

Music & the Internet

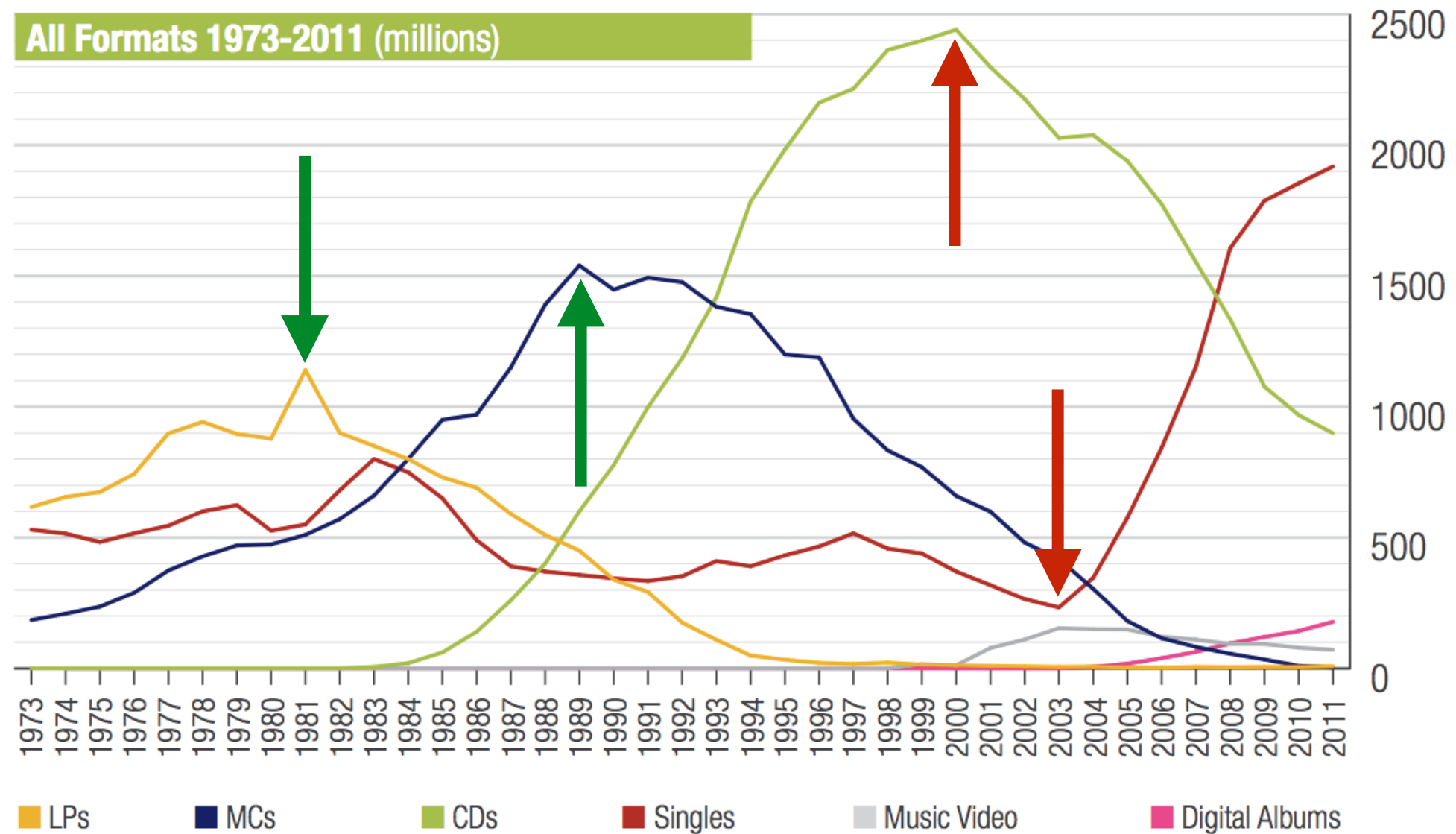
MUMT301

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Schulich School of Music
McGill University

Plan

- Review of the last class
 - Music distribution
- Internet radio broadcasting
- On-demand music services presentation
- HTML, forms, and simple API call

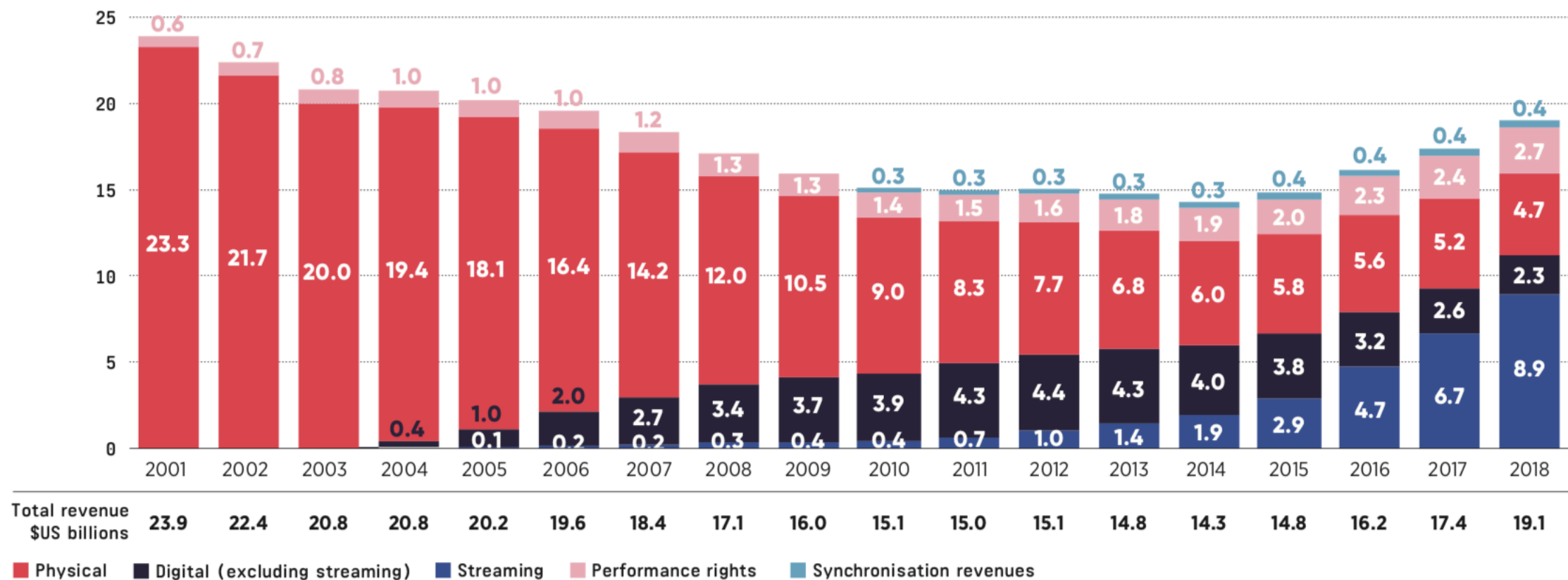
Global music sales by format



Taken from [Record Industry in Numbers 2011 \(IFPI\)](#)

