



Tribler:

Internet standard for (anonymous²⁰¹⁴) streaming?



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Research goal: a new IETF Internet standard for streaming



Streaming&communication for:

Bittorrent

Wikipedia

Youtube

Skype

Twitter

MSN

Facebook

And below IPv4+NAT+IPv6

Plus creative new uses

P2P-Next: European Funding (19MEuro)



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Technology Quarterly: Q1 2010 ▾

Monitor

The bigger picture

Video on the internet: Why are public broadcasters experimenting with the “peer-to-peer” technology beloved of online pirates?

Mar 4th 2010 | from the print edition

LAST year Norway's public broadcaster, NRK, filmed a stunning seven-hour train ride between Bergen and Oslo, shot entirely in high-definition video. Over one million Norwegians watched the film on television. But NRK faced a challenge in reaching a larger audience. How could it distribute the hard-drive-busting 246 gigabytes of raw footage to a global audience without bringing its servers to a grinding halt? The broadcaster made a somewhat surprising choice: it turned to BitTorrent, a peer-to-peer (P2P) internet service best known as a means of sharing pirated movies and music.

Some at NRK worried that using a system associated with piracy would generate negative publicity. But BitTorrent itself is value neutral. It is a uniquely efficient distribution method that lets broadcasters “seed” the internet with one or two copies of their massive media files. It then relies on end users (called peers) who request the file and receive different pieces of it. To assemble a



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Sign Up

Create an account or **log in** to see what your friends are doing.



Is there a problem?

Cooperative streaming

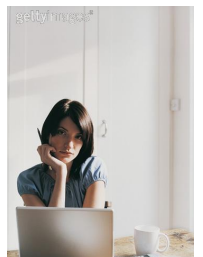
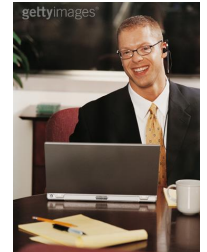


- P2P streaming (live&on-demand)
- Every user helps
- Forward video to others



1 of 100,000

0010101



2007: TUDelft & Harvard: bandwidth-as-a-currency



BBC NEWS | Technology - Mozilla Firefox

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http://news.bbc.co.uk/2/hi/technology/

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Technology

Last Updated: Saturday, 1 September 2007, 09:48 GMT 10:48 UK

File-sharers forced to play fair

Researchers aim to make file-sharing fairer by treating bandwidth like a currency.

- Speed boost plan for file-sharing
- Net firm warns on web video costs

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ALSO IN THE NEWS

NI sniffer dogs take DVD piracy fight to streets of New York

FROM THE BLOGOSPHERE

“To switch or not to switch? is becoming less of a question.”

NBC ends iTunes deal in price row

German spyware plans trigger row

Done

Upcoming IETF Internet standard



[ppsp] I-D Action: draft-ietf-ppsp-peer-protocol-00.txt - Chromium

[ppsp] I-D Action: draft-ietf- x

www.ietf.org/mail-archive/web/ppsp/current/msg01263.html

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[ppsp] I-D Action: draft-ietf-ppsp-peer-protocol-00.txt

