



Academic Streaming in Europe: Report on TF-Netcast

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UNI•C

TERENA Networking Conference, Rhodes, June 9 2004

Acknowledgements

- Co-authors:
 - Alessandro Falaschi, Uni. Roma La Sapienza
 - Michal Krsek, CESNET
 - Ivan Doležal, CESNET
- TF-Netcast members



Outline

- What is TF-Netcast?
- Summary of TF-Netcast results
- Streaming video survey
- Live stream announcement portal
- Open Content Delivery Network
- Future plans and activities

What is TF-Netcast?

- TERENA task force
- Active from March 2003 to March 2004
- Focused on streaming media services for the European academic sector
- www.terena.nl/tech/task-forces/tf-netcast

Summary of results

- Resources for content production
- Streaming video survey
- Live stream announcement portal
- Open Content Delivery Network
- Metadata for video-on-demand

Streaming video survey

- Goal: to understand how streaming video is being used in academic institutions.
- Survey conducted using web-based questionnaire
- Results analysed and published as a report

Questionnaire

112 questions in different categories:

- Content for streaming
- Streaming portal
- Camera and production equipment
- Streaming servers
- Media players
- Network
- Metadata
- Future plans



Streaming production software and hardware



What software or hardware encoding tools are used within your organization? (More than one item can be selected)

- | | | | |
|--|--|--|---|
| <input type="checkbox"/> RealProducer | <input type="checkbox"/> QuickTime Pro | <input type="checkbox"/> Cleaner | <input type="checkbox"/> Other <input type="text"/> |
| <input type="checkbox"/> Windows Media Encoder | <input type="checkbox"/> ProCoder | <input type="checkbox"/> Optibase Moviemaker | |

General comments and suggestions about the used tools.

What types of streaming formats are used within your organization? (More than one item can be selected)

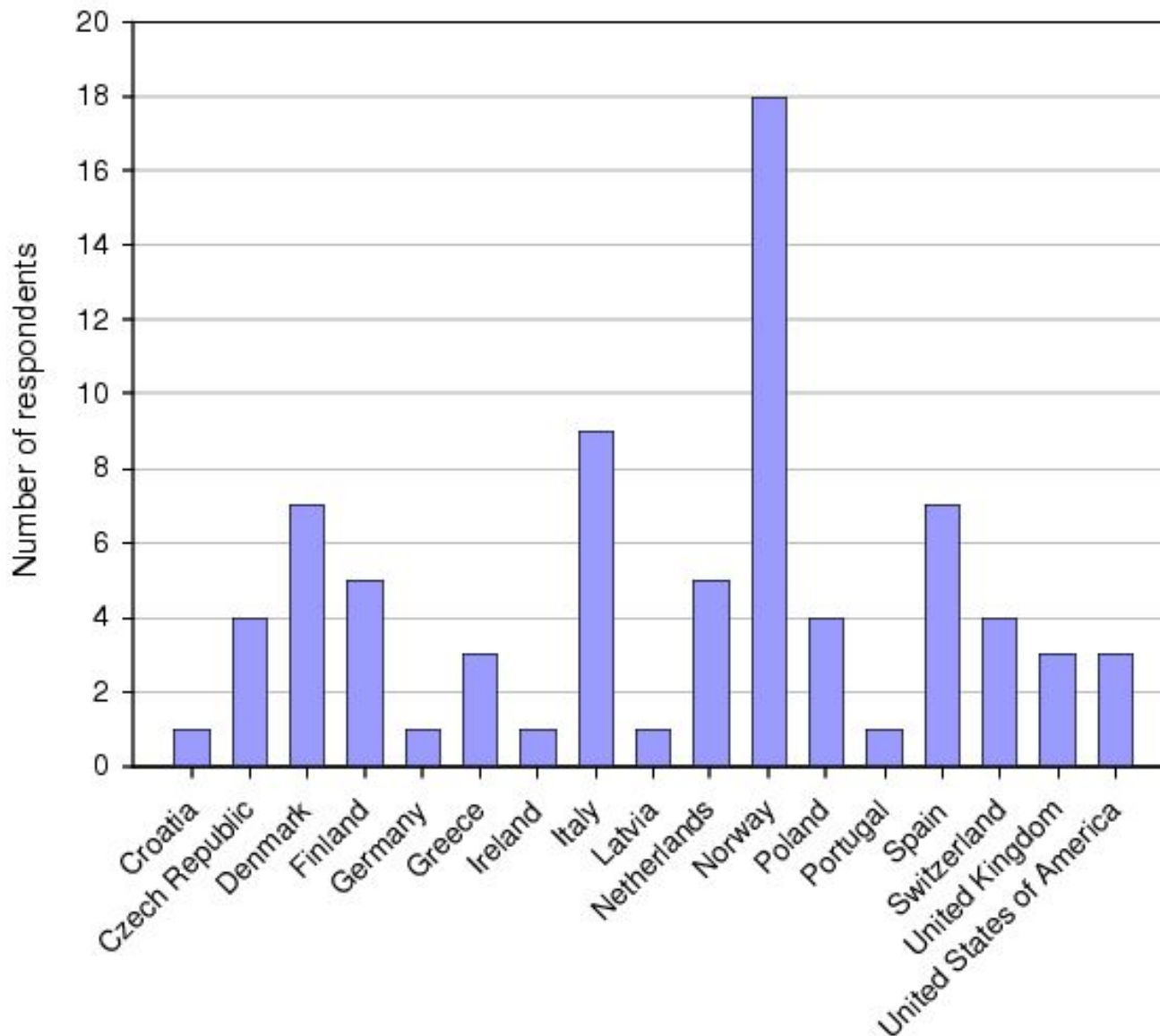
- | | | | |
|---------------------------------|---------------------------------|--|---|
| <input type="checkbox"/> MPEG-1 | <input type="checkbox"/> MPEG-4 | <input type="checkbox"/> Windows Media | <input type="checkbox"/> Other <input type="text"/> |
| <input type="checkbox"/> MPEG-2 | <input type="checkbox"/> Real | <input type="checkbox"/> Quicktime | |

What is the recommended streaming format (filetype, pixelsize, framerate, etc.)? If there are several scenarios that are often used, please describe the settings for all the scenarios.

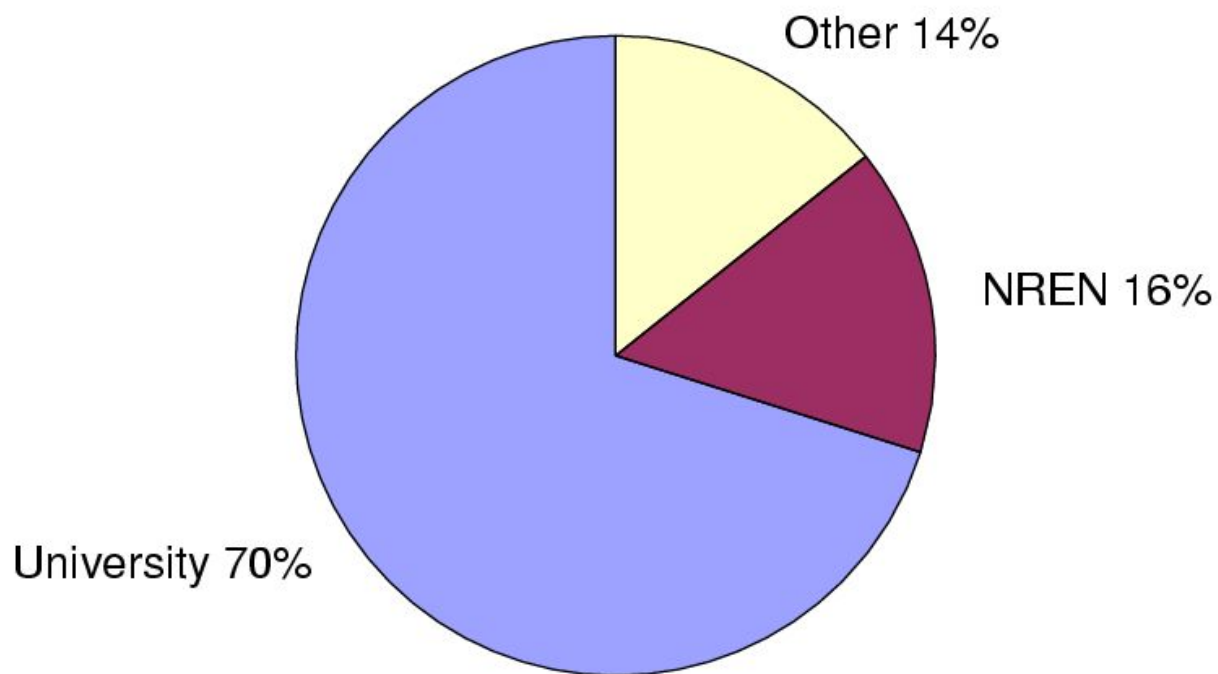


Survey results

- 77 respondents from 17 countries
- 88% stream live content
- 40% have a streaming portal
- 30% use metadata for video assets
- 25% have firewall problems
- 88% have multicast connectivity
- Windows media is the leading format
- Standards & interoperability important

