

# Chapter 7

## Multimedia Networking

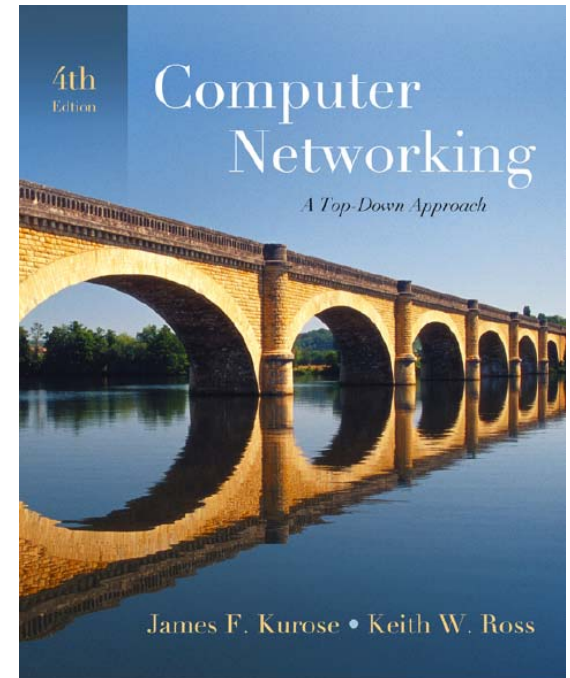
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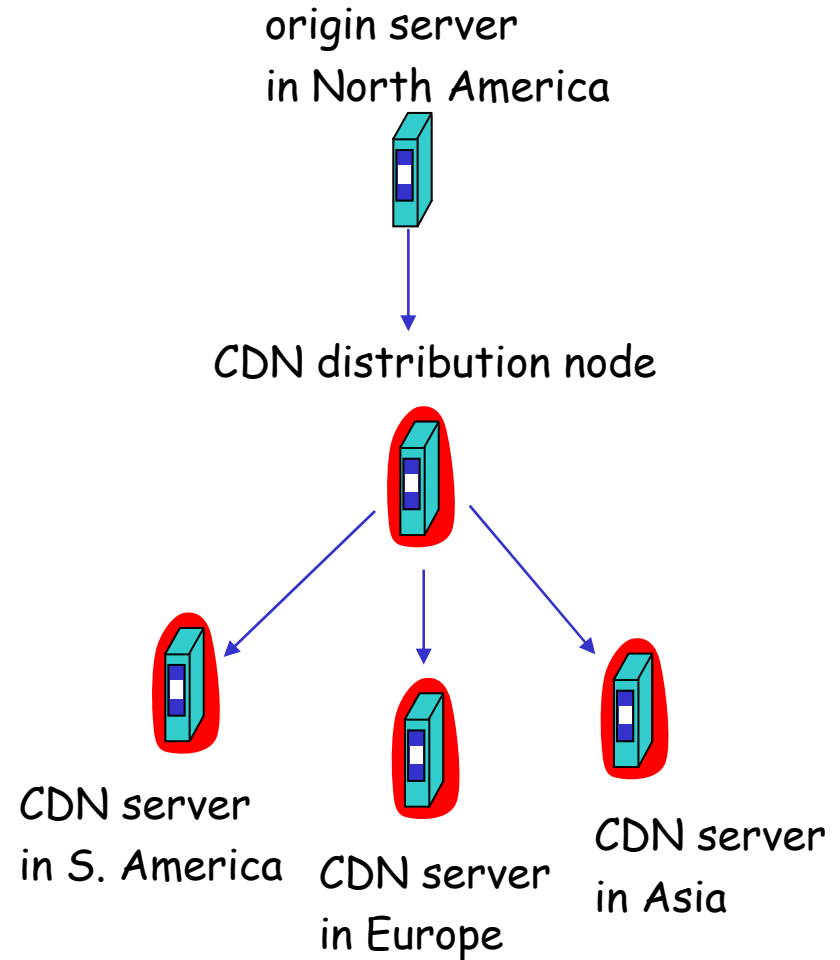


*Computer Networking: A Top  
Down Approach*  
4<sup>th</sup> edition.  
Jim Kurose, Keith Ross  
Addison-Wesley, July 2007.