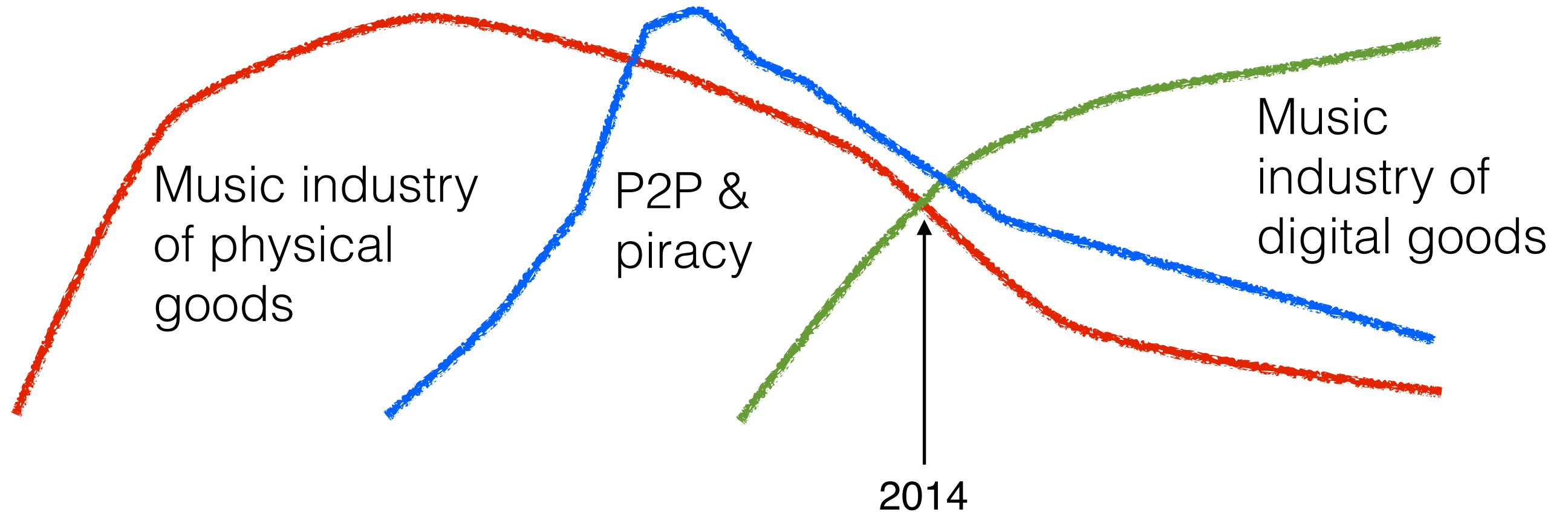
Global recorded music revenues

Global Recorded Music Industry Revenues 2001-2018 (US\$ Billions)



Taken from [Global Music Report 2019: State of the Music Industry](#)

Music industry



Peer to peer (P2P)

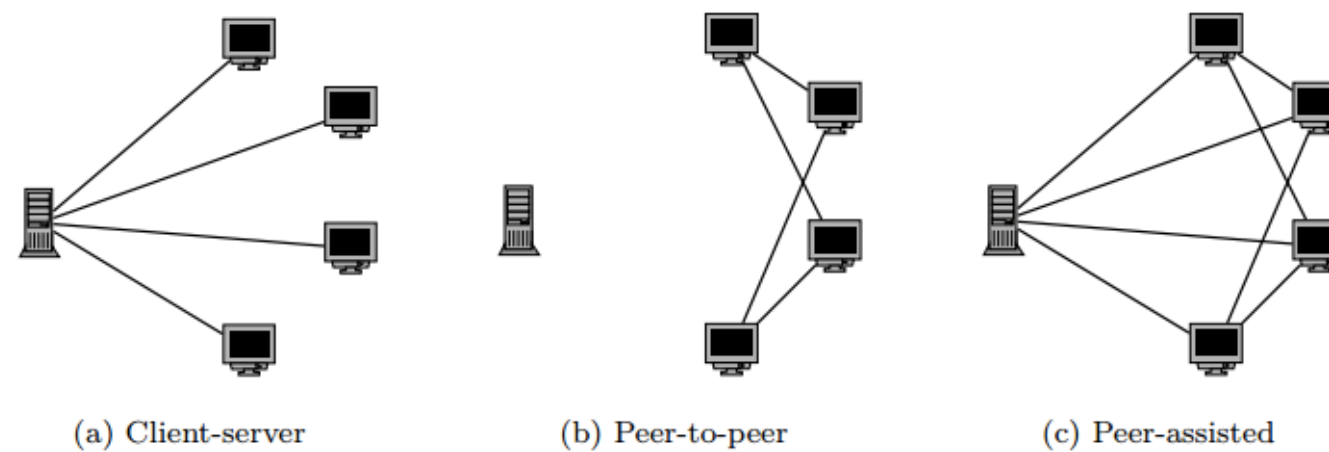
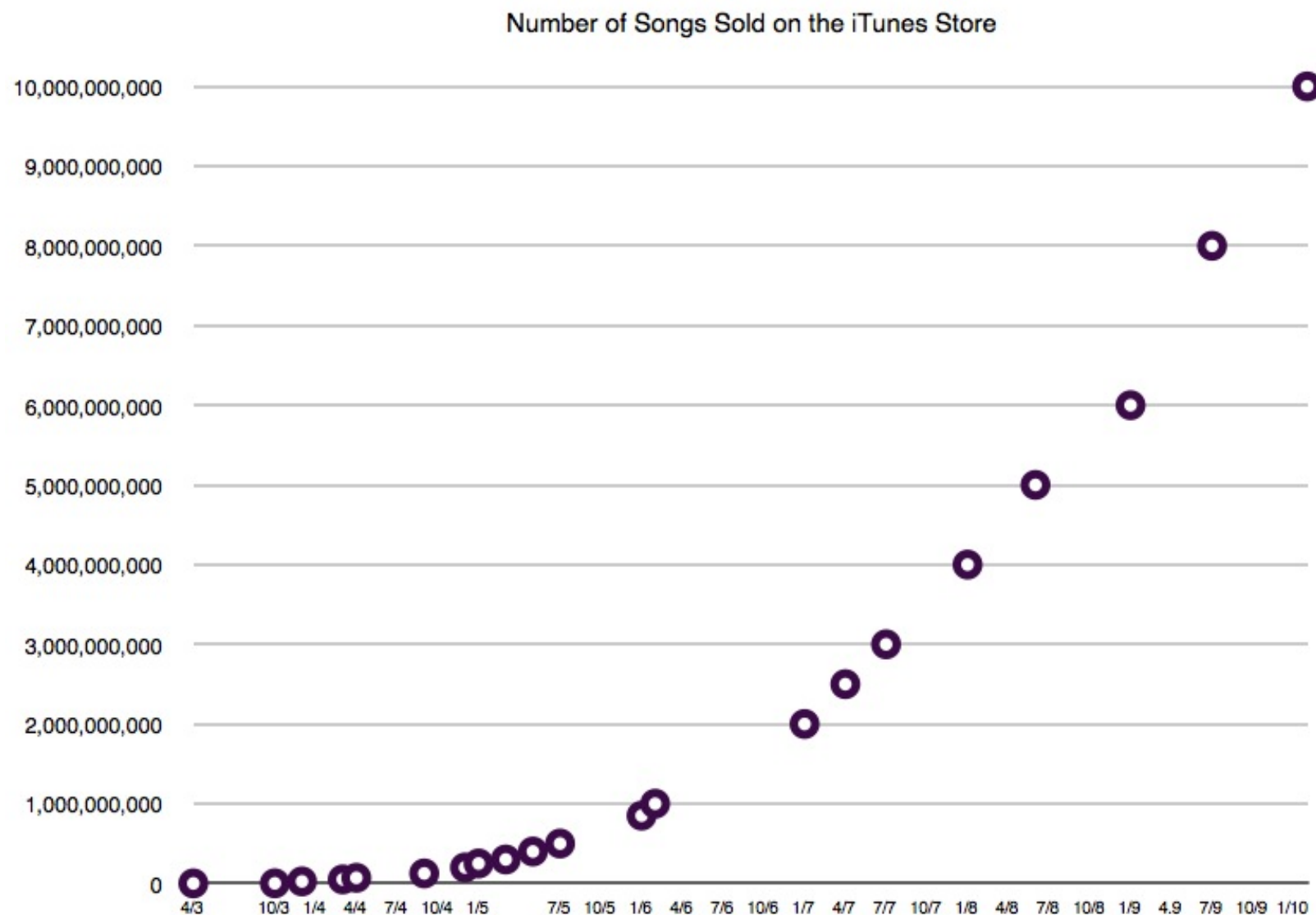


