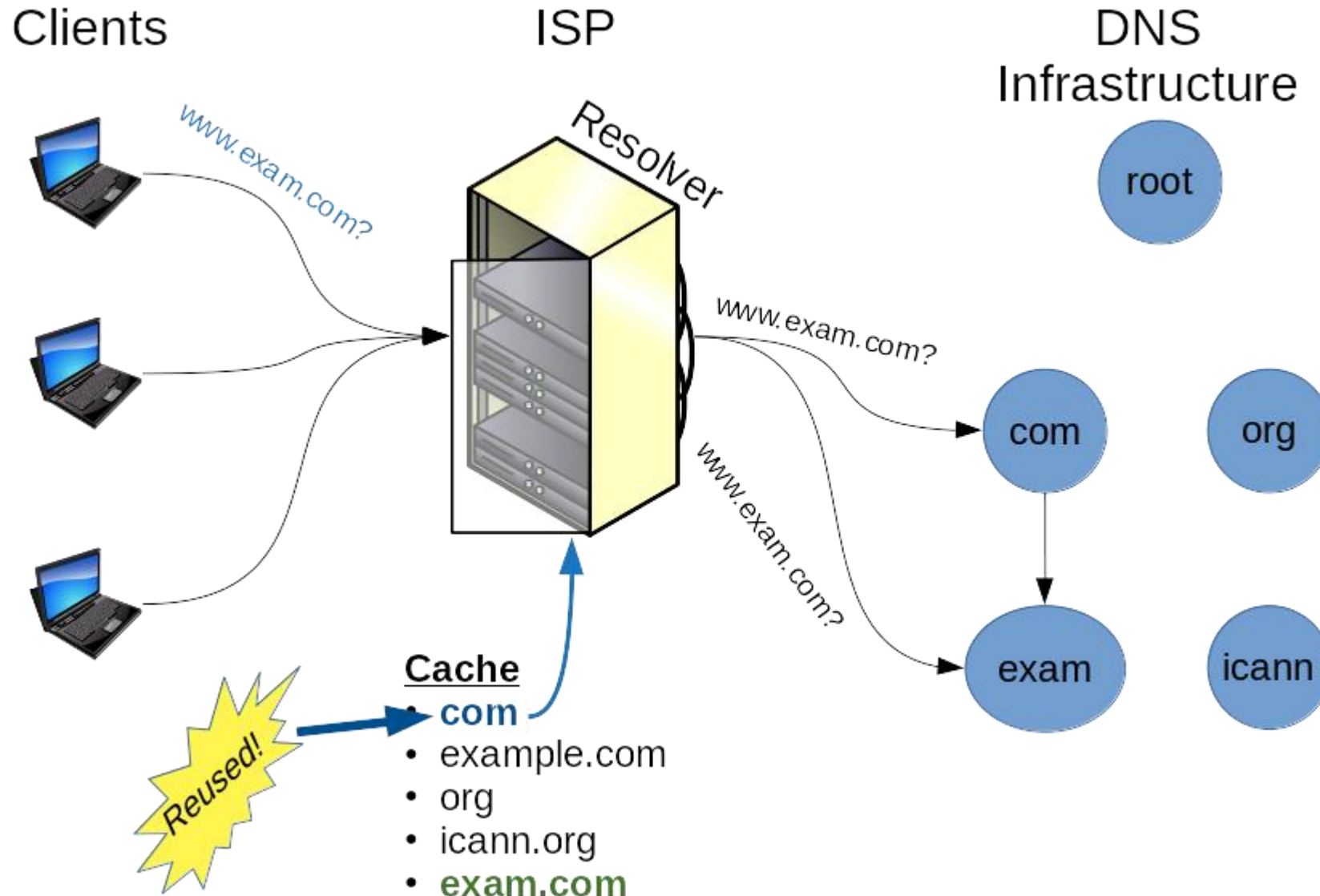
# First request hitting the resolver starts from the top



