AnyEyeballs – Utilizing Happy Eyeballs for load balancing

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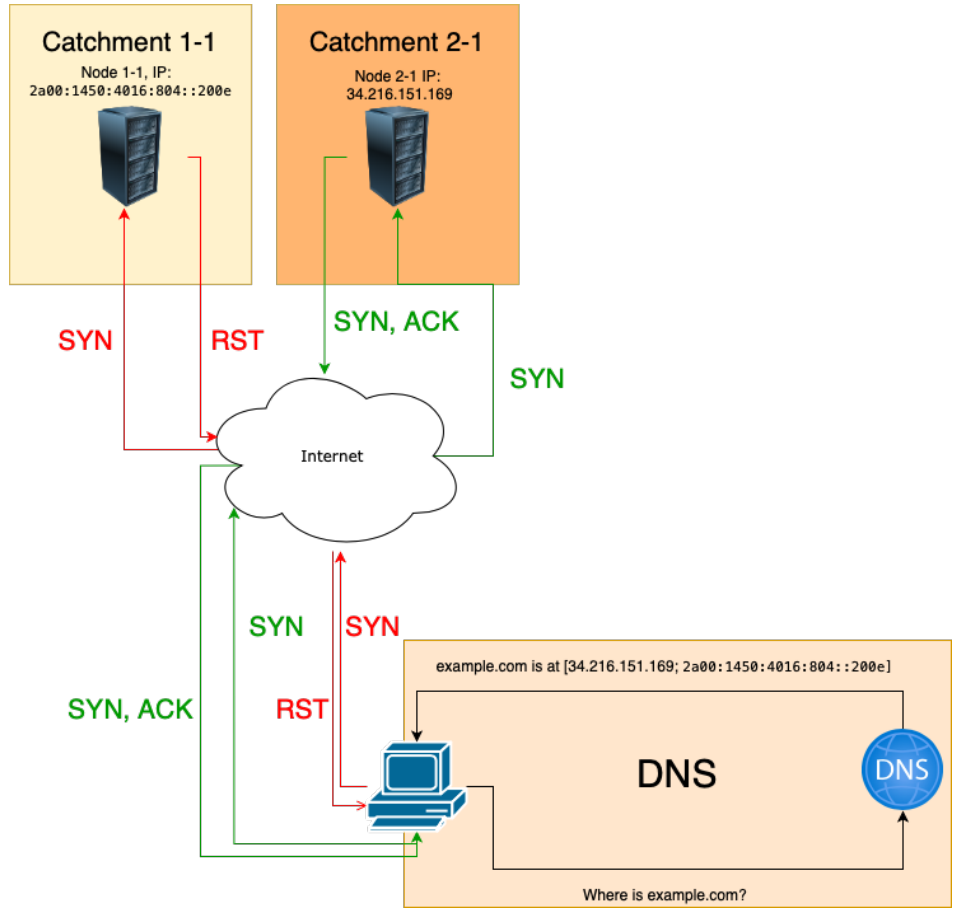
AnyEyeballs – High level overview

- Using Happy Eyeballs for load balancing
- Make use of existing code on the client side
- More fine-grained load balancing control
- Additional load balancing layer for Anycast

Happy Eyeballs

- Quick fallback from IPv6 to IPv4
- Default in many browers including Chrome, Safari and Firefox
- Also supported at the OS level - iOS, MacOS
- Was one method to help transition to IPv6



AnyEyeballs - Overview

- So far Happy Eyeballs was focused on the client side
- In this work we now look at the server side
- How can Happy Eyeballs be utilized from a server point of view?