Figure 1.1: Three types of protocols.

Taken from [Kreitz, G. 2011. Aspects of Secure and Efficient Streaming and Collaboration. PhD Thesis. KTH Computer Science and Communication.](#)

iTunes Store songs sold

- Apple's iTunes Music Store is credited with finally getting people to pay for digital music, unveiled in 2003



Billionth Song	Days taken	Songs per day
1st	1033	968,054
2nd	322	3,105,590
3rd	203	4,926,108
4th	169	5,917,159
5th	157	6,369,426
6th	202	4,950,495
8th	197	5,076,142
10th	109	9,174,311

15th / Jun 2011
20th / Sep 2012
25th / Feb 2013
35th / May 2014

https://en.wikipedia.org/wiki/iTunes_Store

Digital music distribution models

- Music stores (buy to own)
- Music tracks are delivered online
- Music locker
- Music streaming via subscription

The musician's POV

- None of the digital music services will let you in directly
- Artists need to be signed to a major (or big indie) record label
- Or use a **digital music distributor** to get in a digital music service

Digital Distributors Comparison

ARI'S TAKE



# OF OUTLETS	90+	90+	200+	7	200+	90+	90+	200+
COMMISSION	9%	0%	0%	15% originals 30% covers	10%	0%	0%	0%
SIGN UP FEE	single = \$9.95 album = \$49	unlimited songs \$19.99	single = \$9 EP = \$20 album = \$35	unlimited songs \$0	unlimited songs \$39.99	single = \$9.95 album = \$19.95	single = \$9.99 album = \$29.99	\$25 + < 5 songs = \$10.99 (one time) < 10 songs = \$19.99 < 15 songs = \$29.99 16 + songs = \$39.99
YEARLY FEE	\$0	unlimited songs \$19.99	single = \$8 EP = \$20 album = \$25	unlimited songs \$0	unlimited songs \$39.99	single = \$9.95 album = \$49.95	single = \$9.99 album = \$49.99	\$0
ADDING STORES	free	free	free	free	free	free	\$1.98 per store	free
ITUNES WORLDWIDE? (100+ COUNTRIES)	yes	yes	yes	yes	yes	yes	yes	yes
SPEED TO ITUNES (weekdays)	1-2 days	1-2 days	varies	within a week	up to 30 days	1-3 days	1-3 days	weekly
TAKEDOWN COST	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
ITUNES PRE-ORDER	free	N/A	\$41.25	free	\$25	N/A	\$100	free
YOUTUBE MONETIZATION (commission)	30%	20% \$4.95/yr	0% \$79 sign up fee	N/A	20% via AdRev	N/A	10-20%	30%
ITUNES DIGITAL BOOKLET	N/A	N/A	N/A	yes	\$25	no	\$20	yes
PANDORA SUBMISSION	no	no	no	no	no	no	no	yes
CUSTOM LABEL NAME	free	\$16/yr for 2 artists \$60/yr 5+ artists	\$41.25 (one time)	free	\$39.99 one time +\$99/yr for 5+ artists	free	free	write in and ask
ISRC CODES	free	free	free	free	free	free	free	free
UPC CODES	\$5 single \$20 album	free	free	free	free	free	free	free
GET CODES BEFORE UPLOAD	no	yes	yes	no	no	no	yes	yes
SOUNDSKAN REGISTRATION	no	no	\$66-132	no	yes	no	no	no
OPT OUT OF STORES	yes	yes	yes	yes	yes	no	yes	yes
PAYMENT	weekly	immediate	immediate	monthly	monthly	monthly	monthly	quarterly
PAYMENT THRESHOLD	\$10	\$0	\$25	\$10	\$25	\$5	\$0	\$50