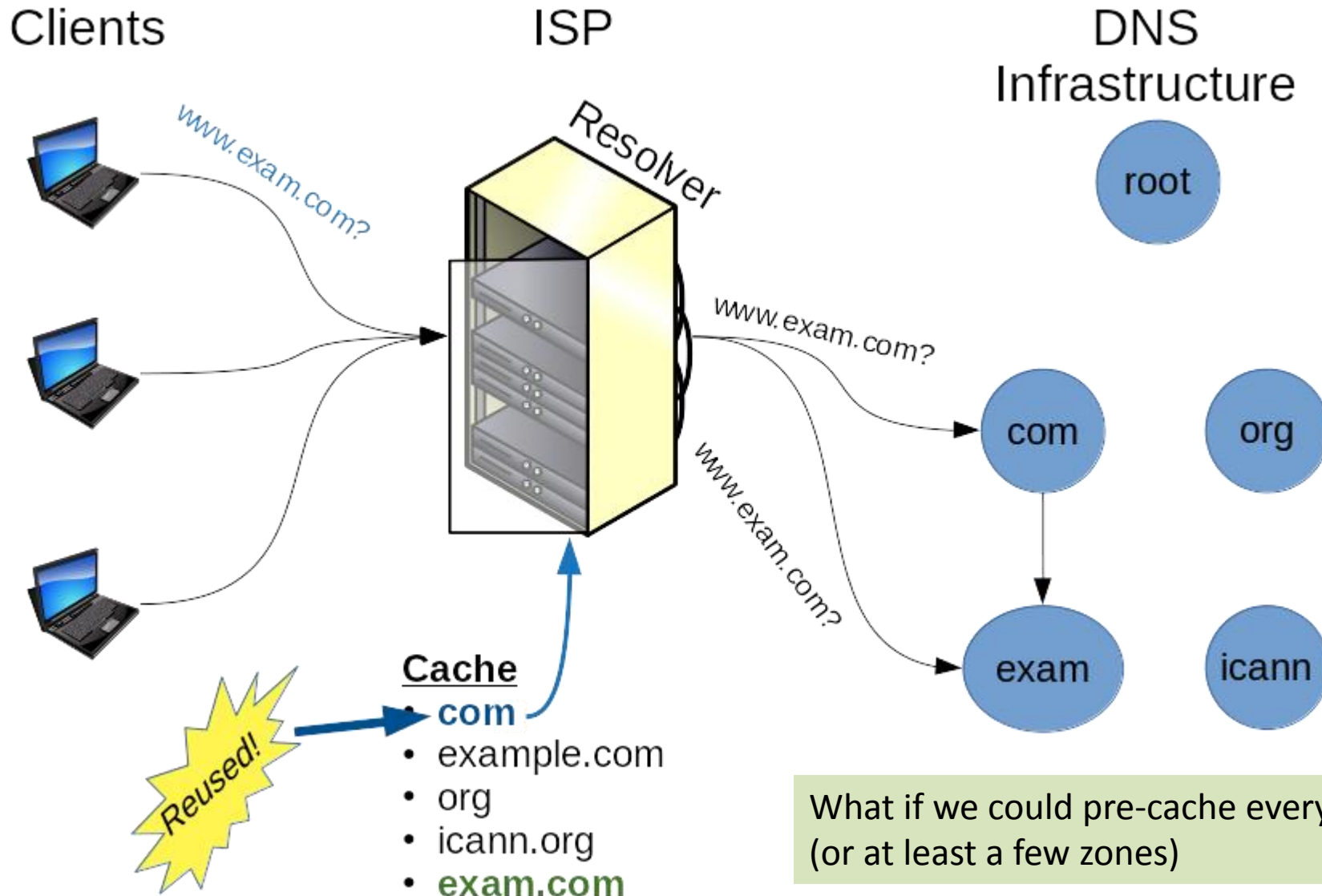
# Second request may also start from the top (.org)