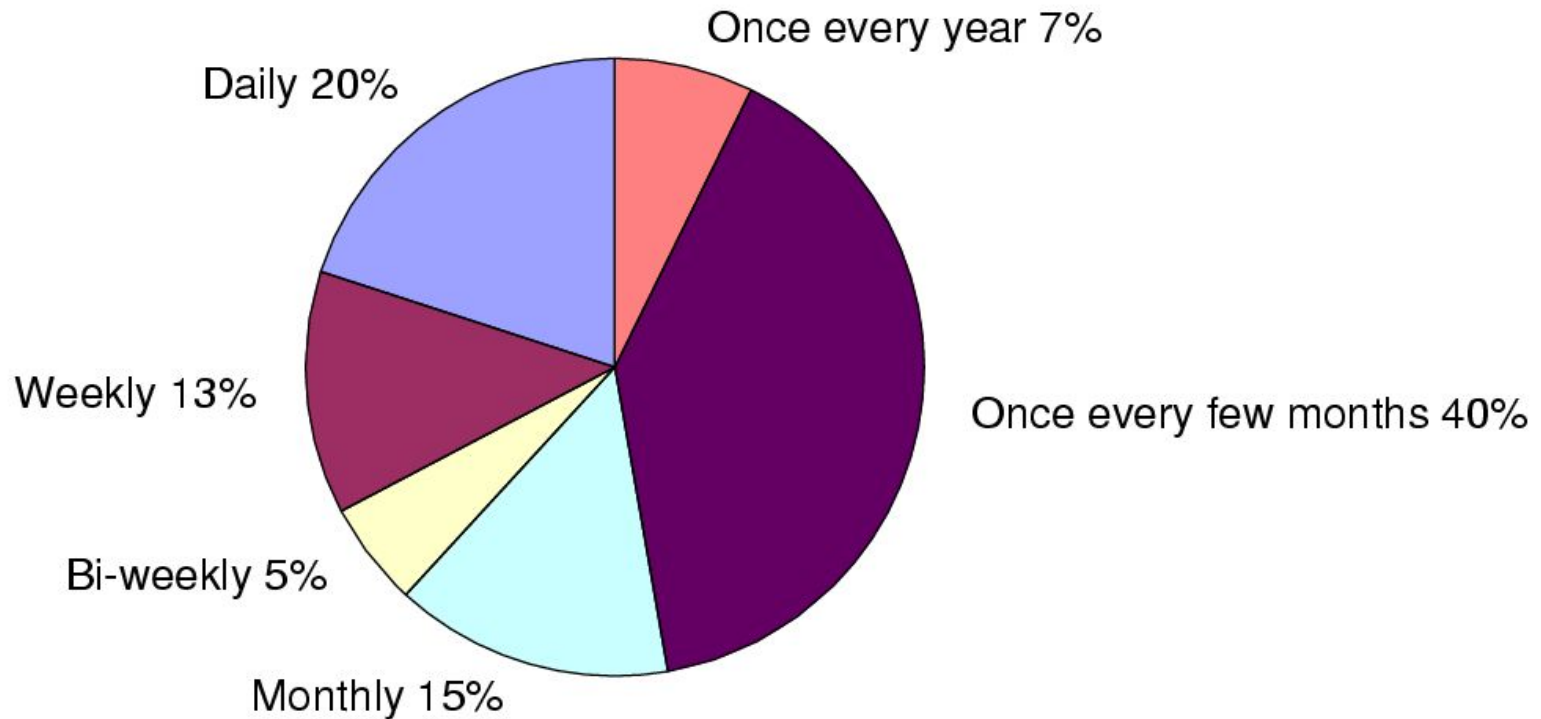


Type of organisation

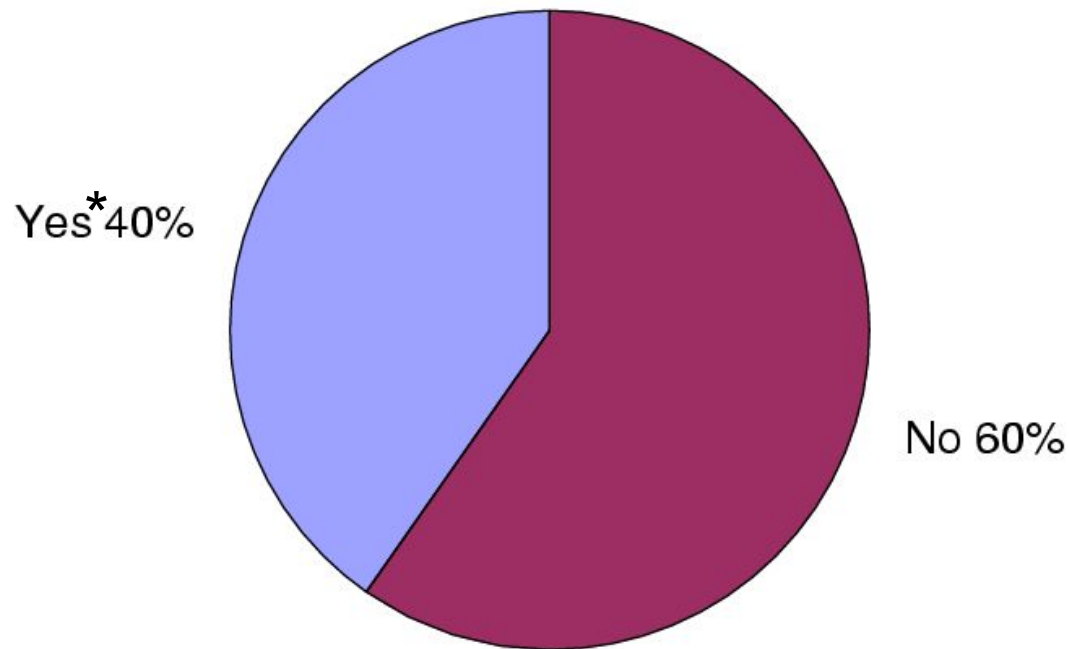


88% say they stream live content

How often do you stream live content?

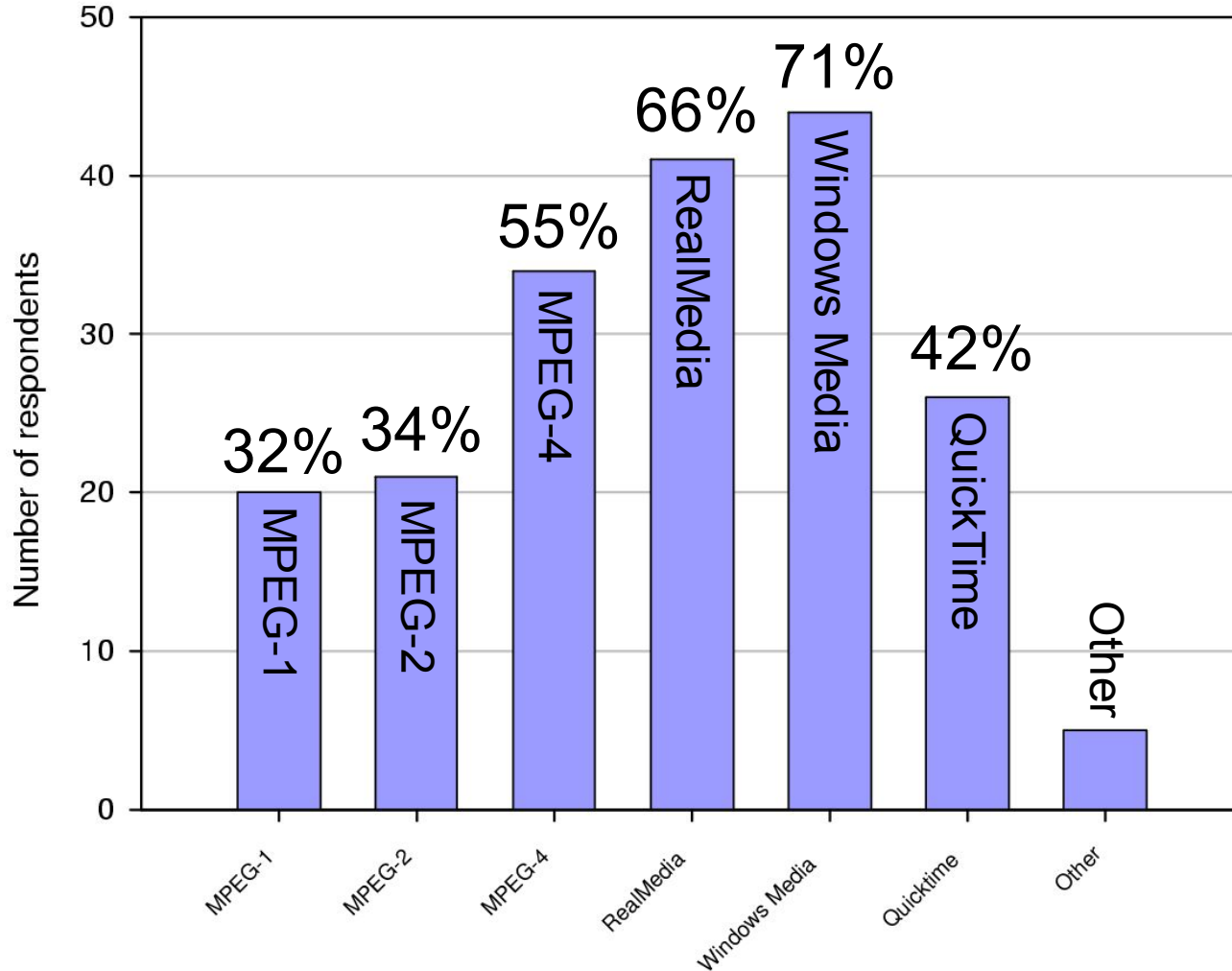


Does your organisation have a streaming portal?

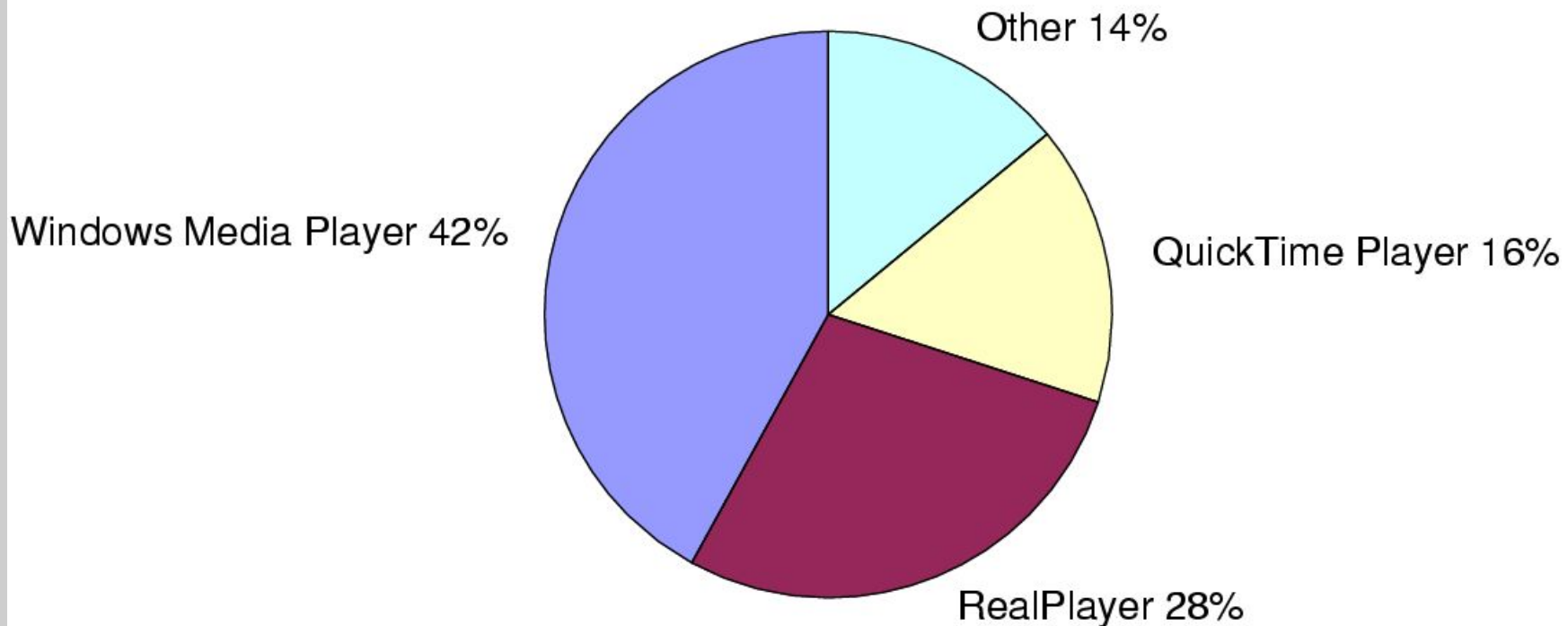


*) Of these 75% have a video archive

What types of streaming formats are used?