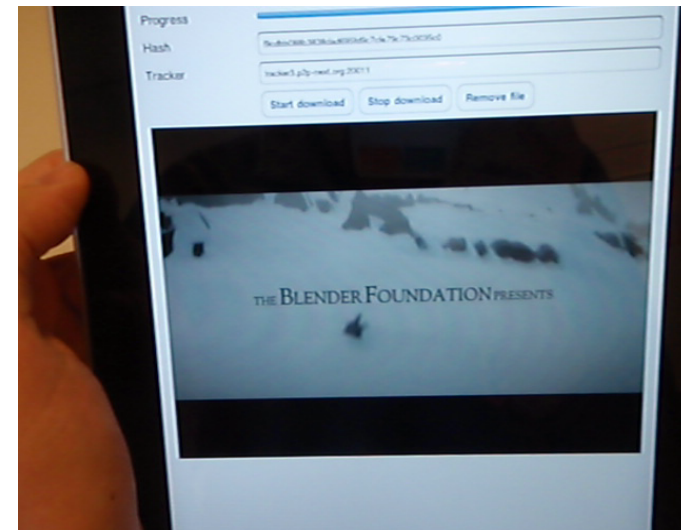
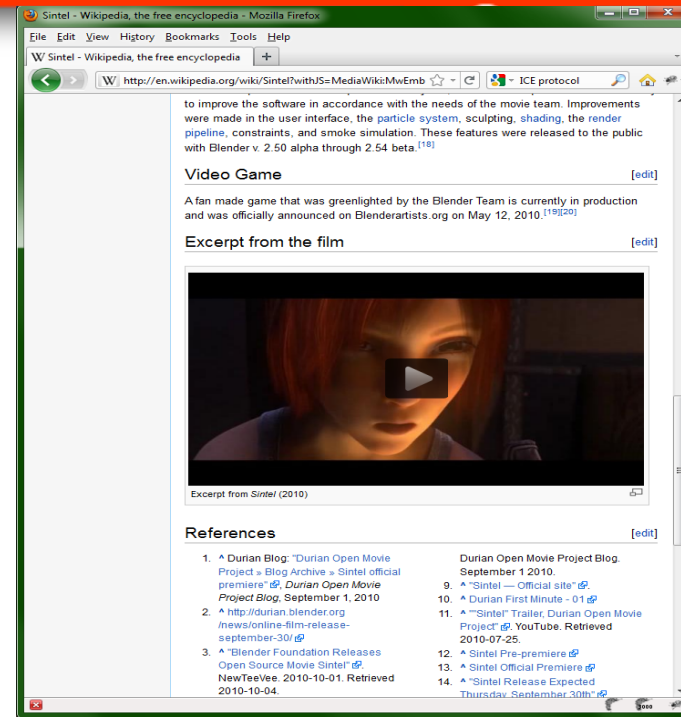
- *From:* [internet-drafts at ietf.org](mailto:internet-drafts@ietf.org)
- *To:* [i-d-announce at ietf.org](mailto:i-d-announce@ietf.org)
- *Cc:* [ppsp at ietf.org](mailto:ppsp@ietf.org)
- *Date:* Mon, 19 Dec 2011 01:47:39 -0800

A New Internet-Draft is available from the on-line Internet-Drafts directories. This draft is a work item of the Peer to Peer Streaming Protocol Working Group of the IETF.

Title	: Peer-to-Peer Streaming Protocol (PPSP)
Author(s)	: A. Bakker
Filename	: draft-ietf-ppsp-peer-protocol-00.txt
Pages	: 40
Date	: 2011-12-19

Libswift P2P streaming engine

- Radical redesign of P2P
- Implemented in C++
 - Video-on-demand over UDP
- Upcoming IETF standard (PPSP)
- Running on:
 - iPad, Android, set-top box
 - Inside a television
 - Firefox: `<video src="swift://... 100 KB plugin, en.wikipedia.org"`
 - within Tribler
- Designed for P2P caching + proxies (content-centric networking)



Source: Grishchenko, "On the Design of a Practical Information-Centric Transport", March 2011, <http://www.pds.ewi.tudelft.nl/fileadmin/pds/reports/2011/PDS-2011-006.pdf>

P2P-Next project: Industry usage

A screenshot of the Tribler application interface. The top bar shows icons for menu, chat, star, and a Twitter-like icon, followed by a "Peers" tab. Below this is a table of peers. The bottom section shows a video player with two "BBC three" logos, a video thumbnail, and a "DOCTOR WHO CONFIDENTIAL" logo. The status bar at the bottom indicates "This Is BBC Three" and "Now Playing".