# Cache Hit == Success

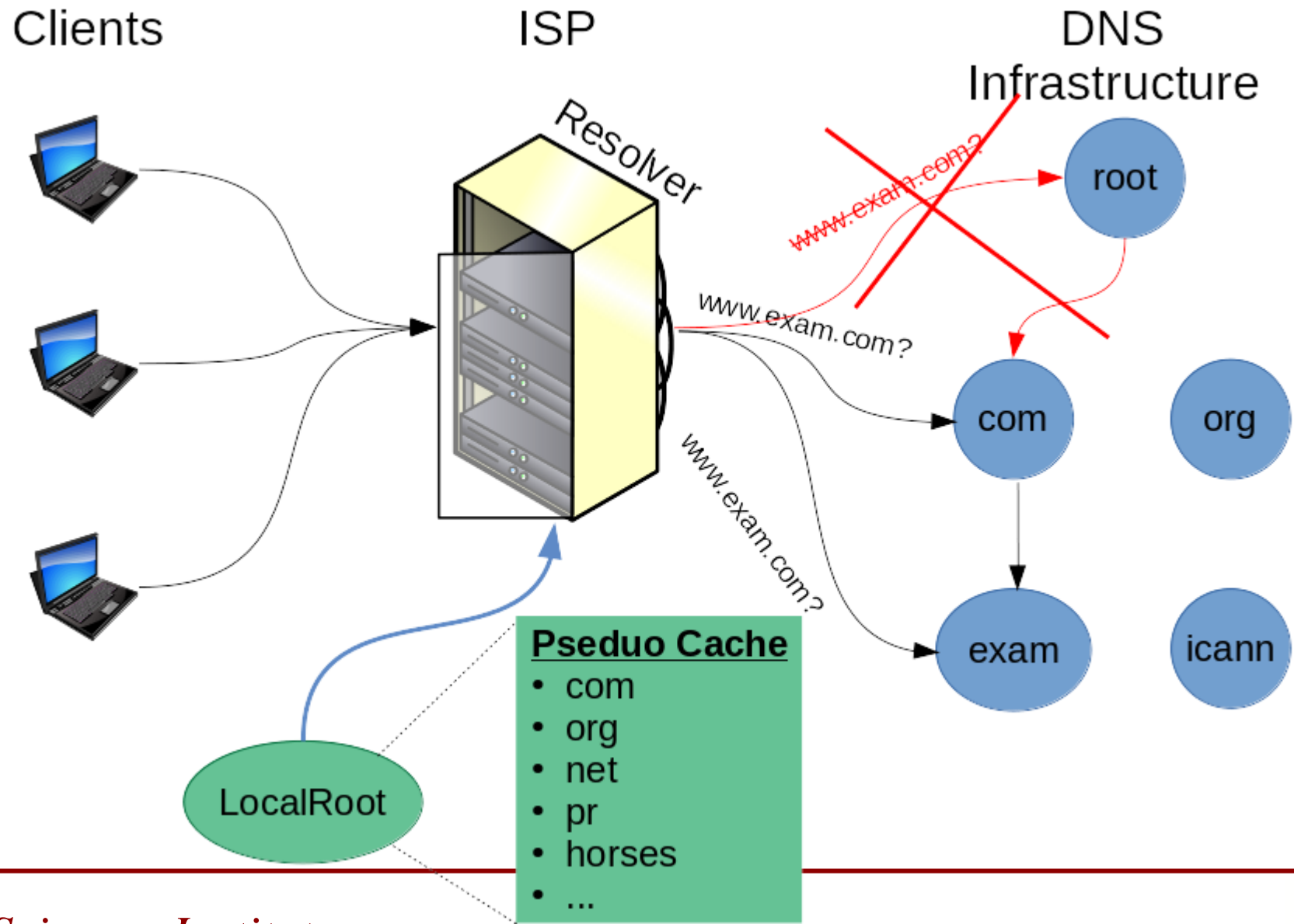


# Cache Hit == Success



What if we could pre-cache everything??  
(or at least a few zones)