<http://aristake.com/?post=92>

Digital Distributors Comparison

ARI'S TAKE

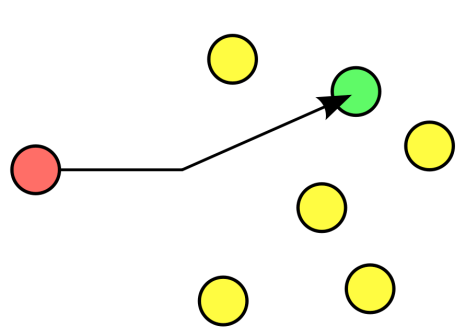
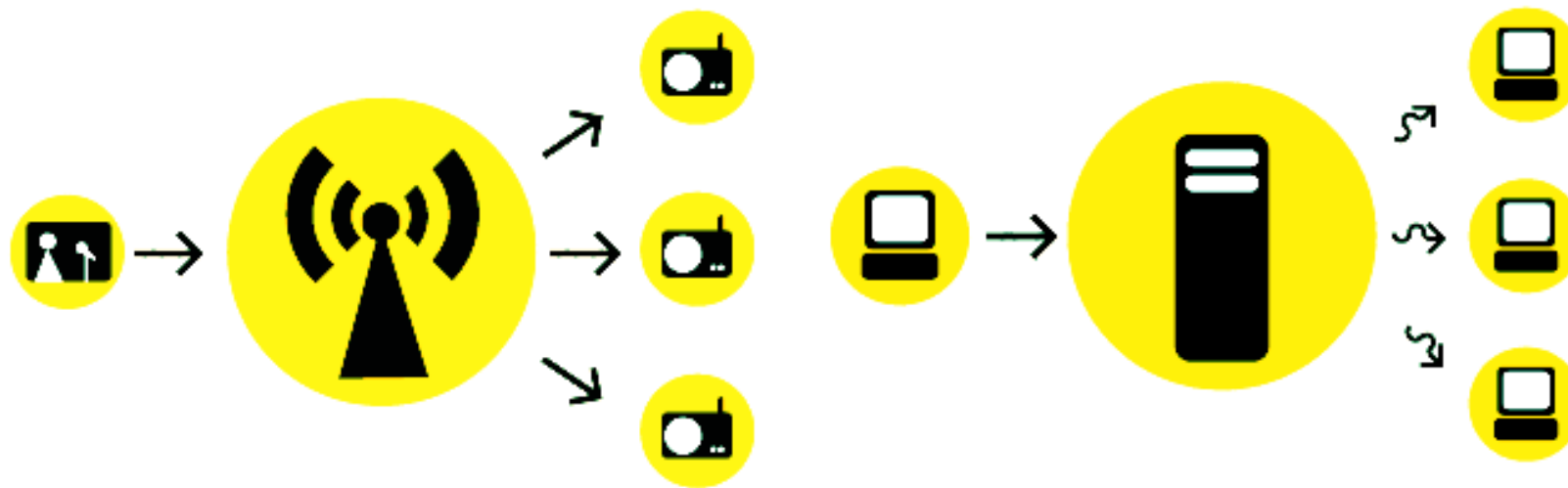


# OF OUTLETS	90+	90+	200+	7	200+	90+	90+	200+
COMMISSION	9%	0%	0%	15% originals 30% covers	10%	0%	0%	0%
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YEARLY FEE	\$0	unlimited songs \$19.99	single = \$8 EP = \$20 album = \$25	unlimited songs \$0	unlimited songs \$39.99	single = \$9.95 album = \$49.95	single = \$9.99 album = \$49.99	\$0
ADDING STORES	free	free	free	free	free	free	\$1.98 per store	free
ITUNES WORLDWIDE? (100+ COUNTRIES)	yes	yes	yes	yes	yes	yes	yes	yes
SPEED TO ITUNES (weekdays)	1-2 days	1-2 days	varies	within a week	up to 30 days	1-3 days	1-3 days	weekly
TAKEDOWN COST	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
ITUNES PRE-ORDER	free	N/A	\$41.25	free	\$25	N/A	\$100	free
YOUTUBE MONETIZATION (commission)	30%	20% \$4.95/yr	0% \$79 sign up fee	N/A	20% via AdRev	N/A	10-20%	30%
ITUNES DIGITAL BOOKLET	N/A	N/A	N/A	yes	\$25	no	\$20	yes
PANDORA SUBMISSION	no	no	no	no	no	no	no	yes
CUSTOM LABEL NAME	free	\$16/yr for 2 artists \$60/yr 5+ artists	\$41.25 (one time)	free	\$39.99 one time +\$99/yr for 5+ artists	free	free	write in and ask
ISRC CODES	free	free	free	free	free	free	free	free
UPC CODES	\$5 single \$20 album	free	free	free	free	free	free	free
GET CODES BEFORE UPLOAD	no	yes	yes	no	no	no	yes	yes
SOUNDSKAN REGISTRATION	no	no	\$66-132	no	yes	no	no	no
OPT OUT OF STORES	yes	yes	yes	yes	yes	no	yes	yes
PAYMENT	weekly	immediate	immediate	monthly	monthly	monthly	monthly	quarterly
PAYMENT THRESHOLD	\$10	\$0	\$25	\$10	\$25	\$5	\$0	\$50