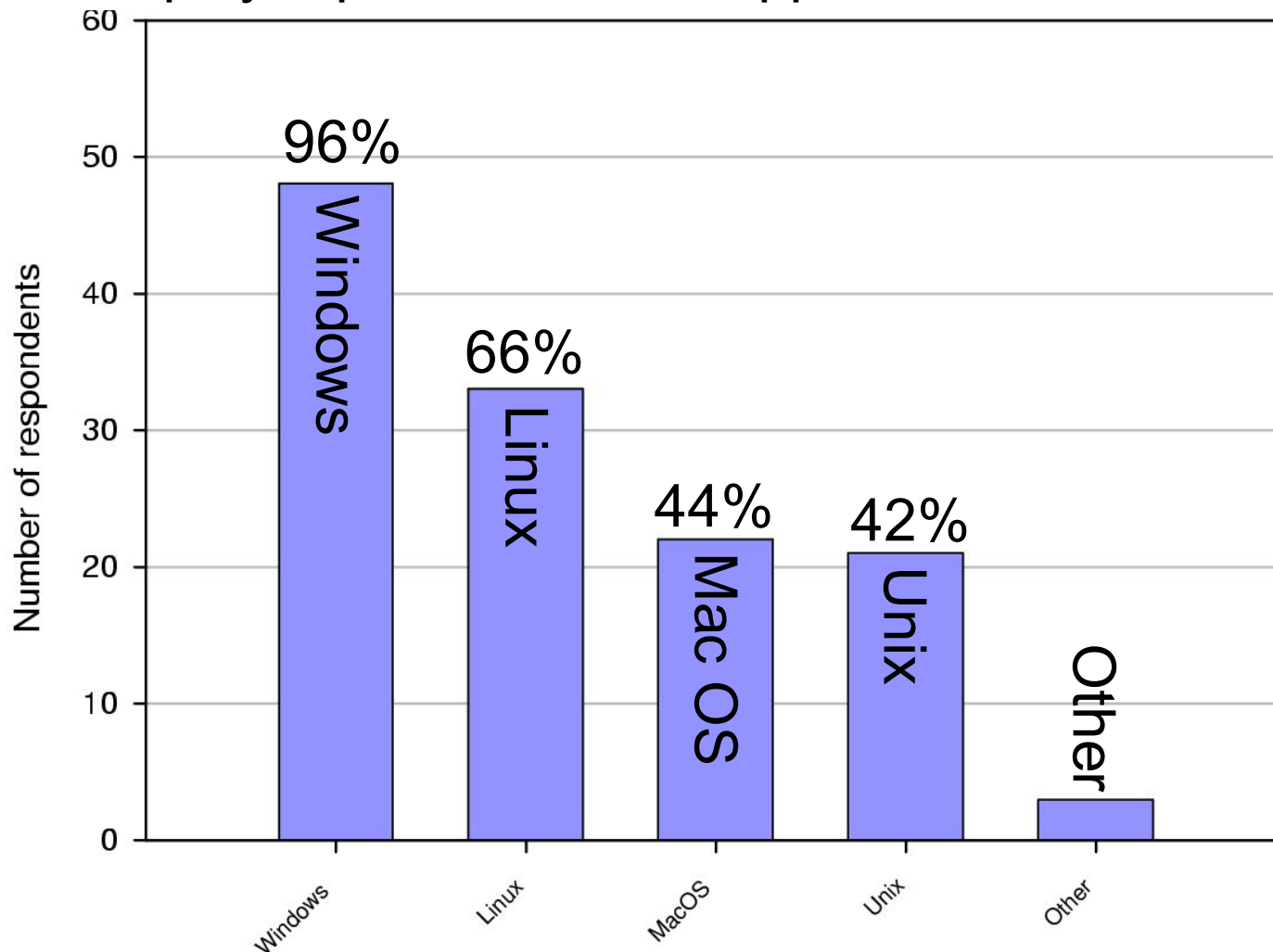


What is your preferred/favourite player?





What player platforms are supported?



Network related results

Firewall issues

- 27% of organisations block UDP traffic
- 25% indicate they have firewall problems

Multicast

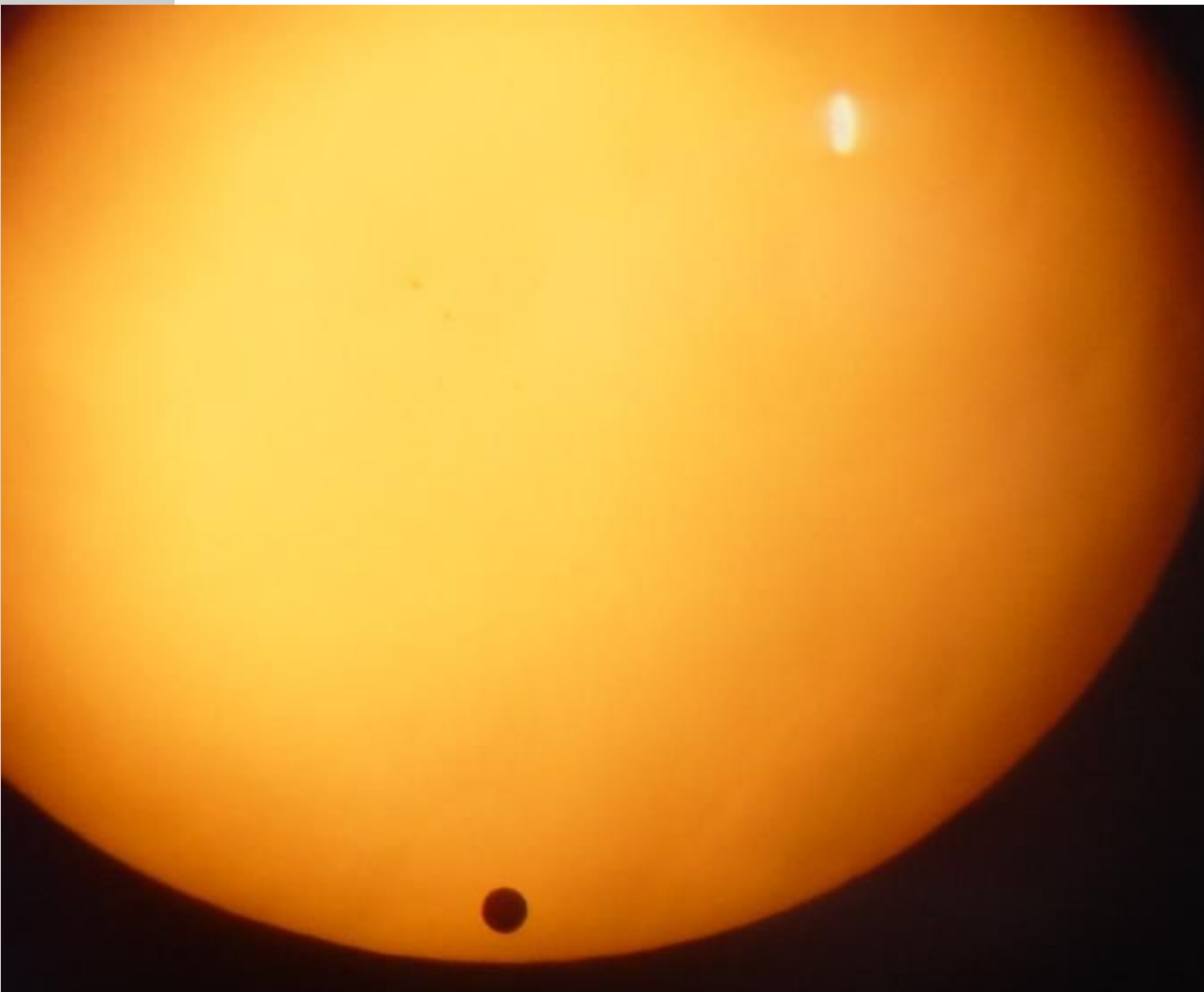
- 84% say its enabled on the backbone
- 88% say its enabled on the LAN

Metadata results

- 30% use metadata for video assets
- 21% use metadata for live streams
- 57% of metadata models are based on standards:
 - Dublin Core
 - IMS
 - MPEG-7
 - RDF
 - SCORM
 - Others

Survey conclusions

- Many organisations have video portals
- Live streaming is widely used (88%)
- Windows Media most popular, but others are not far behind
- Firewalls are a problem for many (25%)
- Multicast seems widely available (84%)
- Metadata is used only by 30%
- There is a large interest in participating in a common content delivery network.



Did you see the
Venus transit
yesterday?

Did you know it was
streamed live?

Would you know
where to find a live
stream?

Picture taken at TNC 2004, 8 June 2004

Announcement portal

- Developed by CESNET
- Web portal for announcing live streaming events
- Supports multiple time zones
- Supports multiple languages:
 - Czech, Danish, Dutch, English, Finnish, German, Greek, Italian, Spanish
- Open for the academic community
- <http://live.academic.tv>



[ζωντανές μεταδόσεις - προσωπική ιστοσελίδα](#)

[σημερινές μεταδόσεις](#)

[howto και υποστήριξη](#)

[subscription webpage](#)

Greek

EET



ζωντανές μεταδόσεις

[<< προηγούμενος μήνας | **Ιούνιος 2004** | επόμενος μήνας >>]

Δευτέρα	Τρίτη	Τετάρτη	Πέμπτη	Παρασκευή	Σάββατο	Κυριακή
31	1	2 20:00 Patch Management and Creating a Patch and Vulnerability Group	3	4	5 19:00 Přednáška: Přechod Venuše přes Slunce	6
7 10:00 Přednáška: Přechod Venuše přes Slunce 15:00 TNC 2004	8 06:00 Venus Transit 07:30 Přechod planety Venuše přes sluneční kotouč 10:00 TNC 2004	9 10:00 TNC 2004 21:00 Internet Storm Center: Threat Update	10 10:00 Proteiny 2004 10:00 TNC 2004	11	12	13
14	15	16	17 20:00 Protecting Critical Government Infrastructure: VeriSign's Managed Security Services	18	19	20
21	22	23	24	25	26	27
28	29	30	1	2	3	4

για επισκόπηση των ζωντανών μεταδόσεων που τροφοδοτούνται από το CESNET2 Multimedialni prenosy αυτό το μήνα: δείξτε με το ποντίκι σας στο όνομα μιας συγκεκριμένης μετάδοσης για να πάρετε περισσότερες πληροφορίες υπό την μορφή tooltip; το "αρχείο" είναι υπό ανάπτυξη

what's really happening

Viewer's interface

- Choice of language & time zone
- Calendar based interface
 - Monthly view for overview
 - Daily view for details
- Viewers can sign up for notifications
 - Select single netcast
 - Select interest by language
 - Reminders are sent out by e-mail

19:30

20:00 - 21:00 **Internet Storm Center: Threat Update**
SANS

Featuring: Johannes Ullrich

The SANS Internet Storm Center (ISC) uses advanced data correlation and visualization techniques to analyze data collected from thousands of sensors in over sixty countries. When a threat is identified, the team immediately begins an intensive investigation to gauge the threat's severity and impact. Recent threats observed by the ISC, and new software vulnerabilities or system exposures that were disclosed over the past month will be discussed. This webcast is presented by senior ISC staff, Johannes Ullrich, followed by a question and answer period.

