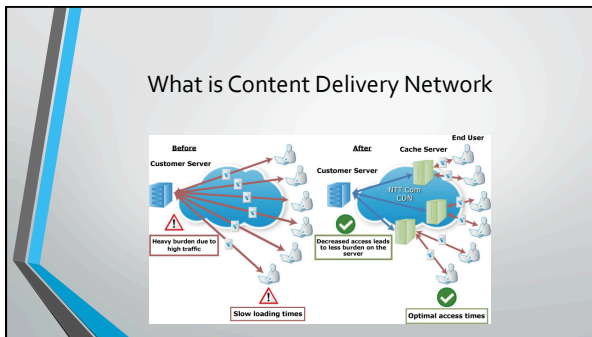


Content Delivery Network & Amazon CloudFront

CS 6030 Cloud Computing
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What is Content Delivery Network

- A content delivery network (CDN) is a distributed system of servers deployed in multiple data centers across the Internet
- Content exists as multiple copies on these servers
- User requests content will be routed to the nearest server that provides the lowest latency (time delay)



DNS-based redirection

- Clients request www.publisher.com
- DNS server directs client to one or more IPs based on the request IP

The diagram illustrates the DNS-based redirection process. A client on the left sends a request to a Local DNS server. The Local DNS server is connected to a publisher DNS server. The publisher DNS server is connected to a publisher server. The publisher server has several 'Nearest replica' servers. The Local DNS server directs the client to one of these nearest replicas based on the request IP.

DNS-based redirection Example

- user:~\$ dig www.fox.com
- ;; ANSWER SECTION:
- www.fox.com. 435 IN CNAME www.fox-rma.com.edgesuite.net.
- www.fox-rma.com.edgesuite.net. 37298 IN CNAME a2047.w7.akamai.net.
- a2047.w7.akamai.net. 12 IN A 23.74.9.24
- a2047.w7.akamai.net. 12 IN A 23.74.9.34
- a2047.w7.akamai.net. 12 IN A 23.74.9.32
- a2047.w7.akamai.net. 12 IN A 23.74.9.66
- a2047.w7.akamai.net. 12 IN A 23.74.9.56

DNS-based redirection

- Advantages
 - Uses existing, scalable DNS infrastructure
 - URLs can stay essentially the same
- Disadvantages
 - Content owner must give up control


Video Streaming using CDN

- Progressive Download and Play
 - Video player can already start playing while the file is being downloaded in the background.
- HTTP Pseudostreaming
 - Video file is broken into small segments and entered as a list in an index file so that this method supports fast forward.
- Live Streaming

Is CDN useful for every site?

- A CDN is a must for many sites, but not necessarily for every site.
- For example, if the content is hosted locally and users are primarily local, CDN won't help you much.

Amazon CloudFront



- Content delivery web service: distribute static and dynamic web content to end users with a global network of edge locations
 - "edge locations": data centers close to user's geographical location

Edge Server Locations

- United States
- Europe
- Asia
- Australia
- South America

North America
Ashburn, VA (3)
Dallas, TX (2)
Hollywood, CA
Jacksonville, FL
Los Angeles, CA (2)
Miami, FL
Newark, NJ
New York, NY (3)
Palo Alto, CA
San Jose, CA
South Bend, IN
St. Louis, MO

Europe
Amsterdam (2)
Frankfurt (2)
London (2)
Madrid
Milan
Paris (2)
Stockholm

Asia
Chengde
Hong Kong (2)
Mumbai
Osaka
Singapore (2)
Sydney (2)

Australia
Sydney

South America
Sao Paulo

Features of CloudFront

- **Low latency** – Improves media load times.
- **High bandwidth** – Enables high bit rate HD video and other media applications.
- **Redundant** – Eliminates single points of failure.
- **Scalable** – Ensure great experience as number of end users grows.
- **Global** – Worldwide network provides great experience regardless of geography.
- **Cost-effective** – Pay as you go model provides flexibility for your business.

How CloudFront Works: Non-Cached Object

1. End-user requests content

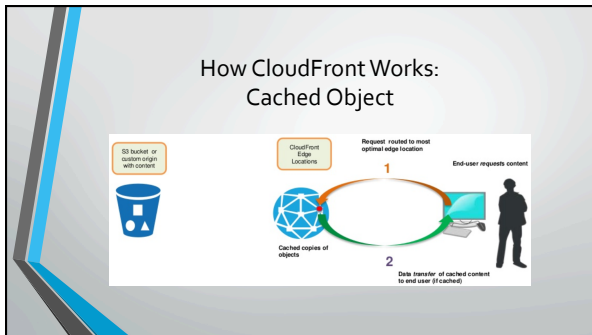
2. If content not cached – object requested from origin

3. Data transfer of content to CloudFront edge location to cache

4. Data transfer of cached content to end user (if cached)

CloudFront Edge Locations

Cached copies of objects



- ### AWS Integration
- Integrates with Amazon Web Services products:
 - Amazon Simple Storage Service (Amazon S3)
 - Amazon Elastic Compute Cloud (Amazon EC2)
 - Amazon Elastic Load Balancing
 - Amazon Route 53

- ### Pricing
- Eligible for AWS Free Usage Tier
 - New AWS customers receive 50 GB Data Transfer Out and 2,000,000 HTTP and HTTPS Requests each month for one year
 - [More Details](#)



