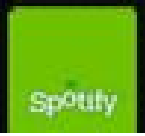
Spotify™
Distributed Systems
Jon Åslund
@jooon
TopPitchDeck

Who am I?

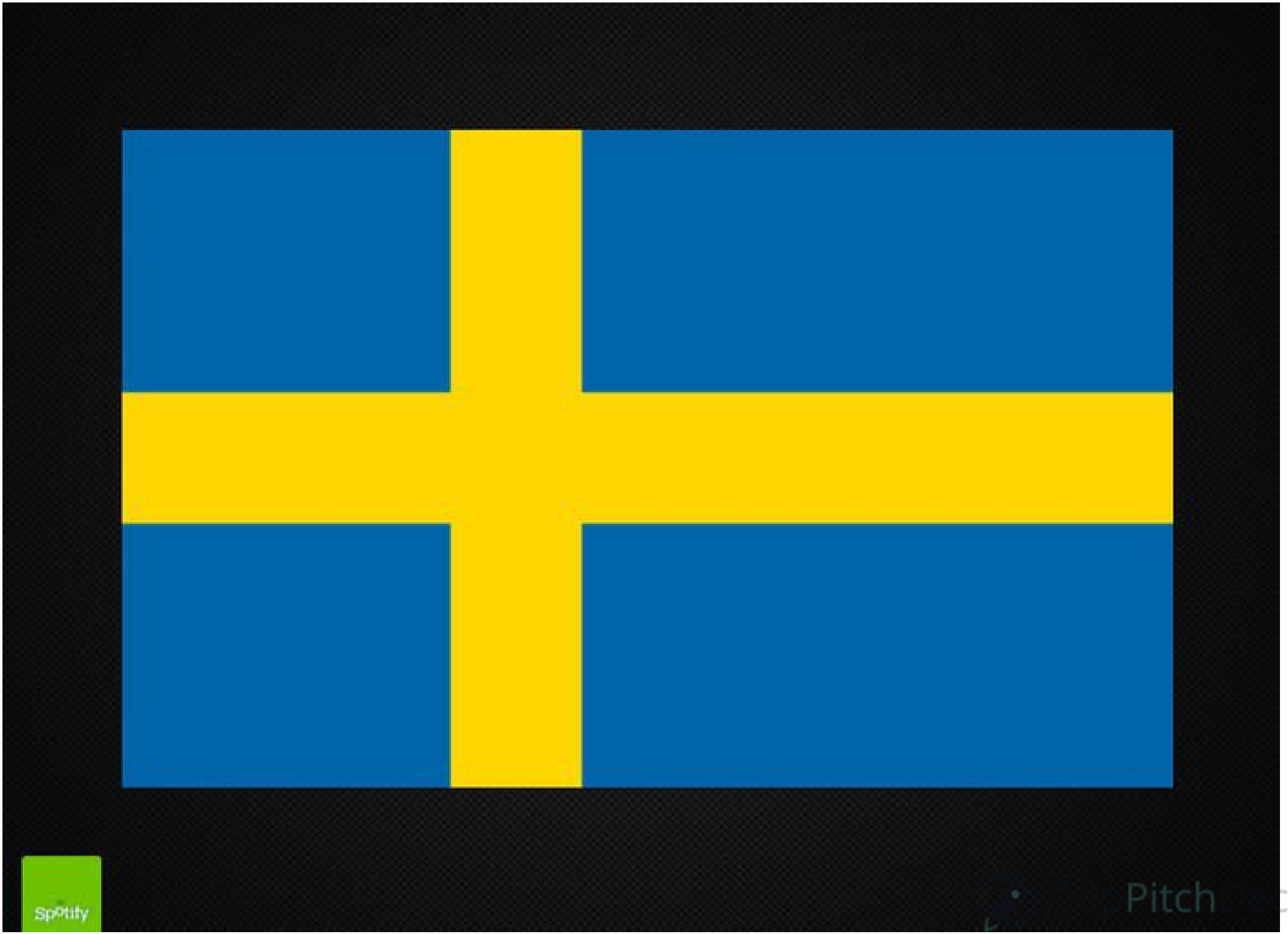


Pitch

Jon Åslund

Spotify

Pitch


Spotify
Pitch

Computer Science

Pitch ck

KTH
VETENSKAP