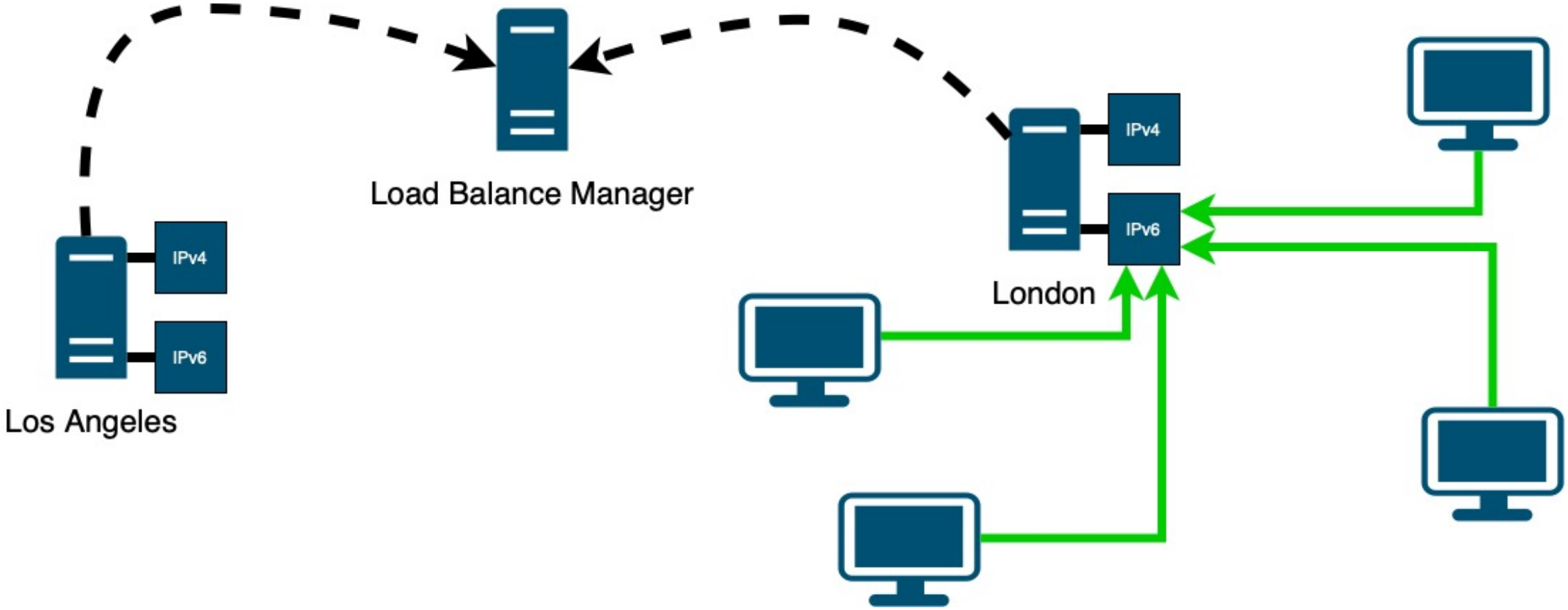
AnyEyeballs - Overview

- Gives power of (at least) two choices to servers
- Selectively have servers reject requests
- Happy Eyeballs chooses next resolved IP
- Gives implicit load balancing option to servers

