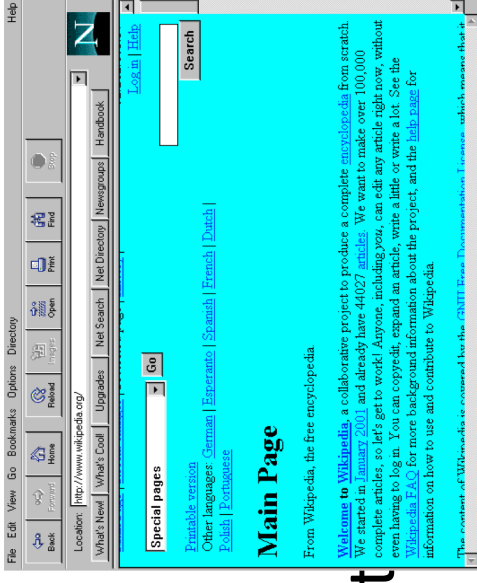# What are CDNs?

CDNs make the Web scale.

Evolution of Serving Web Content

- In the beginning...
  - ...there was a single server
  - Probably located in a closet
  - And it probably served blinking text

- Some improvements
  - Replicated Web Service
  - Load Balancing
  - Proxy Caches

What properties do we want in a caching service?

- Scalability
- Low latency
- Fault tolerance
- Ease of use (Single IP address)

Content Delivery Networks (ISP + Content Provider + Infrastructure approach)

What is a CDN?

A CDN is a global cluster of caches that can serve as a local cache for static objects.

- Geographically distributed
- Ensures that replicas are always available

Is that all?

- Scalability ✔
- Fault tolerance ✔
- Low latency ✔
- Ease of use (Single IP address) ✖

DNS comes to the rescue

- When client requests for foo.jpg:
  - DNS server directs client to the closest CDN server that contains foo.jpg

- Two ways in which the redirection is done
  - Redirecting by directly changing DNS
  - Changing the URL in the Web page

Example 1: DNS redirects.

Lets say, I want to host the file foo.jpg on a CDN which is originally at the address www.foo.com/foo.jpg

Step 1: Register www.foo.com/foo.jpg with the CDN

Step 2: CDN sends back a CNAME (say foojpg.cdn)

Example 1: DNS redirects (cont...)

Step 3

Register this CNAME with *my* DNS authoritative name server

http://ww.foo.com/foo.jpg IN CNAME foojpg.cdn

Step 4

The client is redirected to foojpg.cdn.

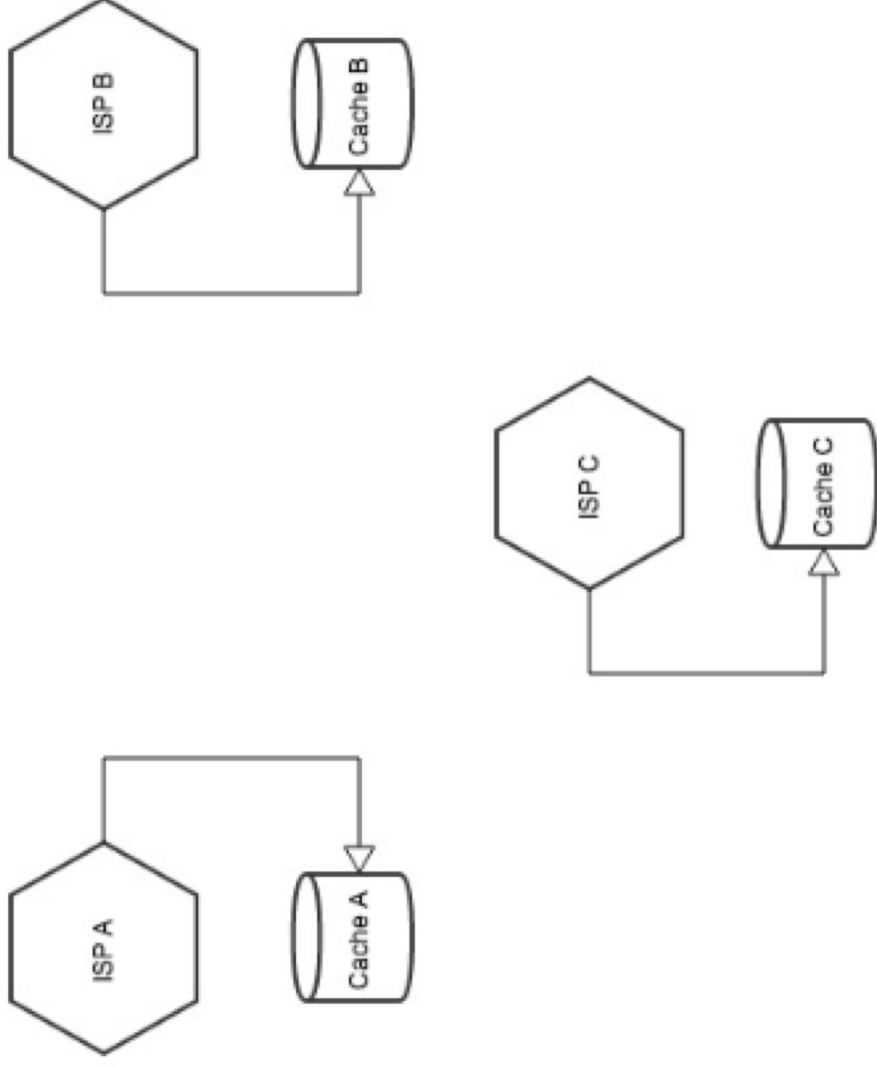Step 5 The CDN periodically refreshes the content

Example 2: Changing URL

Lets say, I want to host the file foo.jpg which is originally at the address www.foo.com/foo.jpg

Step 1: Change the URL embedded in the file to CDNs url.

```
<html>
<a href = cdn.foo.jpg> foo </a>
<a href = cdn.bar.jpg> bar </a>
<a href =cdn.foobar.jpg> foobar </a>
</html>
```

Redirecting to the closest CDN

Redirection: Using logic at the Authoritative Name Server

- The CDN's Name server
  - Gets the location of the DNS resolver
  - Finds the server closest to the DNS resolver and sends this information to the resolver