OCH KONST

Shakespeare Programming Language

Pitch ck

Joined Spotify
Autumn 2006

Pitch

April 2006
the idea

Pitch ck

Spotify™

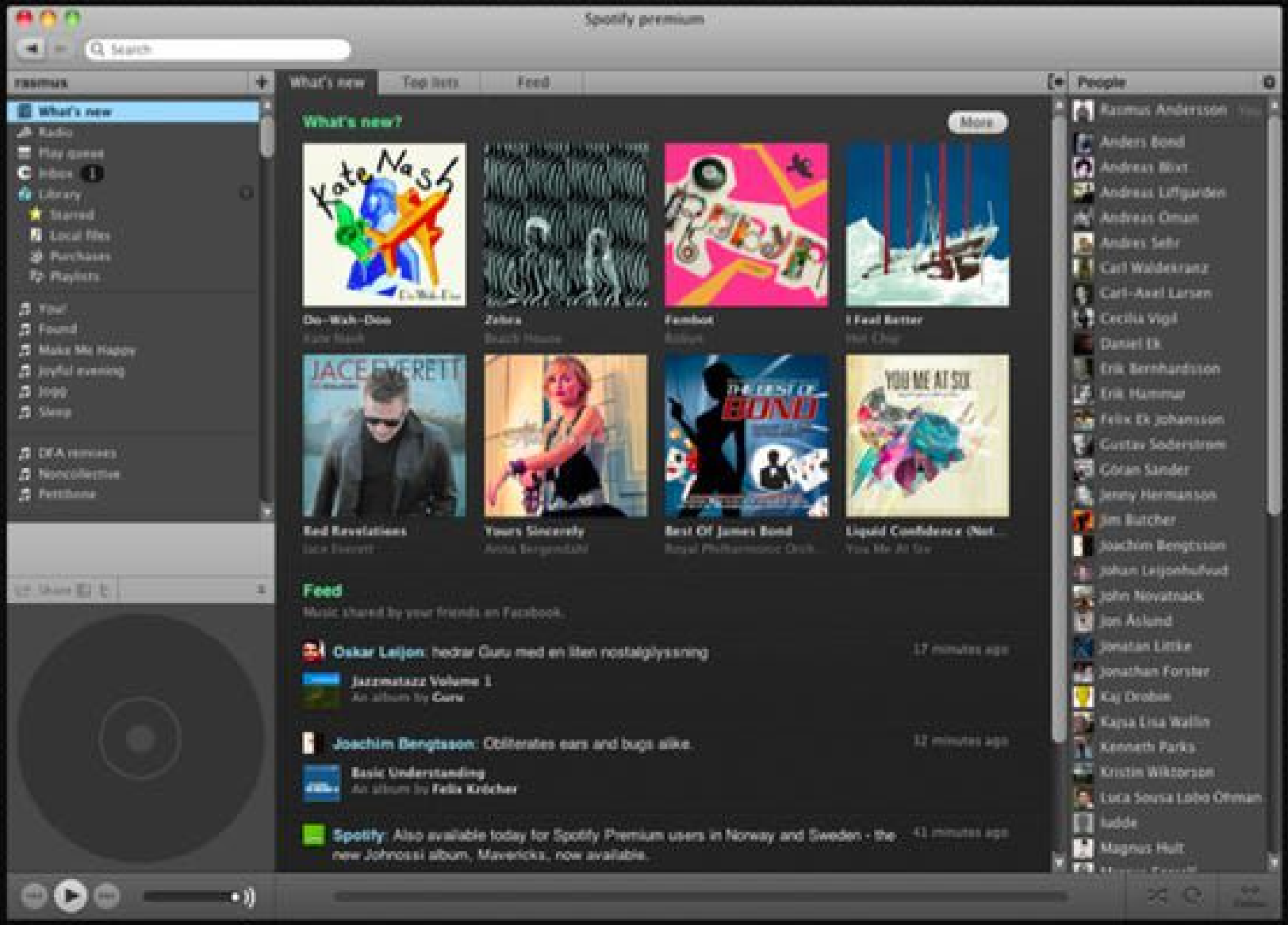
Pitch

"music itself is going to become like running water or electricity"