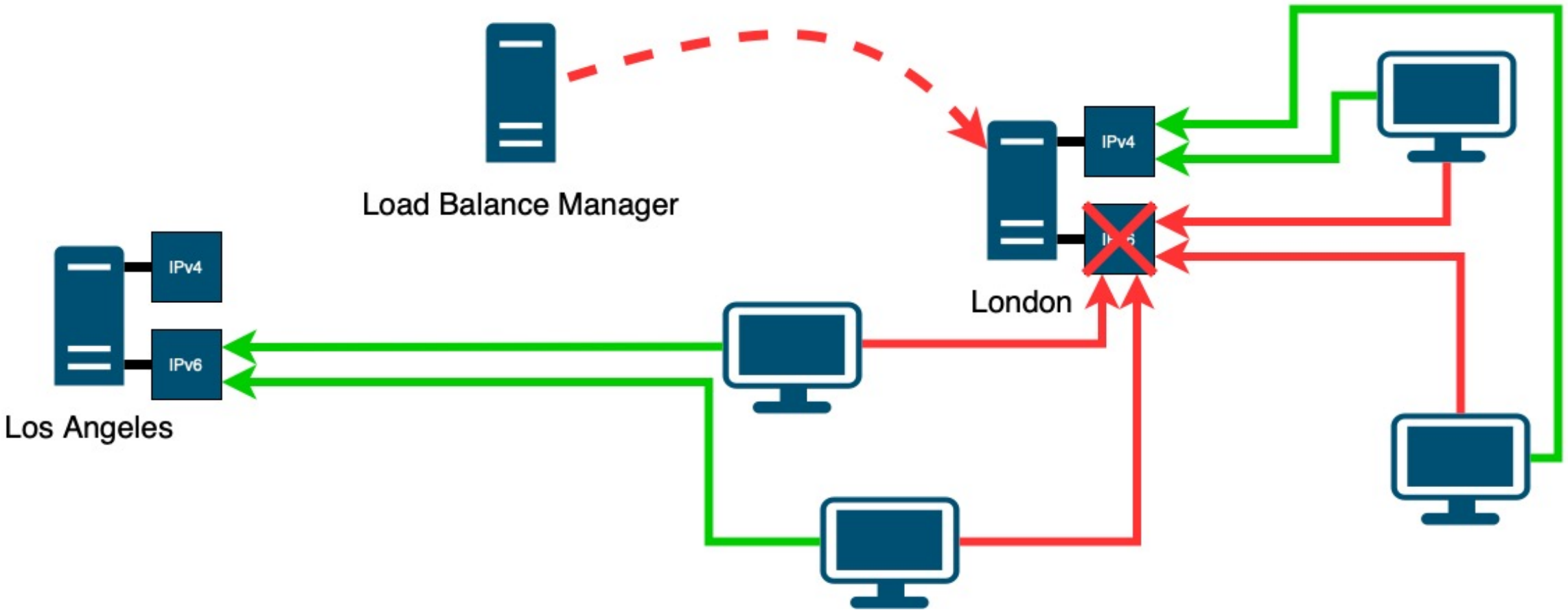
AnyEyeballs - Requirements

- Global overview of network and its current state
- Several nodes
- At least two pairs of different IP addresses

AnyEyeballs – Principle

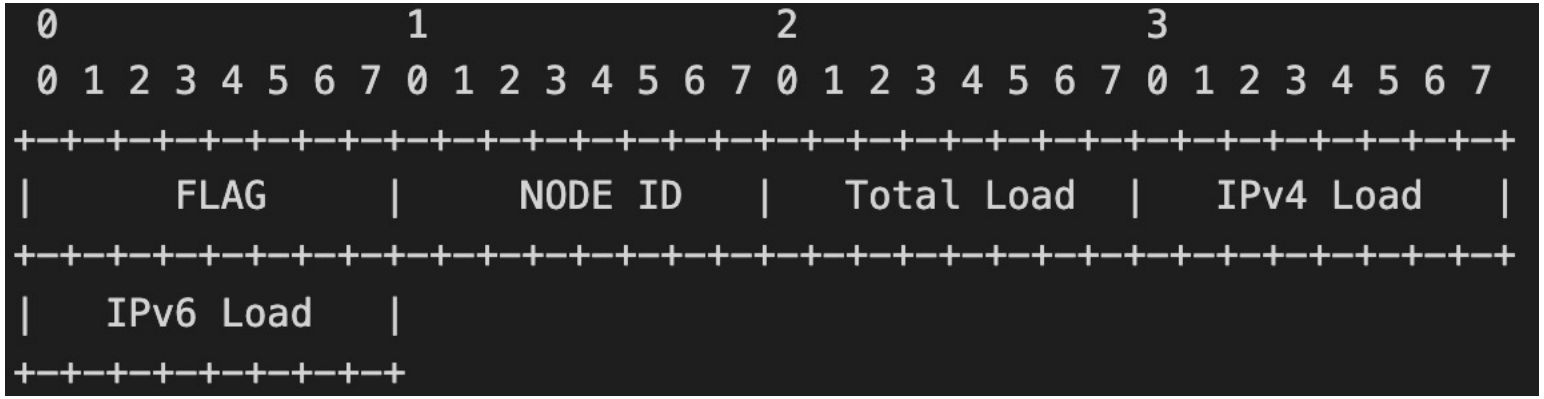


AnyEyeballs – Principle



AnyEyeballs - Architecture

- Several nodes (servers) with different IPs
- One Load Balance Manager (LBM) that has overview over network
- Nodes send status reports once a second
- LBM decides on which nodes to shut down
- Guarantees that at least one nodes is available at all times



AnyEyeballs - Advantages

- No Client side implementation required
- Low overhead
- Useful for Anycast as it allows more adaptive load balancing in addition to catchment based load balancing
- Gives us choice between different protocols and different servers (Power of two choices)