20:30

Johannes is currently responsible for the SANS Internet Storm Center. In addition, as part of the SANS sysadmin team, he is managing some of SANS's systems and networks. Prior to working for SANS, Johannes worked as a lead support engineer for a web development company and as a research physicist. Johannes holds a Ph.D. in Physics and is located outside of Boston, MA.

- SANS, Institute <webcast at sans.org>
- SANS, Institute <webcast at sans.org>



[more info, slides \(free registration\) \[HTML u.s. english ISO-8859-1 \]](#)

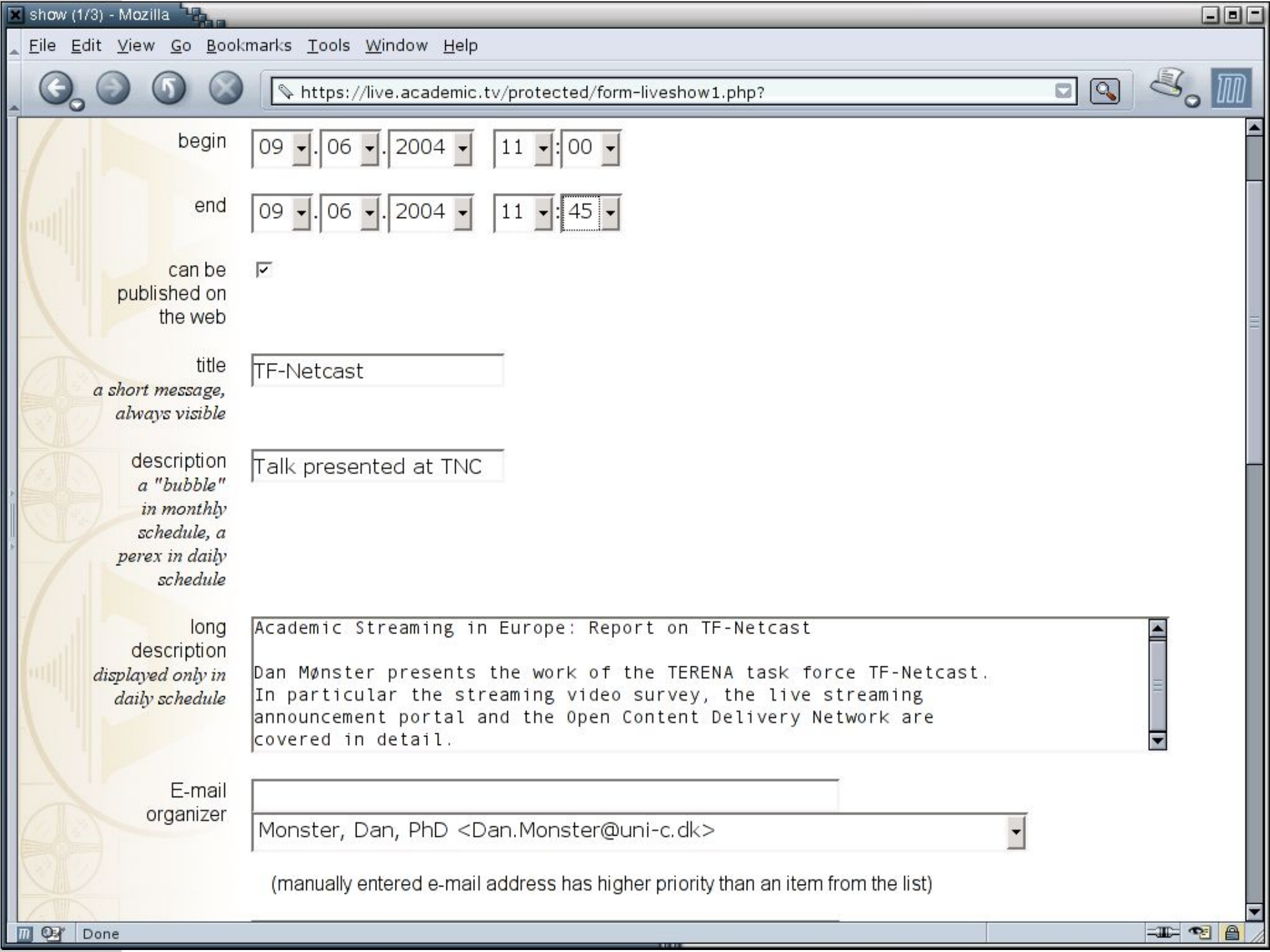
[remind me](#)

recordings of selected transmissions are parts of various archives
(CESNET)

Broadcaster's interface

Submission of announcements

- by web based interface
 - Username / password authentication
 - Supports CAAS (CESNET's LDAP based AA system)
- by e-mail submission (SMTP gateway)
 - Payload contains announcement in XML format
 - Cryptographically signed using PKI



begin 09 . 06 . 2004 11 : 00

end 09 . 06 . 2004 11 : 45

can be published on the web

title TF-Netcast
a short message, always visible

description Talk presented at TNC
a "bubble" in monthly schedule, a perex in daily schedule

long description Academic Streaming in Europe: Report on TF-Netcast
displayed only in daily schedule
Dan Mønster presents the work of the TERENA task force TF-Netcast. In particular the streaming video survey, the live streaming announcement portal and the Open Content Delivery Network are covered in detail.

E-mail organizer
Monster, Dan, PhD <Dan.Monster@uni-c.dk>

(manually entered e-mail address has higher priority than an item from the list)

Future developments

- More languages
- New input methods (SOAP)
- RSS feed
- Other AA systems
 - Discussions with TF-AACE

**One portal to rule them all
One portal to find them
One portal to bring them all
and in the darkness guide
them**

Inspired by

JRR Tolkien

Live streaming infrastructure

The challenge:

Live streaming to a large audience

- Large server load
- Network load (bandwidth saturation)

The Solution:

IP multicast

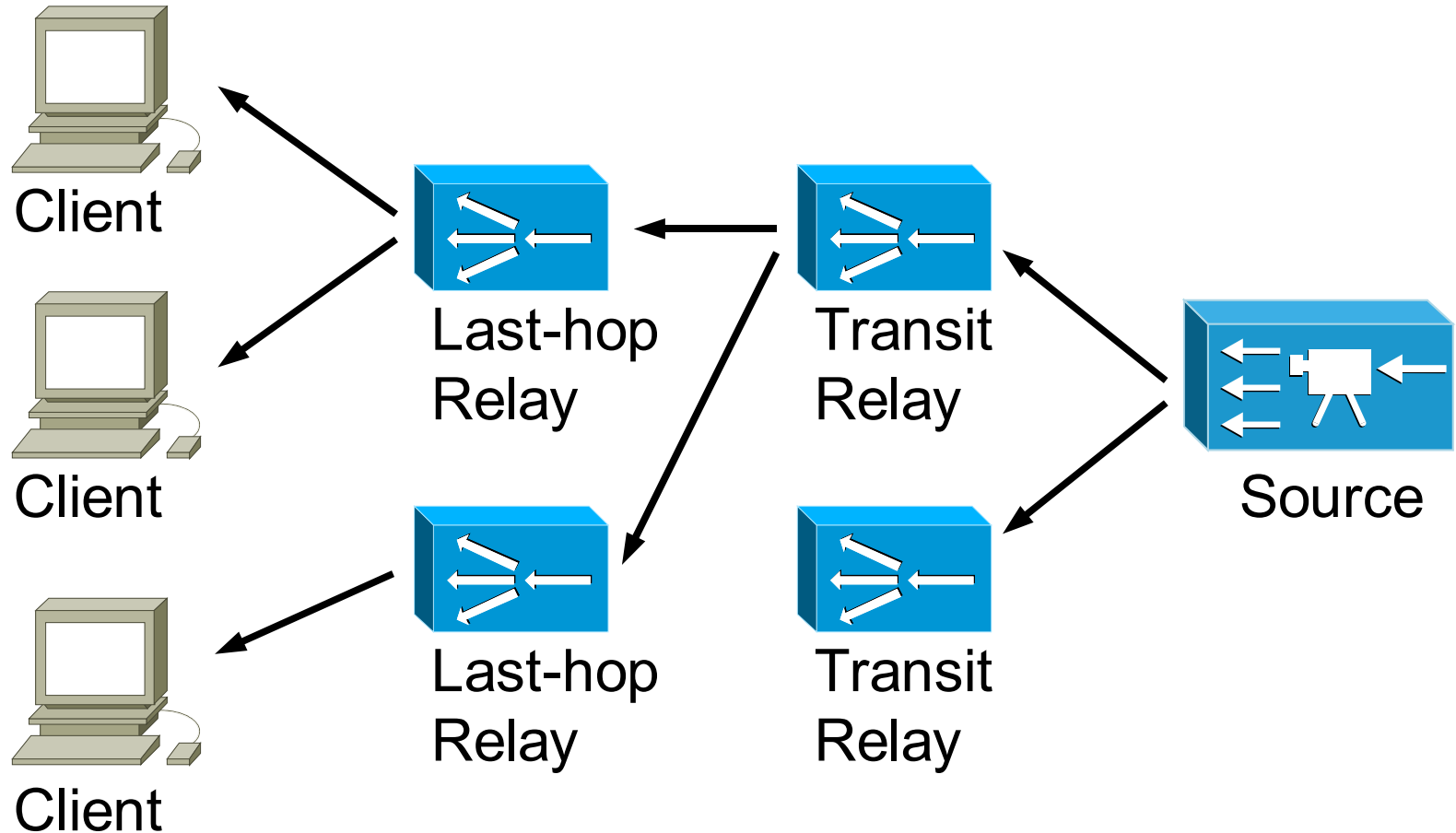
- Confined mostly to NREN backbones
- A different solution is needed

The Solution: OpenCDN

Open Content Delivery Network

- Developed at Uni. Roma La Sapienza
- Application level multicast
- Vendor agnostic
- Open source
- <http://labetel.ing.uniroma1.it/opencdn/>