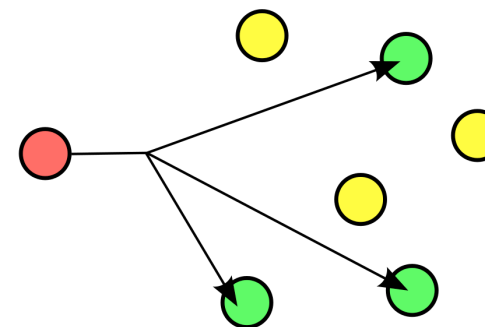
<http://aristake.com/?post=92>

On-demand music services presentation

Internet radio broadcasting

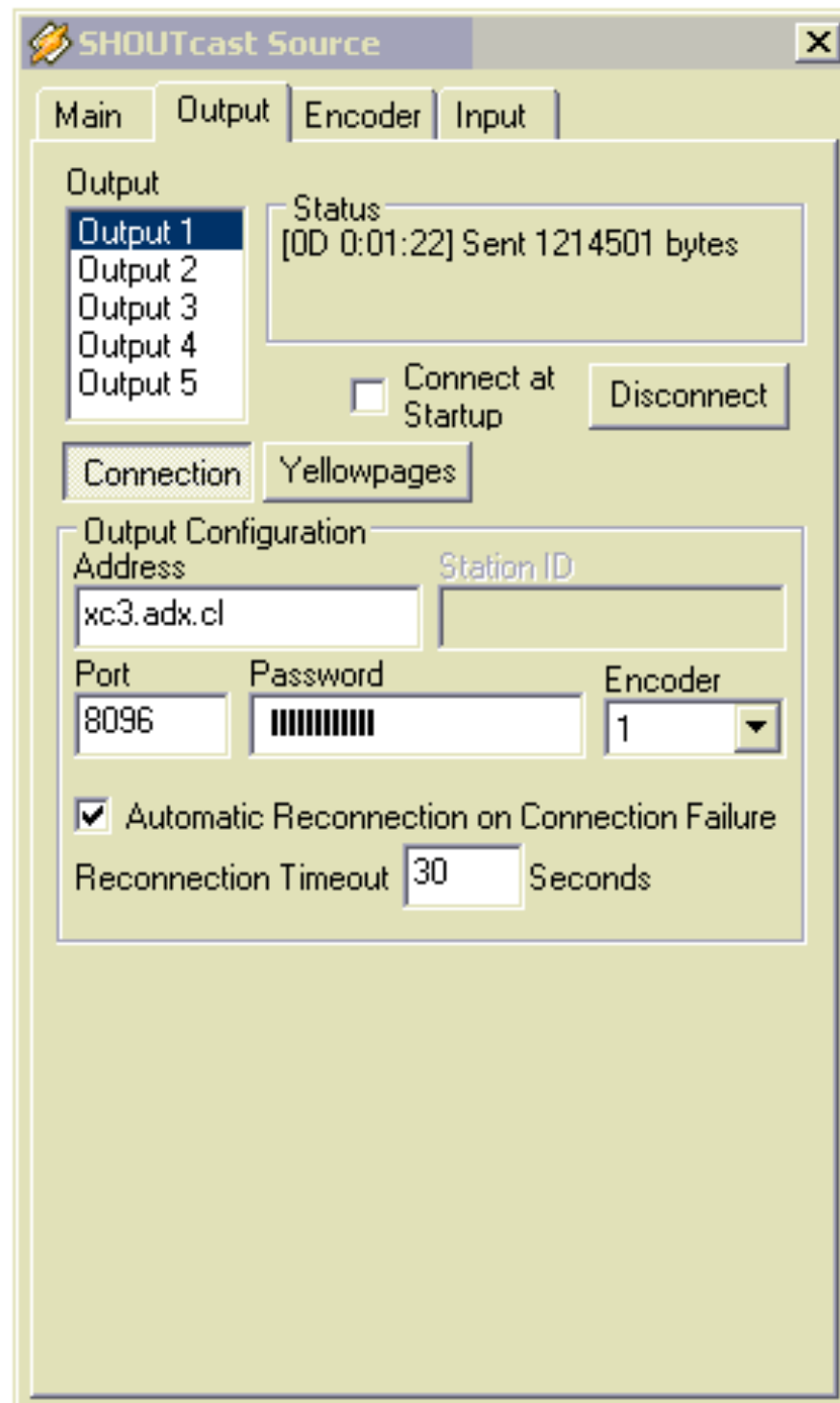


Unicast: Sends IP packets to identified recipients on a network, with added bandwidth



Multicast: sends IP packets to a group of hosts on a network, with no added bandwidth, and not requiring prior knowledge of who or how many receivers there are.

Playlist management



Playlist management

The screenshot displays the Nicecast Broadcast application interface. The top window, titled "Broadcast", shows the "Nicecast" logo and a "Stop Broadcast" button. The state is "On Air" with a level indicator. The source is set to "System Audio". Below this, there are buttons for "Source", "Info", "Titles", "Quality", "Share", and "Effects".

The "Share" section includes a "Share your broadcast with the world." message and a "Server Checker" button. The "Address" field shows the Internet and Local URLs: <http://192.168.1.118:8001/listen.m3u>. The "Now Playing" section shows a list of tracks, with "Die Abschaffung der Arten" by Mouse on Mars currently playing.

The main playlist window, titled "pherinfonprozeession", shows a list of tracks with columns for Name, Time, Artist, Album, Genre, Rating, and Plays. The current track is "Die Abschaffung der Arten" by Mouse on Mars, with a time of 2:38 and a rating of 3 stars.

	Name	Time	Artist	Album	Genre	Rating	Plays
1	Faith	5:53	Ada	Meine zarten Pfoten	Rock		1
2	On The Mend	4:33	Ada	Meine zarten Pfoten	Rock		1
3	Likely	3:36	Ada	Meine zarten Pfoten	Rock		1
4	The Jazz Singer (re-imagined by Ada)	4:40	Ada	Meine zarten Pfoten	Rock		1
5	Intro	4:06	Ada	Meine zarten Pfoten	Rock		1
6	At The Gate	7:29	Ada	Meine zarten Pfoten	Rock		1
7	Interlude	3:15	Ada	Meine zarten Pfoten	Rock		1
8	Happy Birthday	6:14	Ada	Meine zarten Pfoten	Rock		1
9	2 Likely	10:08	Ada	Meine zarten Pfoten	Rock		1
10	Ritual Union	3:30	Little Dragon	Ritual Union	Electronica		3
11	Little Man	2:42	Little Dragon	Ritual Union	Electronica		3
12	Brush The Heat	4:13	Little Dragon	Ritual Union	Electronica		3
13	Shuffle A Dream	2:55	Little Dragon	Ritual Union	Electronica		3
14	Please Turn	3:33	Little Dragon	Ritual Union	Electronica		3
15	Crystalfilm	4:49	Little Dragon	Ritual Union	Electronica		2
16	Precious	3:51	Little Dragon	Ritual Union	Electronica		2
17	Nightlight	3:25	Little Dragon	Ritual Union	Electronica		2
18	Summertearz	3:54	Little Dragon	Ritual Union	Electronica		2
19	When I Go Out	6:02	Little Dragon	Ritual Union	Electronica		2
20	Seconds	4:31	Little Dragon	Ritual Union	Electronica		2
21	aggro moderato	1:50	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
22	veränderungen	6:28	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
23	femtotöne	1:08	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
24	hawai	2:17	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
25	pherinfonprozeession	4:29	Mouse on Mars	Abschaffung der...	Soundtrack	★★★	1
26	ferngefühl	2:13	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
27	cyrus hill	0:43	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
28	news of gente	1:53	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
29	durch die wüste	1:57	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
30	dramus	4:16	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
31	ortlos	0:56	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
32	holos	0:22	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
33	opium	2:44	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
34	windhunde	0:31	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
35	arten braten	0:47	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
36	viele fragen	1:45	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
37	thema der gente	1:28	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
38	tutti genti estinti	1:01	Mouse on Mars	Abschaffung der Ar...	Soundtrack		1
39	Black Scars	3:14	The Residents	Dolor Generar	avantgarde, experimental...	★★	1
40	Burning Madrone	2:15	The Residents	Dolor Generar	avantgarde, experimental...		1
41	Mary Achi	2:42	The Residents	Dolor Generar	avantgarde, experimental...		1
42	Memorv of Transaression	2:41	The Residents	Dolor Generar	avantoarde. experimental...		1

Automated radio broadcasting

SAM Broadcaster - Radio Armable

File Player General Window Layout Tools Help

▶ || ■ ▶ **Mute** **Auto DJ** Desktop A Desktop B Desktop C Config Hide ? 23:27:50 45 viewers, peak of 45

