

European Open Content Delivery Network – EUROCDN

Objective ICT-2009.4.3: Intelligent Information Management

b) Delivering pertinent information

Abstract:

The demand for high quality and bandwidth hungry media content is ever increasing. As high definition devices become the norm users are downloading and/or streaming larger and larger video files – from blockbuster movies to homemade videos. Network congestion and costs are again the hot issues. Indeed the BBC has been investigating building its own Content Delivery Network. What other large content providers will follow? Could this end up being the equivalent to every telecoms provider digging up the road again and again? Could we be more clever about this and end up with a world beating Internet content delivery solution? After all, mobile phone operators are now starting to share network infrastructure. Europe has always been a trailblazer when it comes to interoperability and standards...

There is an opportunity for Europe to work collectively to create a European Open Content Delivery Network. The EUROCDN project aims to research such an opportunity:

- Investigate how potential conflicts between interested parties could be resolved.
- Propose state of the art European Open Content Delivery Network protocols.
- Build reference models.
- Instigate cross-vendor and cross-country trials.

Description:

The economics of CDNs make a great deal of sense: a server that can serve 1Gbps of traffic will only cost a few thousand pounds, but a Gbps of Internet transit will cost of the order of \$25,000 per month. BT Central bandwidth is even more expensive: according to: [How UK ISPs are charged for broadband - the cost of IPStream](#) 622 Mbps of BT Central bandwidth costs roughly £800,000/year, equivalent to £1.3M per Gbps-year, or £107,000 per Gbps-month. Note this is why P2P file-sharing really hurts ISPs and ADSL providers - the BT Central bandwidth is likely their biggest single expense, and, rather than saving them money on transit, a P2P transfer within their network will cost them double what a simple upload will. However, CDN hardware is not free, nor are the network ports used to attach them to ISP networks, and the disk space on them is not unlimited. Someone is going to have to pay for them, and they are likely to want other people to pay for them in turn.

Current commercial CDNs are hosted inside ISPs, and the owners of sites pay the CDN operators to use their service as a cheaper way of pushing out content than staging it on their own servers. The actual web pages are typically served from the site owner's own site, and the content linked within the site (images, movies) is served from the CDN.

Here are the big issues with CDNs:

- Who gets permission to get their content cached?
- How is that content pushed out to the servers?
- When new content is added, and the disk or local store is full, what decides what old content will get pushed out?
- Who gets billed, and how?
- A lot of content still needs specialized streaming proprietary protocols (although Apple's HTTP Live Streaming is getting rid of this) - what are they, who pays the licence fees to run them?
- A lot of content on a CDN needs access control; the operator typically does not want to pass out URLs, which can be used for unlimited downloading by all parties.

In addition, it's sometimes easier to route the request to the content, rather than vice versa. Say you have 10 CDN servers all in one place. It clearly makes more sense, for low traffic content, to put 1/10th of it on each server, route the requests to each server depending on the content required, rather than having all the material on every server. On the other hand, for high traffic content, you should have that content on every one of your servers, so they all serve it at once. Many of these details are the proprietary "secret sauce" of the CDN operators.

Use Case:

Take a multi-vendor CDN cloud, with multiple CDN providers and site operators all working at once. Then what is required are standardized protocols so they can choose who to use from moment to moment, creating a free market in CDN services.

The standardized stuff at the edge can be:

- Protocols for specifying access control for content upload, and for removing content when so desired (a thing which is forgotten in many CDNs).
- Protocols for specifying preferences for service (eg reliability levels / traffic levels vs. pricing, service levels for different territories, including denying service to some territories).
- Protocols for monitoring traffic (including traffic misses) and billing.
- Common conventions for access control for content download (for example, as simple as verifying time-expiring or single-use cookies to use as part of the URL or associated cookies).

In addition, it might be interesting to consider whether there should be ISP-to-CDN protocols to allow preferences to be expressed as to where traffic is hosted and staged, in order to optimize network usage and response.

Note that billing can be in different directions: does the CDN charge the ISP for providing cheap bandwidth to their customers, or the ISP charge the CDN for providing network ports so it can provide better service for its site-owner customers? Are there any circumstances in which the site owners might actually charge the ISP or CDN, rather than vice-versa? All of the above need to be capable of dealing with real-time changes and the preferences may change at any moment (minute-to-minute, perhaps, but not second-to-second).

Consortium:

The EUROCDN project needs participants from mobile and fix line operators, Internet service providers, content owners and aggregators, academic and research institutes. The project needs a coordinator.

Company:

Kendra Initiative (hosted and managed by Kendra Foundation) is an international media, technology, academic and industry alliance. The mission is to foster an open distributed marketplace for digital media (including films, music, images, games and text). The initiative researches, recommends and develops enhancements to the digital media marketplace that facilitate interoperability between and revenue generation for content owners and service providers; to enable consumers to use any device or application to browse, search and purchase content from any content catalogue, seamlessly. Its goals are to:

- Simplify and streamline buying and selling digital content by driving industry adoption of open protocols.
- Enable interoperability between service providers, media applications and devices - every link in the content value chain.
- Build a system where consumers can use any device or application to browse, search and purchase from the globally distributed collection of content catalogues.
- Create a more pleasurable buying experience for consumers and increase reach and revenue for content owners.



Kendra is currently working on the following funded EU and UK projects:

- **P2P-Next** (Next Generation Peer-to-Peer Content Delivery Platform) EC FP7 IP commenced early 2008
- **Valid** (Video Access and Licensing Identity Database for Education) UK TSB commenced mid 2009
- **Saracen** (Socially Aware, collaboRative, scAlable Coding mEdia distribution) EC FP7 STREP to commence early 2010

Relevant Research:

- The cross-industry stakeholder group is currently investigating content description, search, visibility, discovery, delivery and payment whilst developing and trialling prototypes.
- Previous research has included Kendra Base, investigating how complex, non-normalised and distributed media databases could be searched and harmonious results obtained using semantic web type technologies.

Members Includes:

- Content owners: Real World (Peter Gabriel) Records, Cherry Red Records, MOD Films, Whistling Mule Productions...
- Network providers: BT, Telefonica, Interoute, Sohonet...
- Hardware manufacturers: Pioneer, Narrowstep...

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