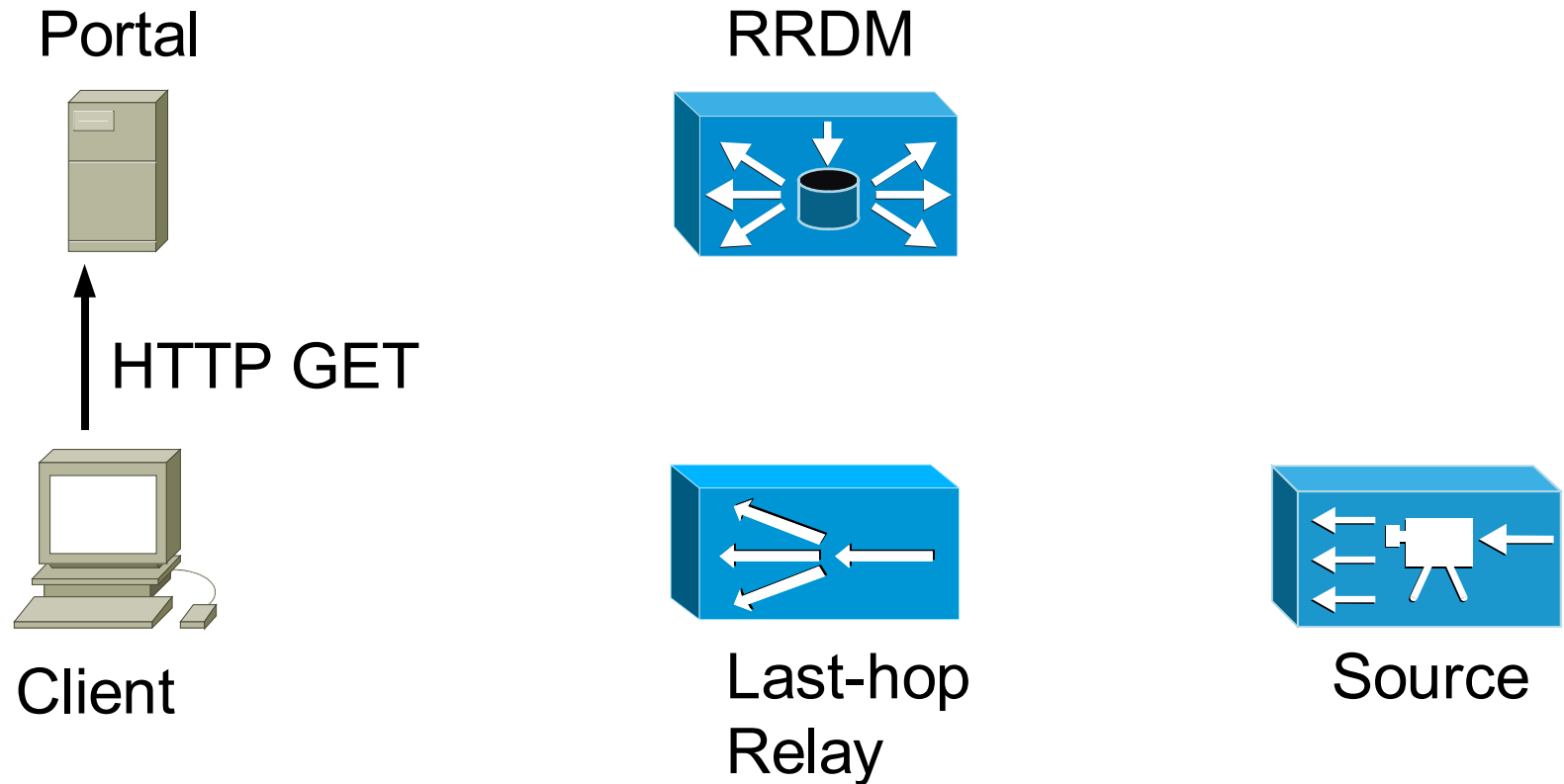
OpenCDN overview



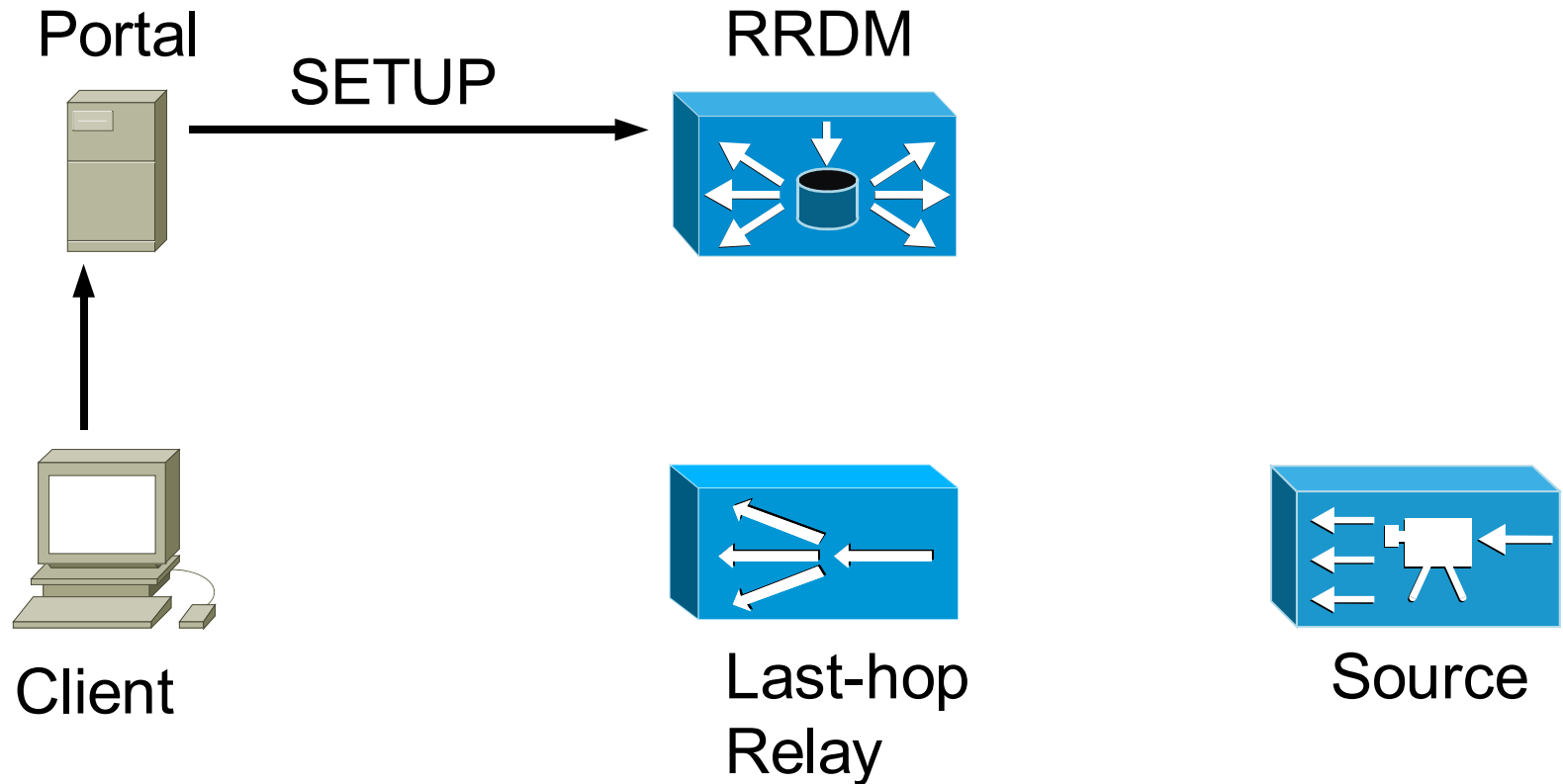
OpenCDN Architecture

- Client communicates with portal
- Portal sends request to OpenCDN
- Request routing and relaying is managed by **Request Routing and Distribution Manager (RRDM)**
- Relays report status and footprint information to RRDM