Deck A

The Knife - We Share Our Mother's Health

Cur 0:24.3 192 kbps
Tot 4:11.4 44.1 kHz
Rem -3:47.1 Stereo
Intro : bpm

Volume -0 to -30 dB

CP EQ

Air Cue

Deck B

Sleeparchive - Sleep Cycle 6

Cur 0:00.0 192 kbps
Tot 0:40.0 44.1 kHz
Rem -0:40.0 Stereo
Intro : bpm

Volume -0 to -30 dB

CP EQ

Air Cue

History

Time	Artist - Title	Duration
23:27:30	The Knife - We Share Our Mother's Health	4:11
23:27:00	ARMABLE - mx_2	0:32
23:26:45	Roots of Chicha - Carinito	4:05
23:19:27	Can - Paperhouse	7:28
23:11:54	Alex - 28122002	7:41
23:08:17	Lee Scratch Perry & The Upsetters - Super	3:49
23:02:56	Morgan Geist - Skyblue Pink	5:26
22:55:57	Closer Muzik - Closer Dance...	7:05
22:48:35	Villalobos - Bahaha Hah...	7:34

200 tracks (23:25:39)

Queue

ETA	Artist - Title	Duration
23:32:18	Boards of Canada - opening the mouth	1:11
23:33:30	Chet Baker - I've Never Been In Love Before	4:30
23:38:01	Burial - Near Dark	3:58
23:41:59	Alvin Curran - Canti Illuminati (edit) (1978)	34:00
0:16:00	Milton Babbitt - Philomel (edit)	21:17
0:37:17	Raymond Scott - Cindy Electronium (1959)	8:58
0:46:16	ARMABLE - mx_2	0:32
0:46:48	DJ Raff - I Need a Beat feat. Maca Melendez	3:11
0:49:59	Arthur Russell - Our Last Night Together	3:27
0:53:27	Zomby - Mozaik	3:12

10 tracks (1:24:20)

FTP log

FTP Log FTP Queue

~ Log cleared...
< 226-File successfully transferred
< 226 0.125 seconds (measured here), 39.14 Kbytes per second
! 5021 bytes received/sent in 0 seconds (40168 Bytes/sec)
> QUIT
< 221-Goodbye. You uploaded 7 and downloaded 0 kbytes.

2 items in FTP queue

Playlist

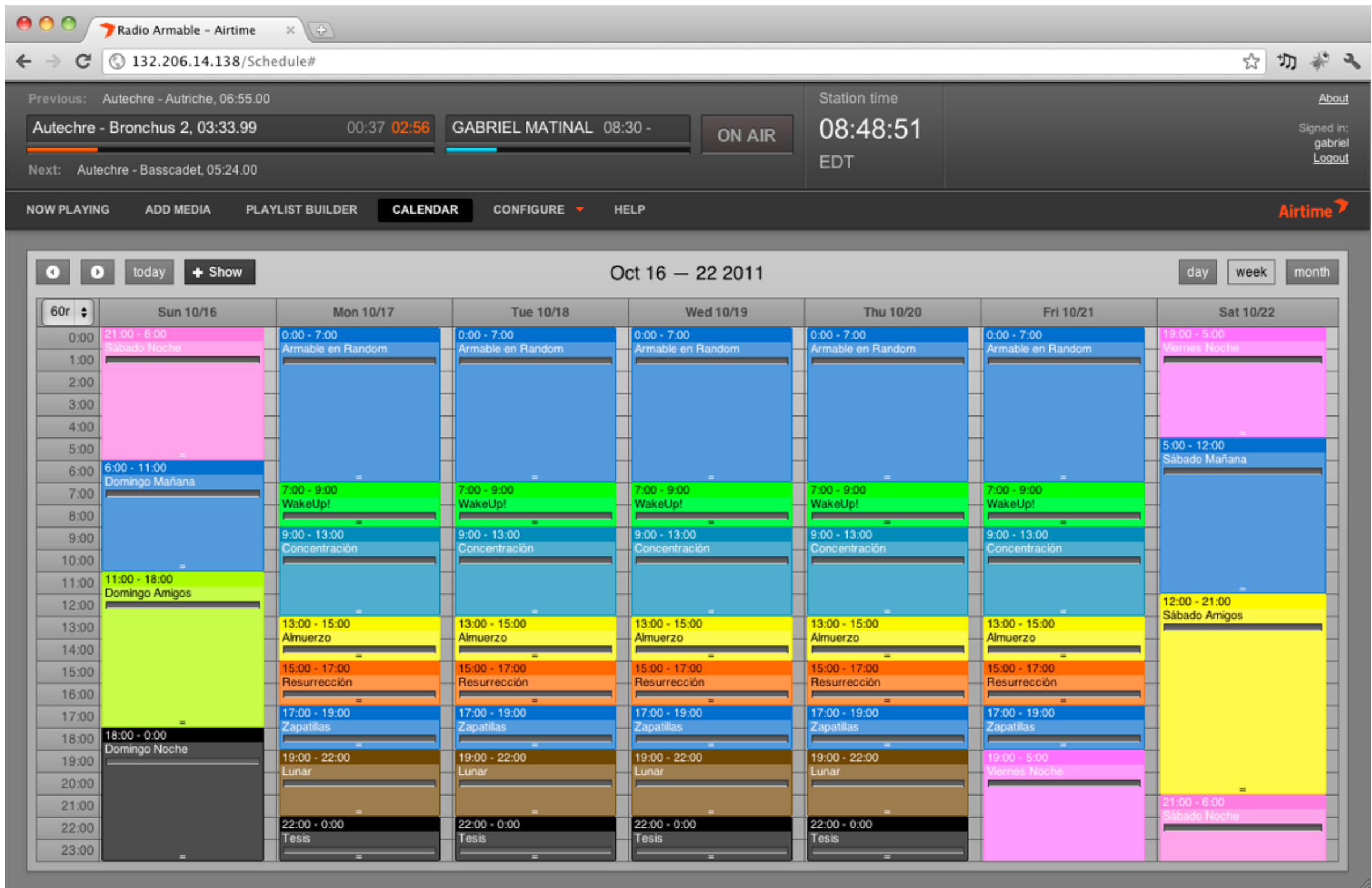
#	Artist - Title	Duration
1	Zomby - A Devil Lay Here	2:51
2	Zomby - Alothea	2:49
3	Zomby - Black Orchid	1:33
4	Zomby - Digital Rain	3:29
5	Zomby - Florence	1:40
6	Zomby - Haunted	2:18
7	Zomby - Lucifer	0:56
8	Zomby - Mozaik	3:12
9	Zomby - Natalia's Song	4:03
10	Zomby - Riding With Death	2:02
11	Zomby - Salamander	0:51
12	Zomby - Things Fall Apart	2:50
13	Zomby - Vanquish	0:59
14	Closer Muzik - Giganten	9:14
15	Closer Muzik - Closer Dancer	7:05
16	Losoul - late play	2:28
17	Losoul - resisting curare	6:43
18	Losoul - sunbeams and the rain	7:23
19	Losoul - position	6:27
20	David Tudor - Rainforest Version 1...	24:56
21	Villalobos - Y.G.H	8:16
22	Villalobos - Bahaha Hahi	7:34
23	Villalobos - I try to love (Can I live?)	9:21
24	Roots of Chicha - Sonido Amazonico	2:35
25	Roots of Chicha - Linda Nena	3:45
26	Roots of Chicha - A Patricia	3:14
27	Roots of Chicha - Carinito	4:05
28	Roots of Chicha - El Guapo	3:04
29	Roots of Chicha - Ya Se Ha Muert...	4:09
30	Roots of Chicha - El Milagro Verde	2:43
31	Roots of Chicha - Para Elisa	2:46