# LocalRoot is a pseudo cache

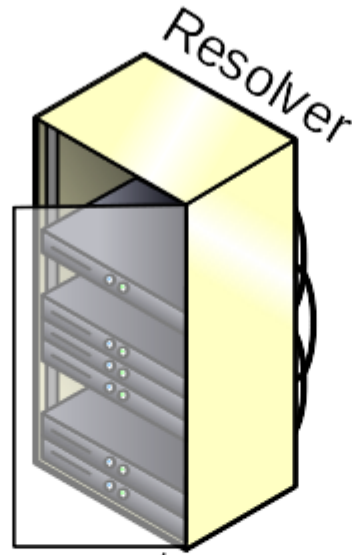


# Extends RFC7706 to add Security and Notifications

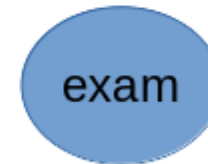
Clients



ISP



DNS Infrastructure



DNS Notification:  
new root data



DNS AXFR  
Transfer new copy

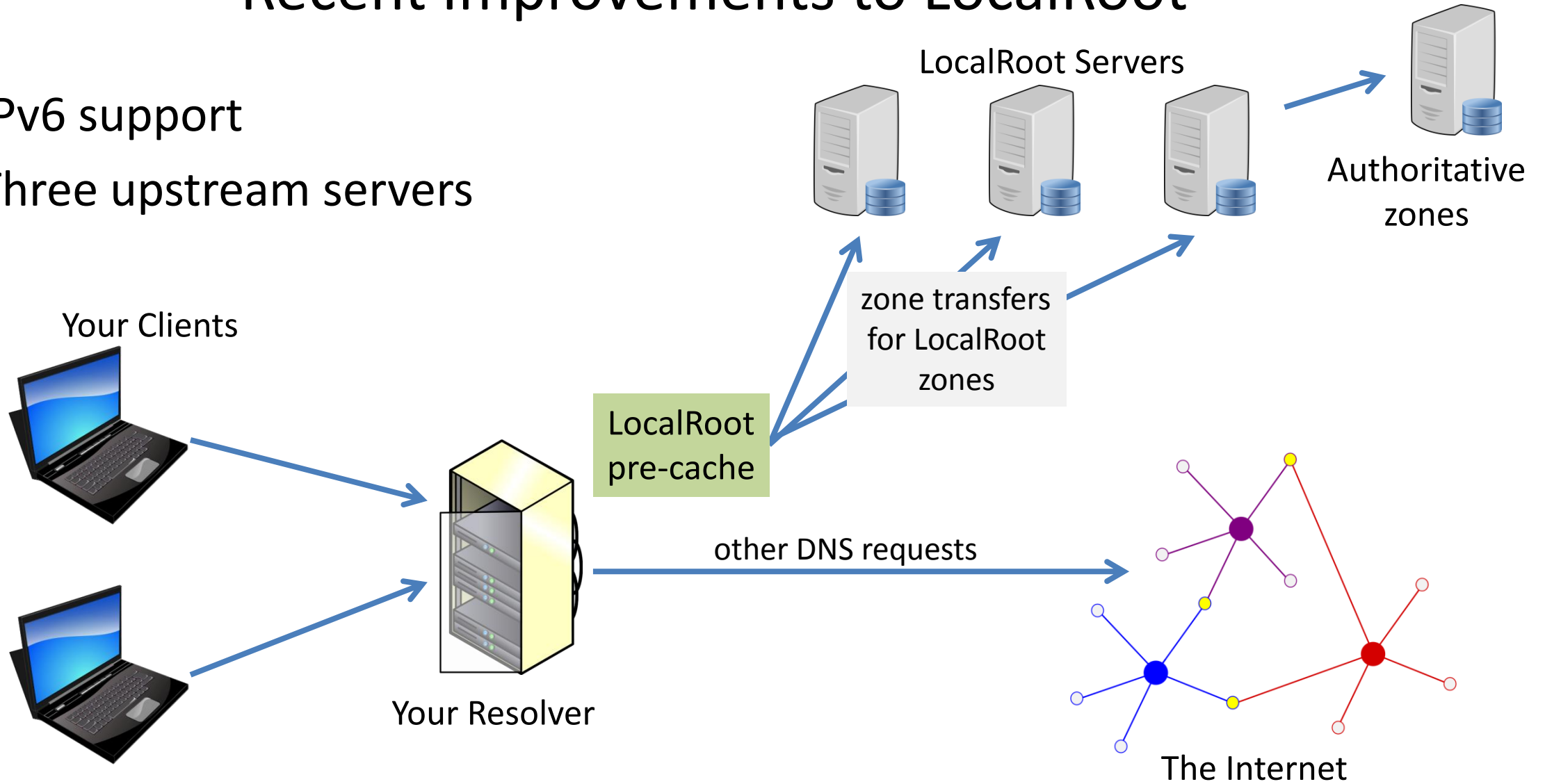


# Why Use LocalRoot

- Benefits
  - “Psuedo-caching” of the root and other zones
    - Removes the need to contact them frequently
  - Faster DNS lookups for first TLD and other lookups
  - Faster NXDOMAIN results
    - Negative answers make up most root traffic
    - 2020/05/06 DITL data: of 6.7B requests, only 1.34B were valid
    - 80% were NXDOMAIN answers == TLD didn't exist!
- Research project of your own?
  - Trigger events after root-change notification?