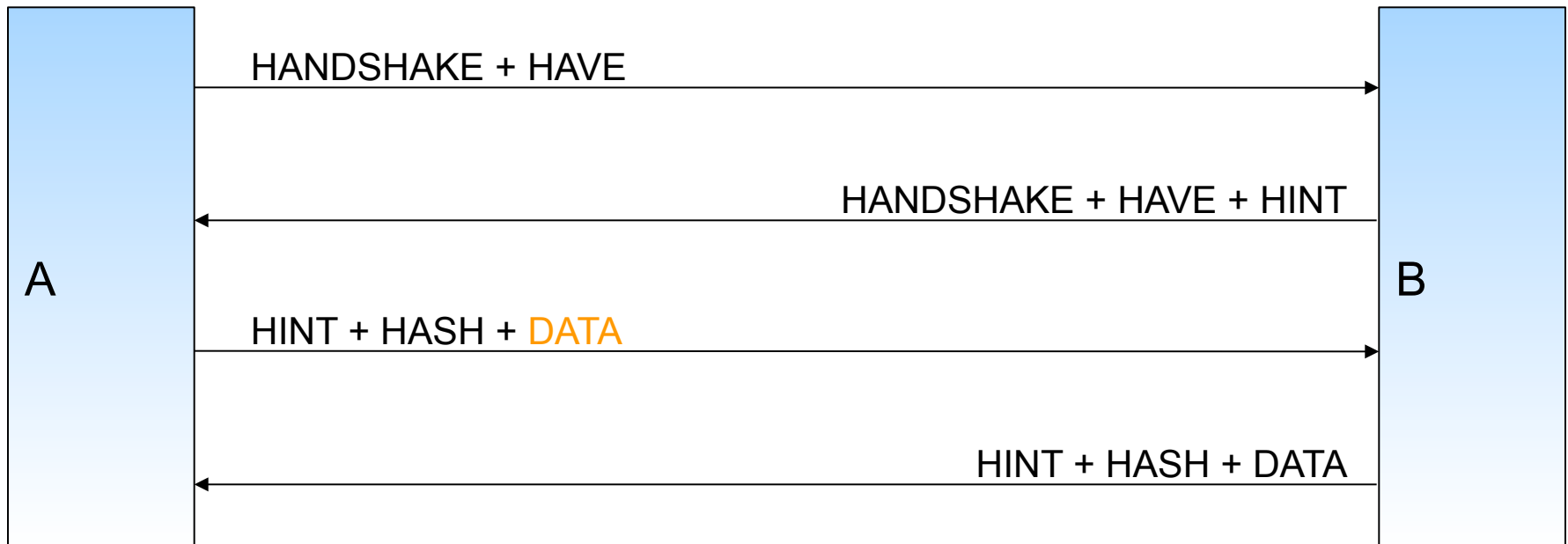
Name (IP:port)	↓ KiB/s	↓ KiB	↑ KiB/s	↑ KiB
Arno 130.161.211.240:7705	35	20480	33	15808
MarshConsult 82.33.212.26:7707	26	12896	30	13408
[Unknown 1] 130.161.211.198:7764	91	51392	0	0
[Unknown 2] 132.185.142.131:7705	45	18592	35	15872

Now Playing -04:17:...

Source: Arno Bakker, Delft University of Technology, IETF 81 PPSP WG 25.7.2011, Quebec City

Libswift on the wire (1)