298 tracks (33:03:55+??)

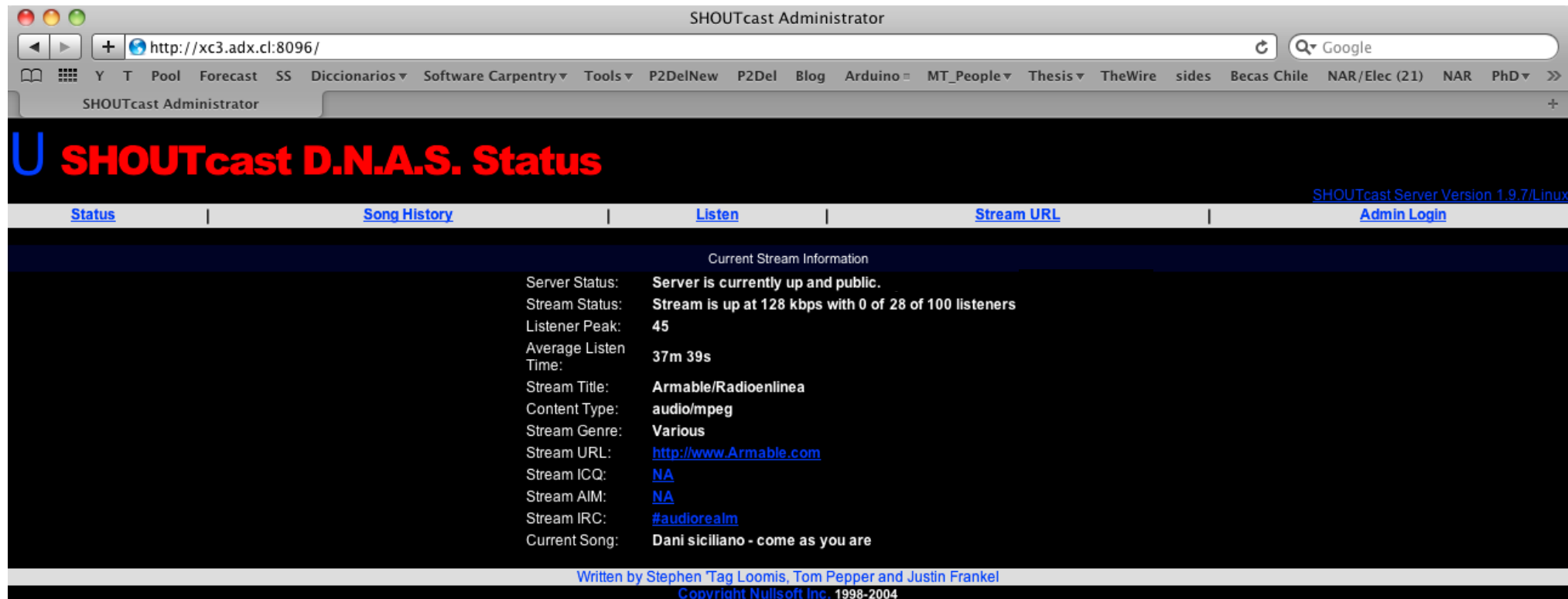
Playlist Categories

- Playlist
- WakeUp
- Tesis
- Concentracion
- Almuerzo
- Resurreccion
- Zapatillas
- Lunar

Social radio applications



Streaming media servers



The screenshot shows a web browser window titled "SHOUTcast Administrator" with the address bar displaying "http://xc3.adx.cl:8096/". The page features a navigation bar with links: Status, Song History, Listen, Stream URL, and Admin Login. The main content area, titled "SHOUTcast D.N.A.S. Status", displays "Current Stream Information" for a server named "Armable/Radioenlinea". The status is "Server is currently up and public." with a stream rate of 128 kbps and 0 of 28 of 100 listeners. Other details include a listener peak of 45, an average listen time of 37m 39s, content type of audio/mpeg, and stream genre of Various. The stream URL is http://www.Armable.com, and the current song is "Dani siciliano - come as you are". The footer credits Stephen Tag Loomis, Tom Pepper, and Justin Frankel, with a copyright notice for Nullsoft Inc. 1998-2004.