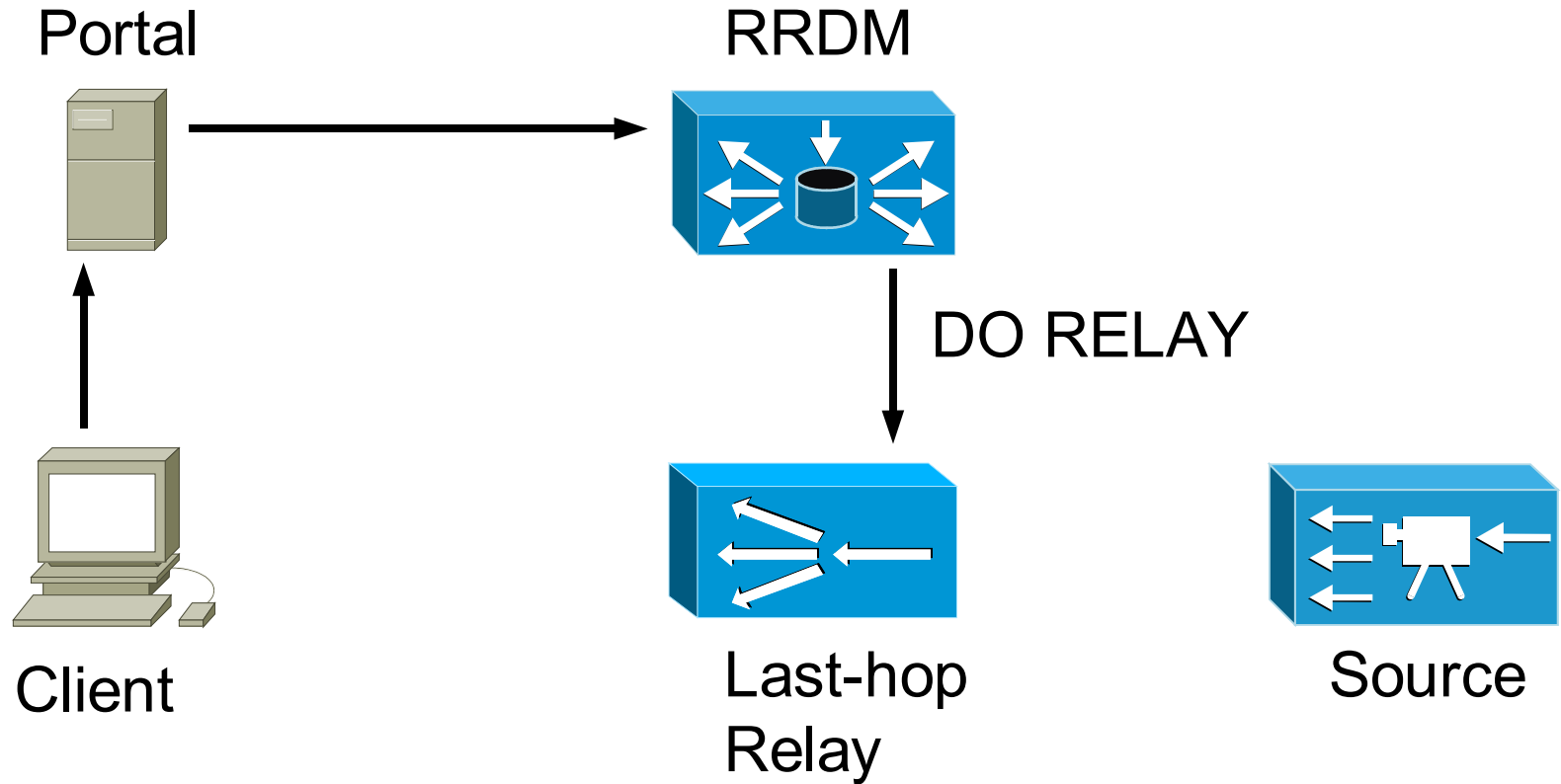
OpenCDN operation



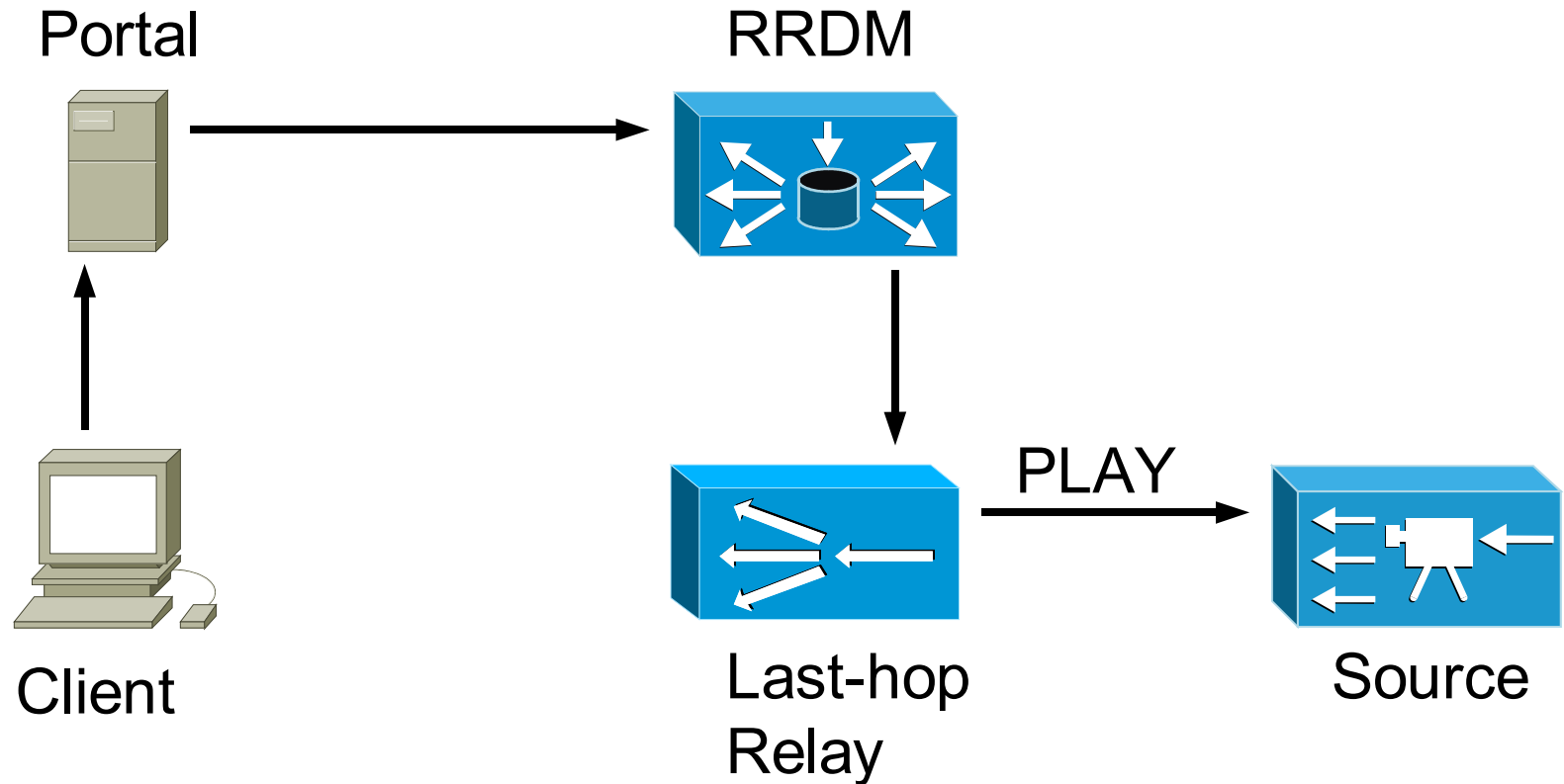
OpenCDN operation



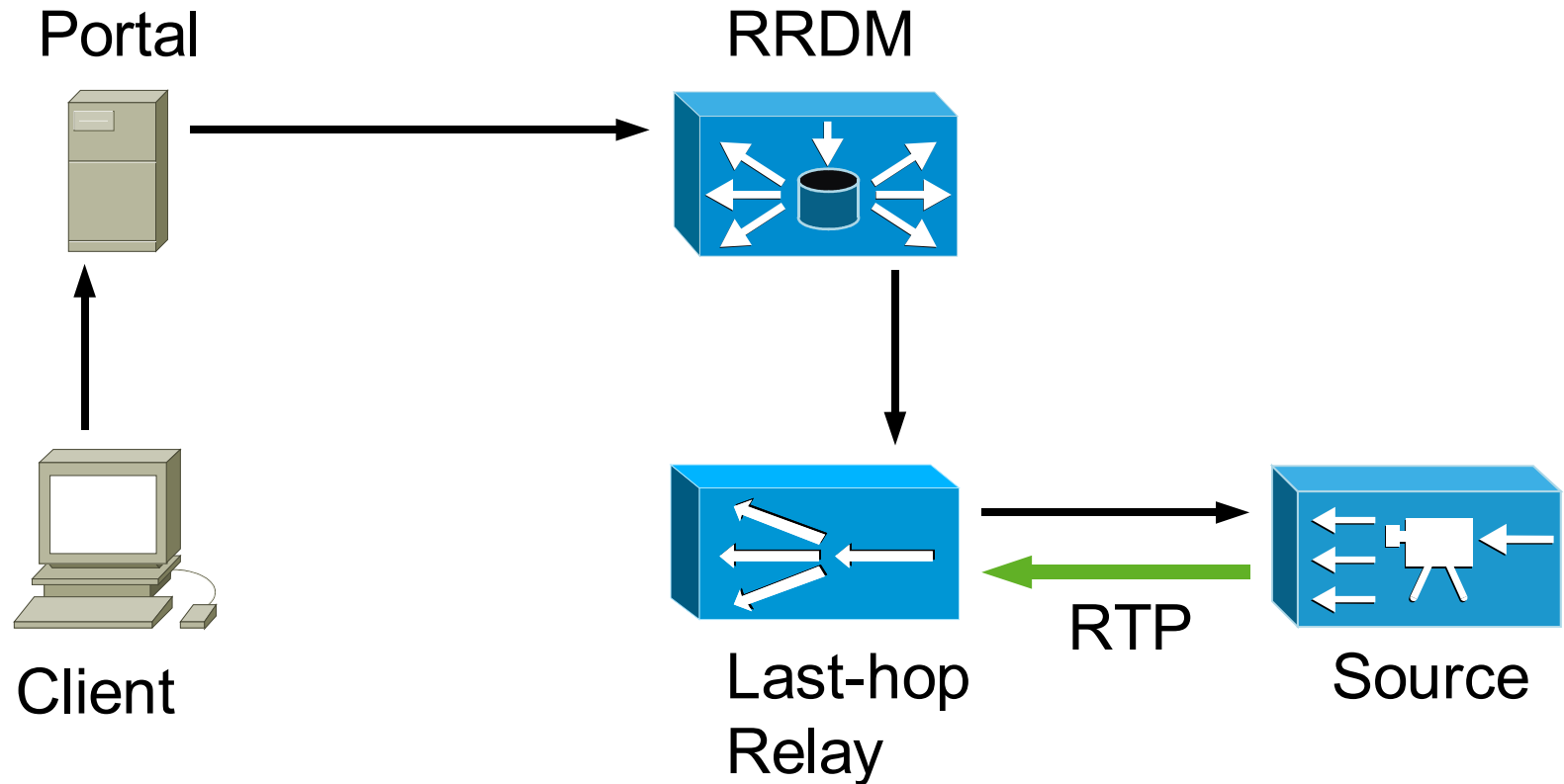
OpenCDN operation