- Peer A and B both have some chunks

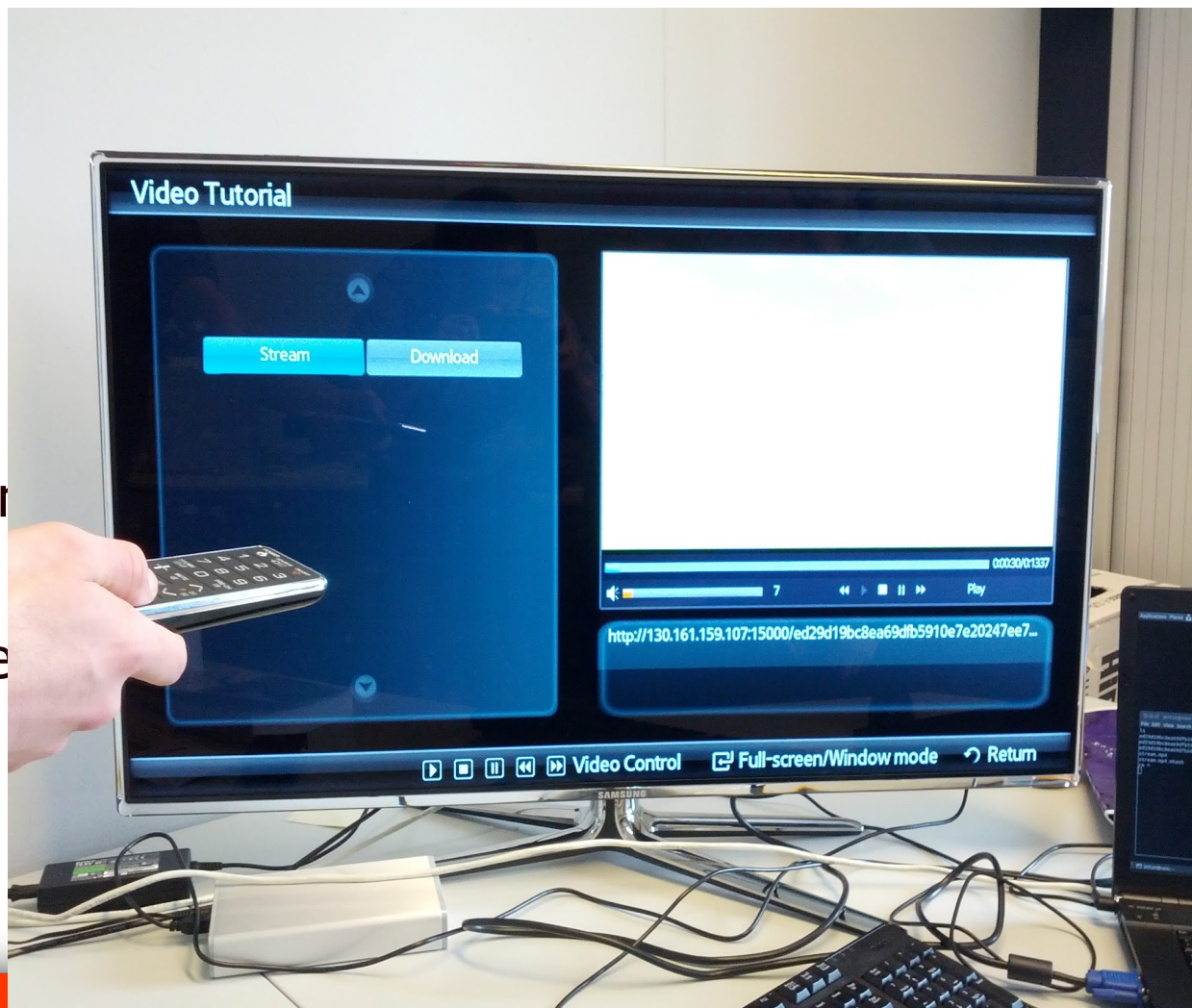


- Note: low latency, data transfer already in 3rd datagram.



Libswift inside TV firmware

- Self-forming:
 - Keyword search *Firmware: <http://www.tribler.org/SwiftTV>*
 - Sharing
 - Streaming
- Running code on a TV
- Samsung UE40D7000
- ARMv7 gcc-toolchain
- Thnx to SamyGO
- PPSP, LEDBAT, NAT, etc.
- Open Source
- 6 years of work, 12-18 people



"Tribler Mobile" app

From Android:



H.264
Encoder



PPSP
Engine



To Android:



PPSP
Engine



VLC



Delft University of Technology, IETF 85 PPSP WG 05.11.2012, Atlanta

No server infrastructure!

<https://play.google.com/store/apps/details?id=org.tribler.mobile>



Questions

Further reading:

"Tribler search and stream", <http://sigmm.org/records/records1201/featured03.html>

"Improving accuracy and coverage in an internet-deployed reputation mechanism", (Google is your friend)

Code: [Github.com/Tribler](https://github.com/Tribler)