# Recent Improvements to LocalRoot

- IPv6 support
- Three upstream servers



# Recent Improvements to LocalRoot

- Configuration support for bind, unbound and NSD
- Multiple zones supported:
  - the root zone
  - .arpa
  - root-servers.net
  - dnssec-tools.org
- User preferences
- E-mail notifications
- Moved inside our production service monitoring
- UI and documentation Improvements

# LocalRoot Home Page

LocalRoot -- Serve Yourself the Root



[About LocalRoot](#)

[Getting Started](#)

[Register](#)

[Login](#)

## LocalRoot

Our *LocalRoot* service allows you to serve a copy of the DNS Root Zone from your recursive resolver. For more information about *LocalRoot*, please see our [About LocalRoot](#) page and [Getting Started](#) pages.

- [Register](#)
- [Login](#)

## NEWS

### 2020-06-05: Major update!

- IPv6 support
- Three upstream name-serves for localroot mirrored instances
- Support for new nameserver configuration generation:
  - Bind
  - Unbound
  - Knot
  - NSD
- Infrastructure in place to mirror zones other than just the root. Currently available:
  - . (The root zone)

# Server List

LocalRoot -- Serve Yourself the Root




hardaker@isi.edu  
preferences  
Your TSIG Keys  
Your Servers  
Logout

[About LocalRoot](#)

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## Server List

Administrative Name	Address	TSIG	Last Transfer (UTC)	Enabled	Active	Delete	Config
dawn.hardakers.net	68.78.72.17	dawn.hardakers.net	Wed Jun 17 13:30:22 2020	✓	✓		<a href="#">[get config]</a>

[Add a New Server](#)


*(Click on the enabled buttons to toggle)*

*Servers will not be listed **active** until an hour after an initial AXFR has been seen.*

*Servers not marked as active **will still work**. Active simply means localroot will send DNS notifications to the registered address. Even without notifications, the server will properly cache root zone data.*

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# Configuration Generator Options

**LocalRoot** -- Serve Yourself the Root  


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## Configuration Generator

Generating configuration for server *dawn.hardakers.net* at *68.78.72.17*

Type of configuration to generate:

ISC BIND - Full recursive resolver configuration

Other configuration options:

Where do you want to store zonefile data?  
(This directory must exist and be writable by the user running your name server!):

Add support for listening to other network private address blocks:

10.0.0.0/8

172.16.0.0/12

192.16.0.0/12

Select zones to mirror:

root

arpa

root-servers.net

dnssec-tools.org

# Configuration Example

**LocalRoot** -- Serve Yourself the Root 

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preferences  
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Your generated configuration for **dawn.hardakers.net** at **68.78.72.17** is:

Place the following configuration in your `/etc/unbound/conf.d/` directory as a "localroot.conf" file, for example.

**Note: this only works with Unbound 1.8 and above!**

```
auth-zone:
  name: "."
  zonefile: "root.zone"

master: "128.9.28.5" # localroot-w-4
master: "2001:1878:401::8009:1c05" # localroot-w-6
master: "128.9.63.145" # localroot-e-4
master: "2001:470:7:b8:1:0:8009:3f91" # localroot-e-6
master: "206.117.5.93" # localroot-lax-4
master: "2001:500:204::1:0:93" # localroot-lax-6

# Backup servers that allow axfr today:

master: "192.228.79.201 # b-v4.root-servers.net
master: "2001:500:200::b # b-v6.root-servers.net
master: "192.33.4.12 # c-v4.root-servers.net
master: "2001:500:2::c # c-v6.root-servers.net
master: "199.7.91.13 # d-v4.root-servers.net
```

# Account Preferences

LocalRoot -- Serve Yourself the Root



hardaker@isi.edu

preferences

Your TSIG Keys

Your Servers

Logout

[About LocalRoot](#)

[Getting Started](#)

Account: hardaker@isi.edu

Email me on LocalRoot news:



Email me on required configuration changes:



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# Future Improvements

- E-Mail notifications on out-of-date detection
- Support for other small-medium zones:
  - ***Your zone here!***
  - Contact me if interested
- A REST API
- Group accounts
  
- Please send feature requests / feedback my way!
  - [hardaker@isi.edu](mailto:hardaker@isi.edu)