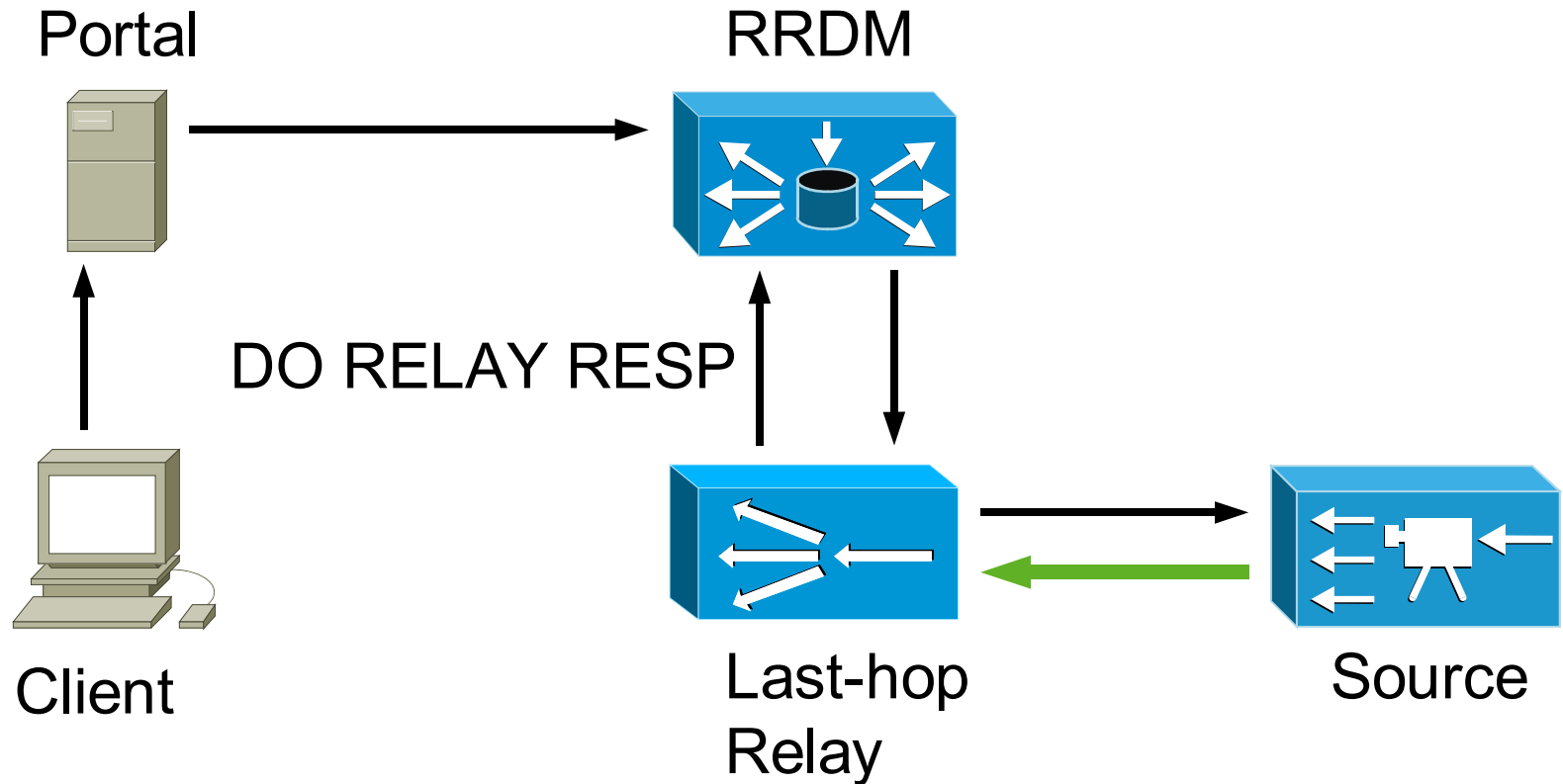
OpenCDN operation



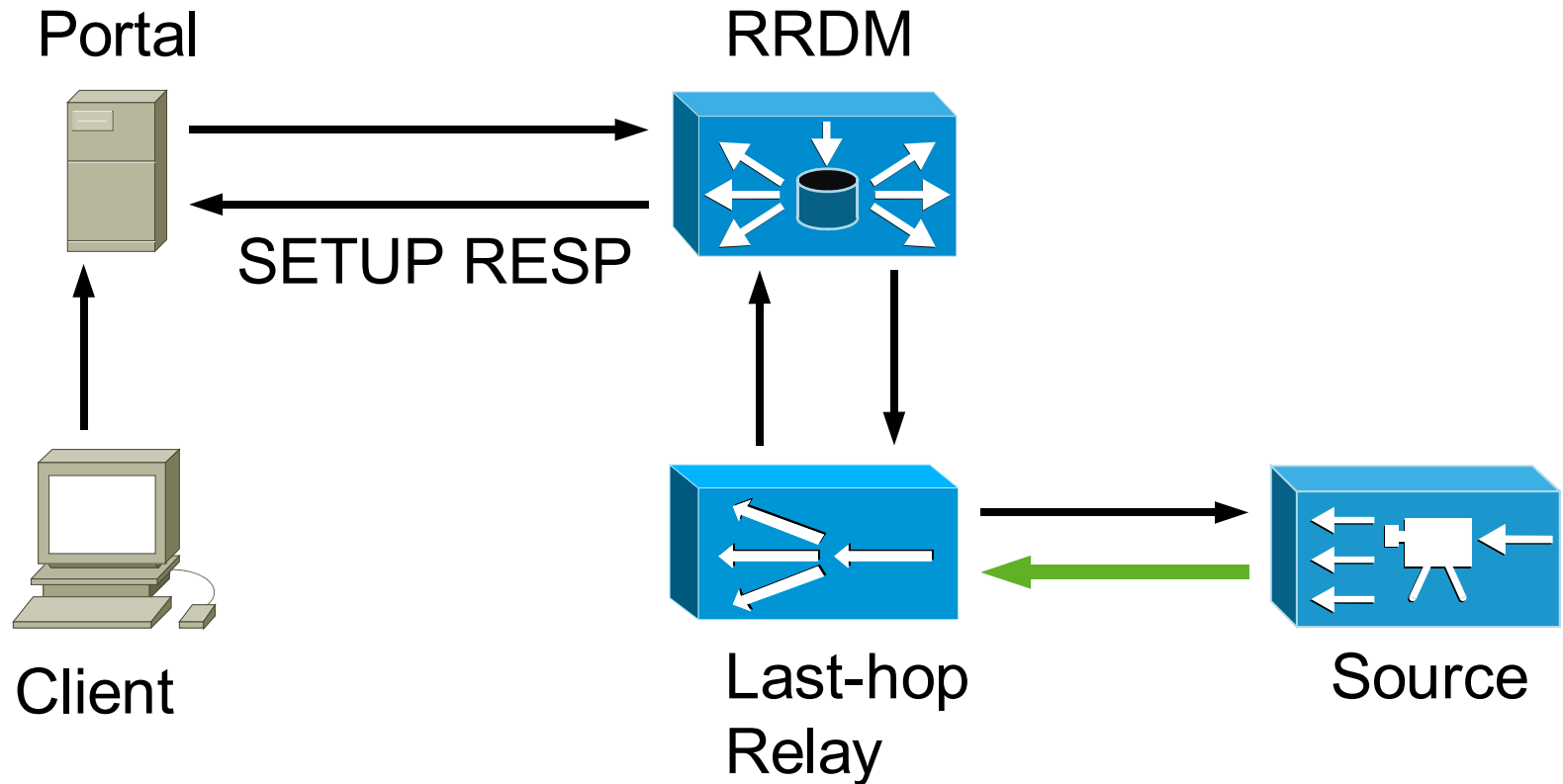
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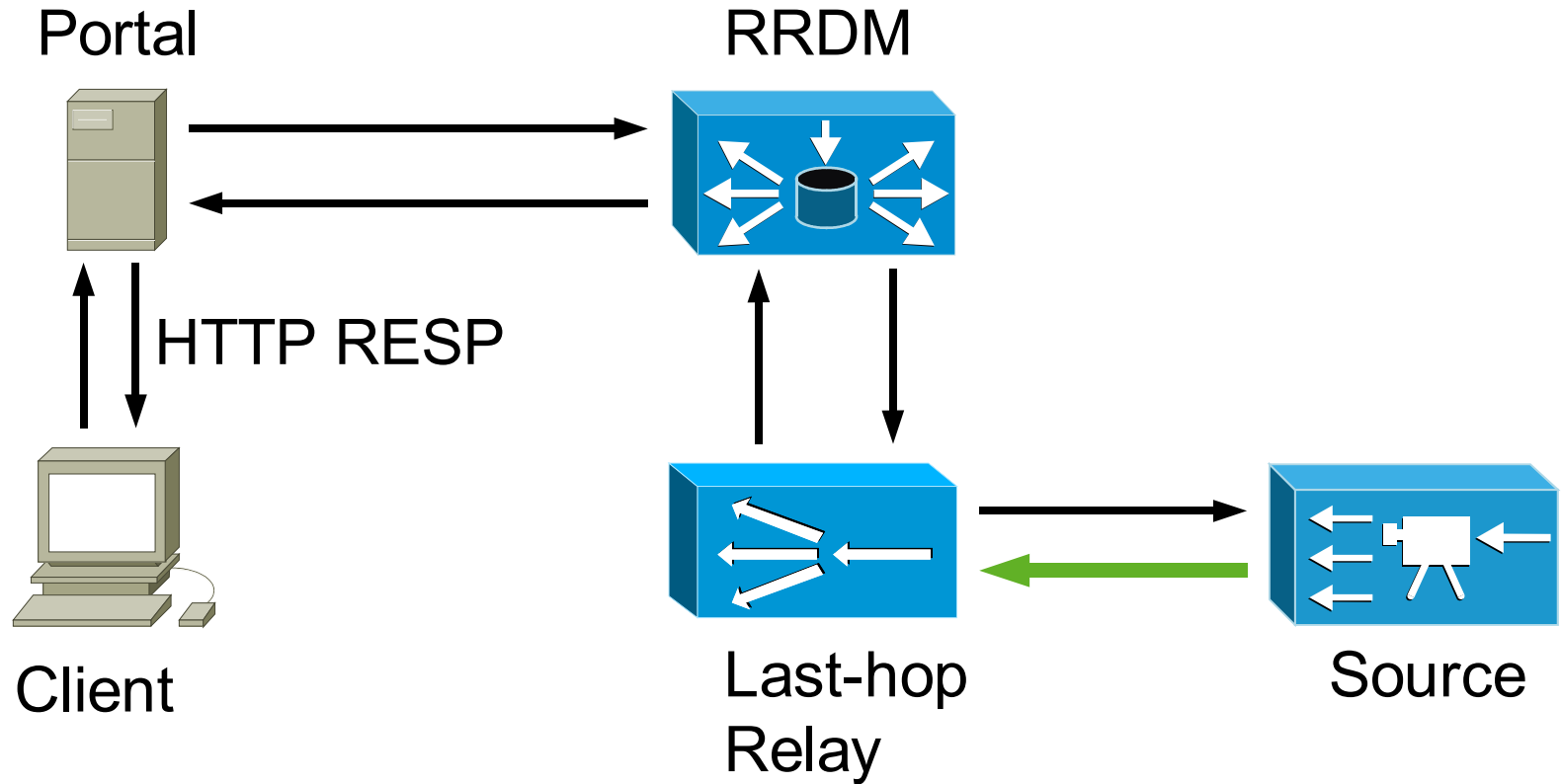
OpenCDN operation