# Content distribution networks (CDNs)

## Content replication

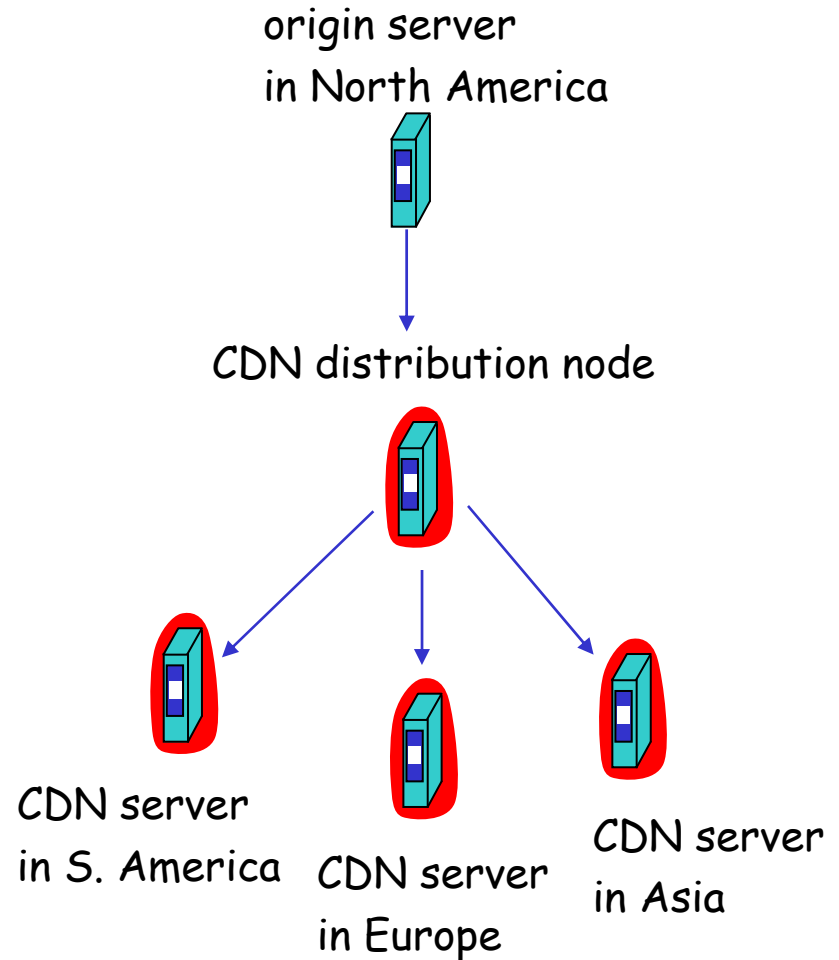
- ❑ challenging to stream large files (e.g., video) from single origin server in real time
- ❑ *solution*: replicate content at hundreds of servers throughout Internet
  - content downloaded to CDN servers ahead of time
  - *placing content "close" to user avoids impairments (loss, delay) of sending content over long paths*
  - CDN server typically in edge/access network



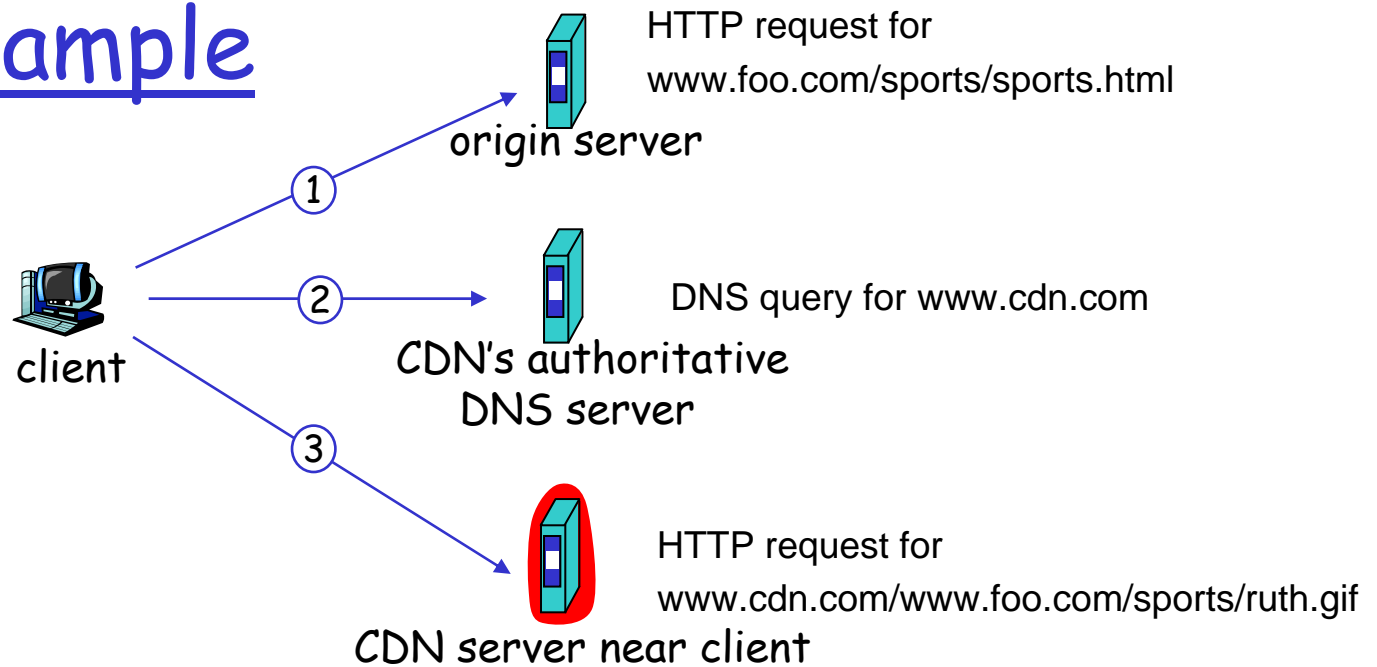
# Content distribution networks (CDNs)

## Content replication

- ❑ CDN (e.g., Akamai) customer is the content provider (e.g., CNN)
- ❑ CDN replicates customers' content in CDN servers.
- ❑ when provider updates content, CDN updates servers



# CDN example



## origin server (www.foo.com)

distributes HTML

replaces:

`http://www.foo.com/sports.ruth.gif`

with

`http://www.cdn.com/www.foo.com/sports/ruth.gif`

## CDN company (cdn.com)

distributes gif files

uses its authoritative DNS server to route redirect requests

# More about CDNs

## routing requests

- ❑ CDN creates a “map”, indicating distances from leaf ISPs and CDN nodes
- ❑ when query arrives at authoritative DNS server:
  - server determines ISP from which query originates
  - uses “map” to determine best CDN server
- ❑ CDN nodes create application-layer overlay network