SHOUTcast Administrator

http://xc3.adx.cl:8096/

SHOUTcast D.N.A.S. Status

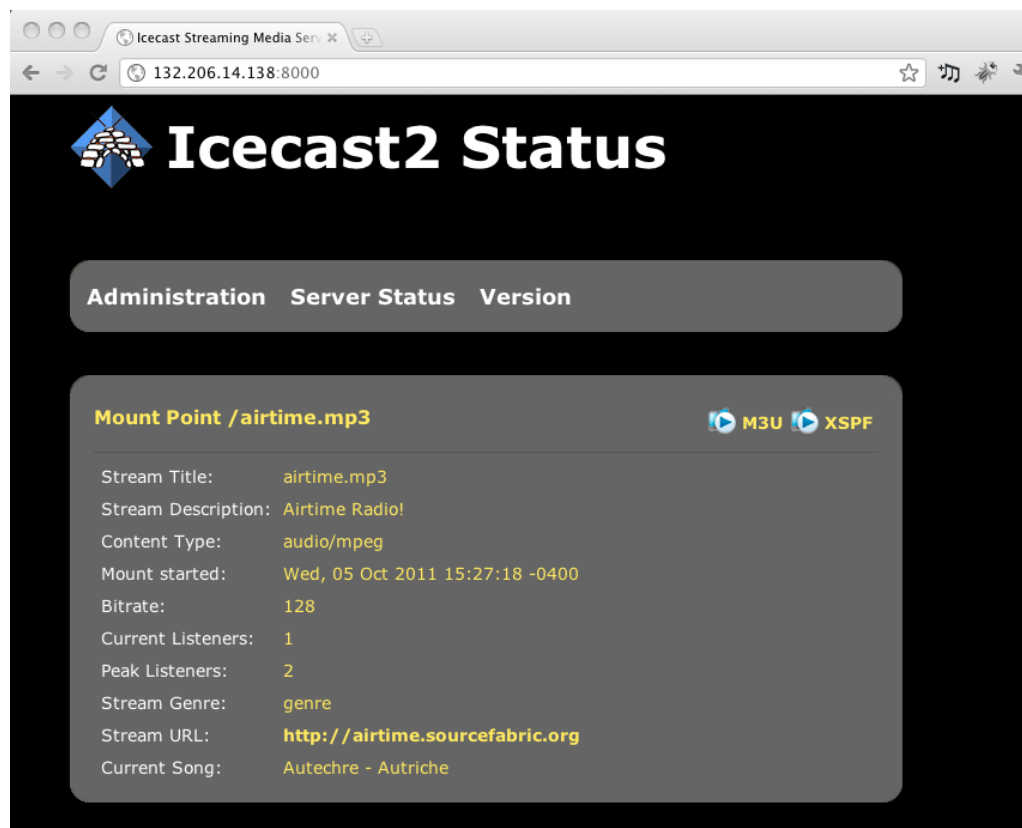
SHOUTcast Server Version 1.9.7/Linux

Status | Song History | Listen | Stream URL | Admin Login

Current Stream Information

Server Status: Server is currently up and public.
Stream Status: Stream is up at 128 kbps with 0 of 28 of 100 listeners
Listener Peak: 45
Average Listen Time: 37m 39s
Stream Title: Armable/Radioenlinea
Content Type: audio/mpeg
Stream Genre: Various
Stream URL: <http://www.Armable.com>
Stream ICQ: [NA](#)
Stream AIM: [NA](#)
Stream IRC: [#audiorealm](#)
Current Song: Dani siciliano - come as you are

Written by Stephen Tag Loomis, Tom Pepper and Justin Frankel
Copyright Nullsoft Inc. 1998-2004



The screenshot shows a web browser window titled "Icecast Streaming Media Service" with the address bar displaying "132.206.14.138:8000". The page features a navigation bar with links: Administration, Server Status, and Version. The main content area, titled "Icecast2 Status", displays "Mount Point /airtime.mp3" with a play button icon and "M3U XSPF" links. The status is "Mount Point /airtime.mp3" with a stream rate of 128 kbps and 1 of 2 of 100 listeners. Other details include a listener peak of 2, an average listen time of 37m 39s, content type of audio/mpeg, and stream genre of Various. The stream URL is http://airtime.sourcefabric.org, and the current song is "Autechre - Autriche".

Icecast Streaming Media Service

132.206.14.138:8000

Icecast2 Status

Administration | Server Status | Version

Mount Point /airtime.mp3

Stream Title: airtime.mp3
Stream Description: Airtime Radio!
Content Type: audio/mpeg
Mount started: Wed, 05 Oct 2011 15:27:18 -0400
Bitrate: 128
Current Listeners: 1
Peak Listeners: 2
Stream Genre: genre
Stream URL: <http://airtime.sourcefabric.org>
Current Song: Autechre - Autriche

<http://icecast.org/faq/>

Streaming media servers

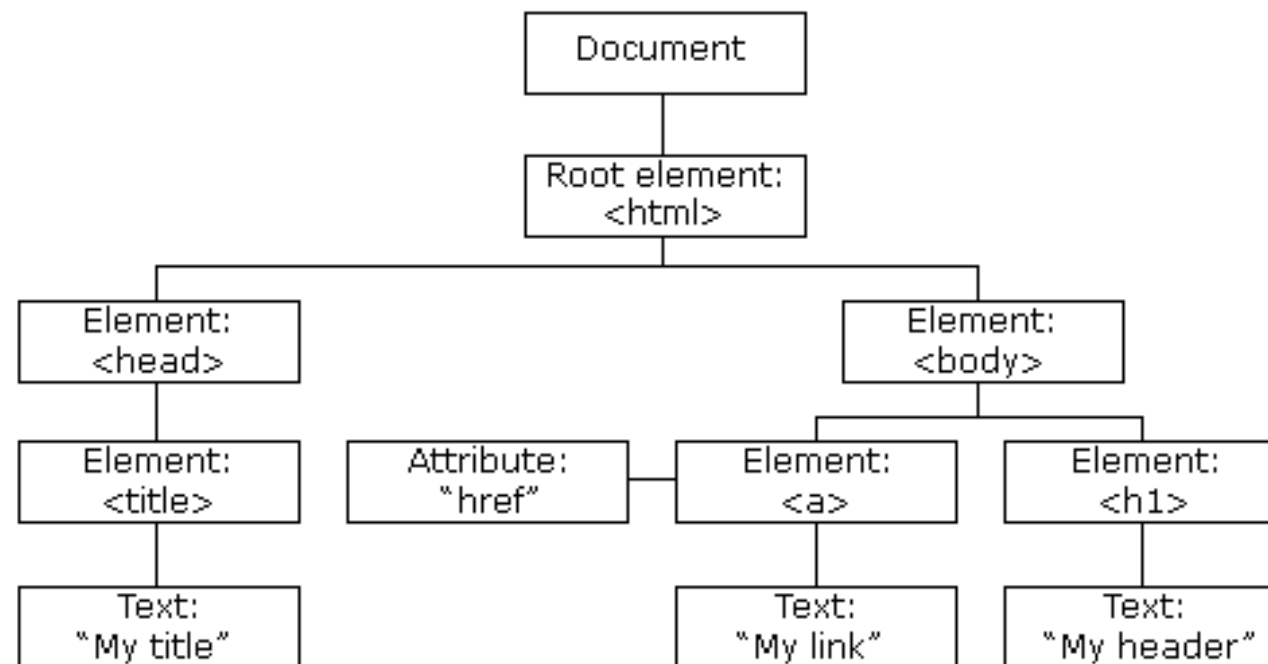
Demo!

- Playlisting app: Spotify
- Audio routing app:
 - Free and open source: Butt + Soundflower
 - Paid and proprietary: Audio Hijack + Loopback
- Streaming media server: Icecast

BREAK

HTML DOM

- "The W3C Document Object Model (DOM) is a platform and language-neutral interface that allows programs and scripts to dynamically access and update the content, structure, and style of a document."
- When a web page is loaded, the browser creates a Document Object Model of the page
- The DOM is constructed as a tree of objects



- With the object model, JavaScript gets all the power it needs to create dynamic HTML