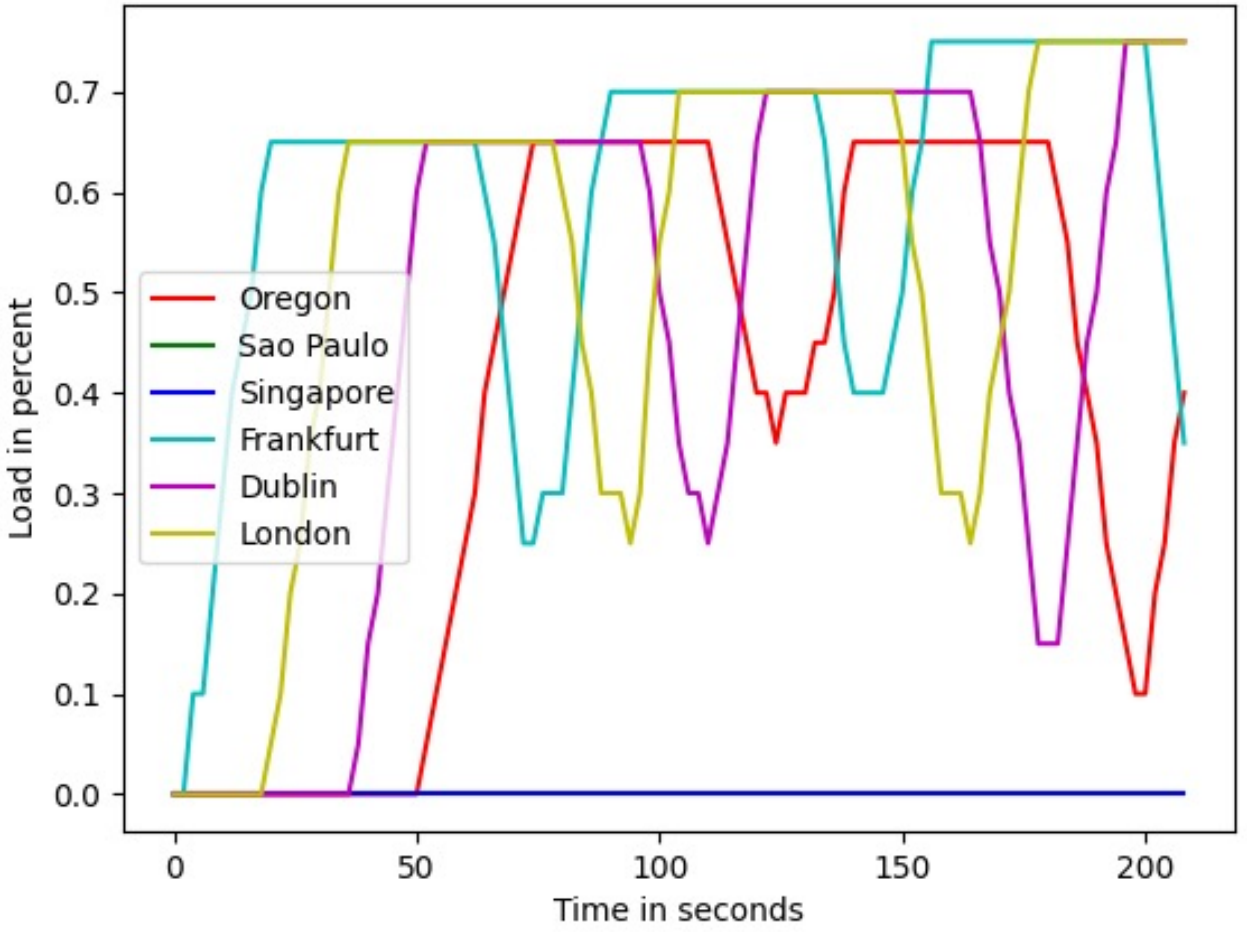
AnyEyeballs - Drawbacks

- Only works if Happy Eyeballs is present
- Can slightly increase latency for clients (due to fallback)

AnyEyeballs - Implementation

- Implemented in Rust
- Research code, not performance optimized or bug free
- Some abstractions made for load simulation
- So far works as intended
- Plan to deploy on anycast Infrastructure

AnyEyeballs - Results



Thank you for your attention!

Any questions or comments?

Implementation available at:
https://github.com/MaxF12/AnyEyeballs