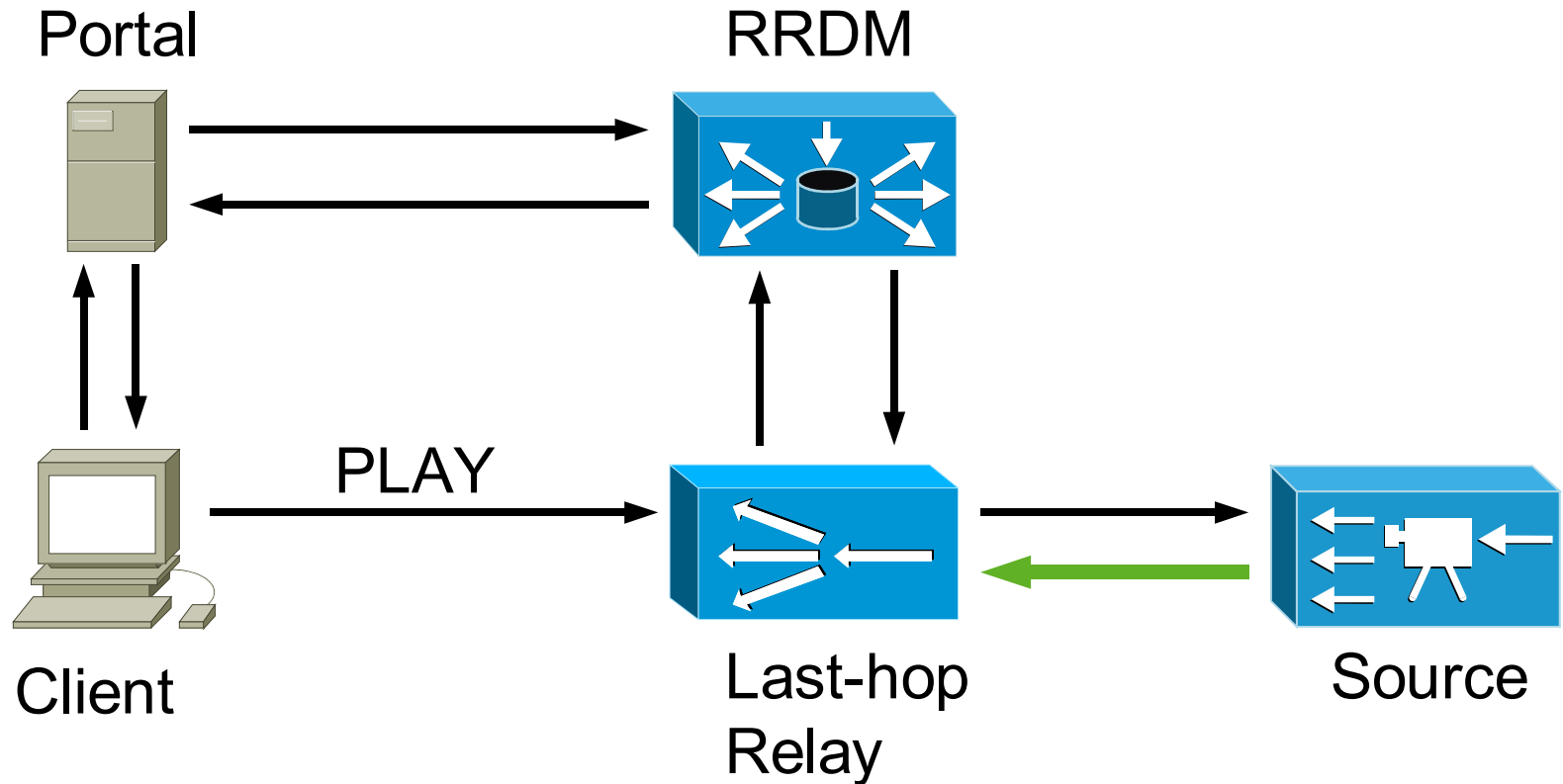
OpenCDN operation



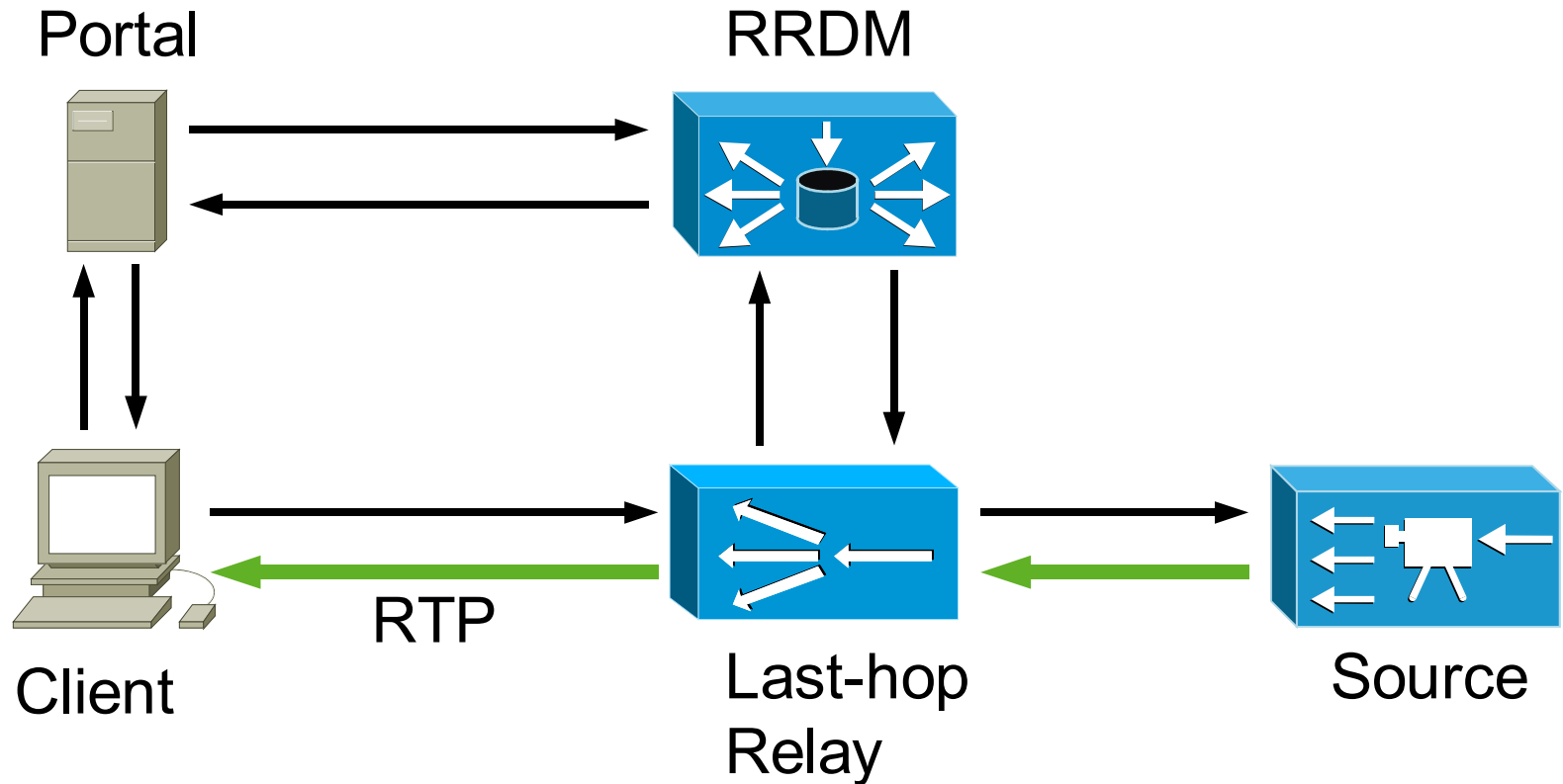
OpenCDN operation



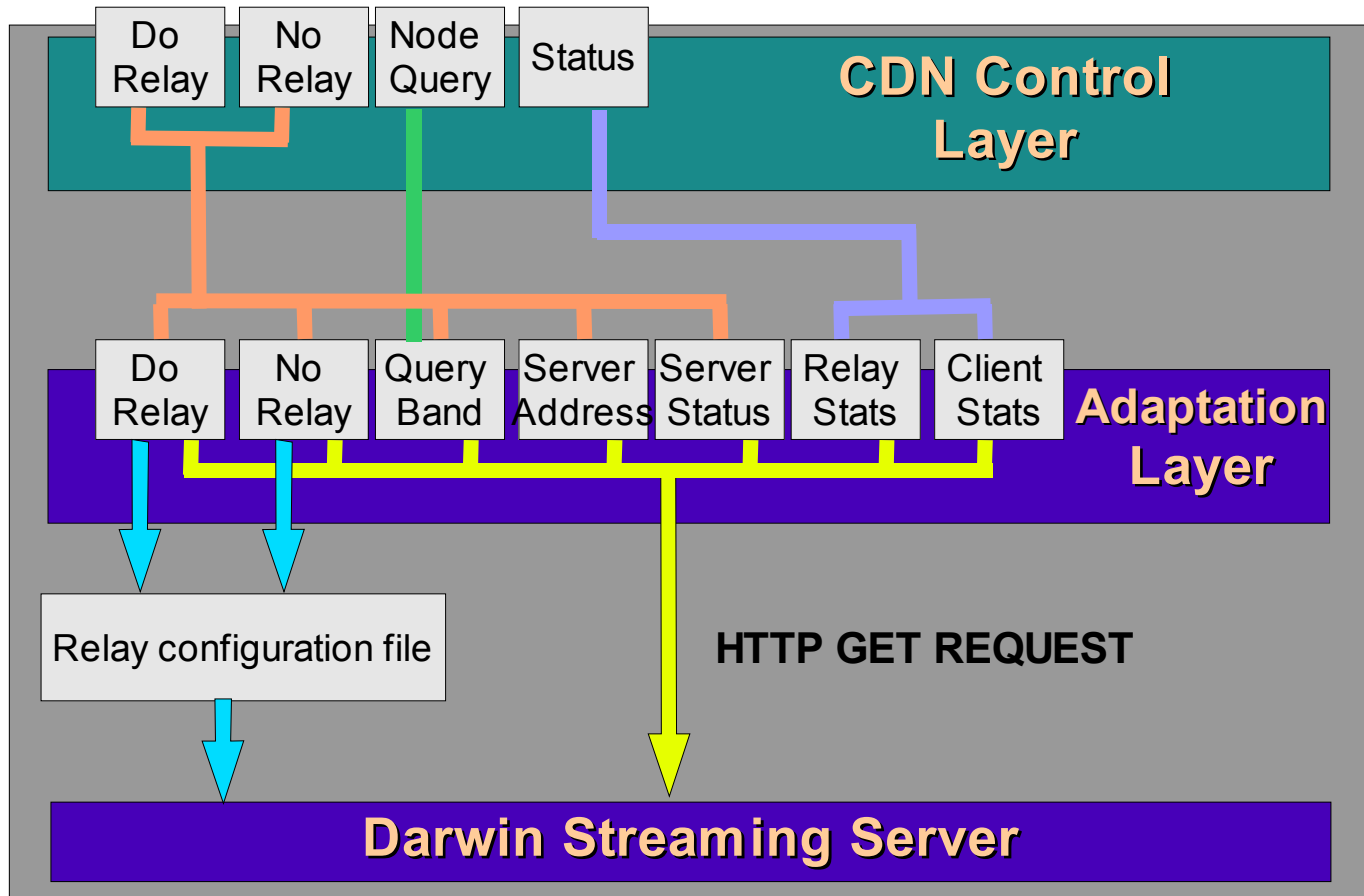
OpenCDN operation



OpenCDN operation



OpenCDN Node



OpenCDN Summary

- Hierarchical, scalable CDN system
- Vendor agnostic
 - Darwin Streaming Server supported
 - Others (Real, Windows Media) possible
- Multi-platform
- Open Source

OpenCDN future

- More nodes & sources deployed
- Use in large scale event
- Integration with academic netcasting portal
- Support for more platforms (Real, WM)
- Further developments
- Participate:
<http://labetel.ing.uniroma1.it/opencdn/>

OpenCDN Project

[About](#)[News](#)[Documentation](#)[Mailing List](#)[Test Page](#)[Download](#)[CVS](#)[Contact](#)[Links](#)

What is this ?

OpenCDN pertains about the application-level development of a *Content Delivery Network*, suitable for replication and splitting of live and recorded multimedia content.

It is written in Perl, and wraps a *Relay* (which splits incoming media packets for each downstream flow) within a control plane, allowing for remote control of the Delivery process. Splitting nodes may be hierarchically arranged with the aid of a centralized control unit named *Request Routing and Distribution Management* (RRDM), also written in Perl. Communication in between RRDM and nodes, and in between nodes, is performed by [XML-RPC](#) calls.

Provided that a sufficient number of Relay nodes are scattered in between the source and the destinations, media can be efficiently distributed to a very large number of clients, without severe network and server requirements, actually performing an *Application Level Multicast* content routing.

The code is modular and should allow for easy porting to different Relay architectures: although development is based on the [Apple Darwin Streaming Server](#), use of Real or WM servers should be possible, by writing a new *Adaptation Layer* piece of code.

[Examples](#) are given of web-based operations, in which clients visit an announcement page, distribution is set-up, and a response page indicates the nearest node where the client can pick up the streaming content.

News

- April 16, 2004: milestone distribution 0.4-1 released. Main improvements are:
 - Darwin Streamin Server 5 is now used. Previous DSS releases will no more be supported

Summary

- TF-Netcast streaming video survey
- Live streaming announcement portal
- Open Content Delivery Network
- Not covered here:
 - Resources for content producers
 - Report on metadata for video-on-demand
- Find it all here:
<http://www.terena.nl/tech/task-forces/tf-netcast/>

What's next?

TF-Netcast will be followed by **TF-VVC**

- Covers Voice, Video & Collaboration
- Merger of TF-Netcast, TF-Stream, and IP Telephony cookbook project
- BoF session on **TF-VVC** later today:

Date: Wednesday, 9 June

Time: 17:30 - 18:00

Venue: Speakers' Room