David Bowie, 2002

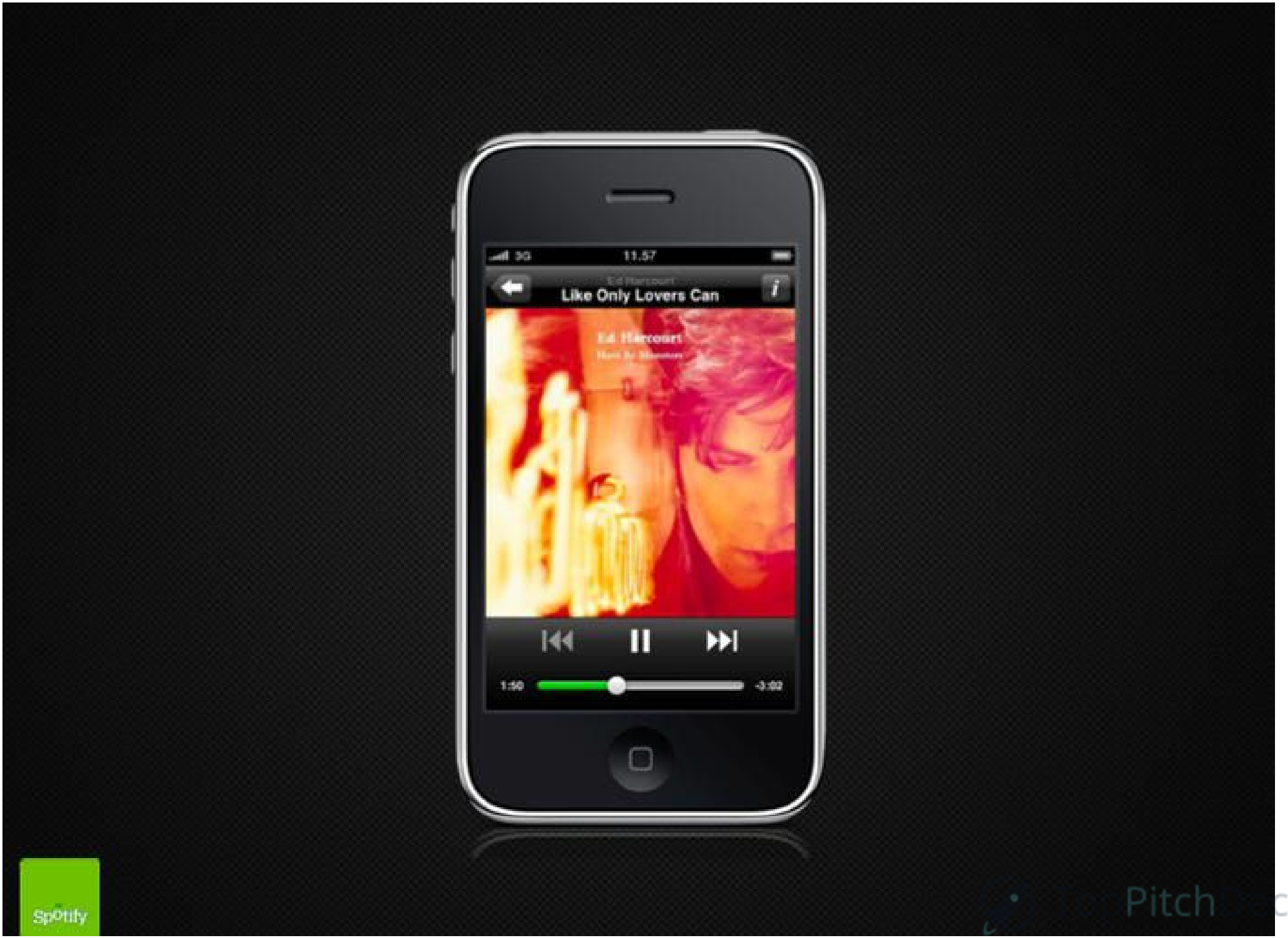
Spotify

Pitch



Spotify

Pitch ck


3G
11.57
Like Only Lovers Can
Ed Harcourt
1:50
-3:02
Spotify
Pitch

Pitch

Spotify Box – Jordi Parra @zenona

February 2012

Pitch

10+ million users

(active within previous 30 days)

Pitch

15+ million tracks

Pitch

500+ million playlists

Spotify

Pitch

1000+ servers
in 3 countries

Pitch ck

Spotify is a distributed system

Spotify

Pitch

Fast
<200ms

Spotify

Pitch

Always working

Pitch ck

How do you accomplish that?

Spotify

Pitch

Cheat
as much as possible

Spotify

Pitch ck

Fast
vs
Feels fast

Spotify

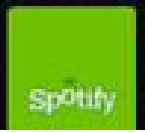
Pitch

Always working
vs
Pretend there is
nothing wrong

Spotify

Pitch ck

Build to fail



Pitch ck

Redundancy
(talk about waffles)

Pitch ck

Error recovery

Pitch

Don't forget to test your recovery code

Pitch ck

Fire drill: Cut the atlantic cable

Spotify

Pitch

Netflix
Chaos Monkey

spotify

Pitch

"On January 15, 1990, AT&T's long-distance telephone switching system crashed."

Pitch

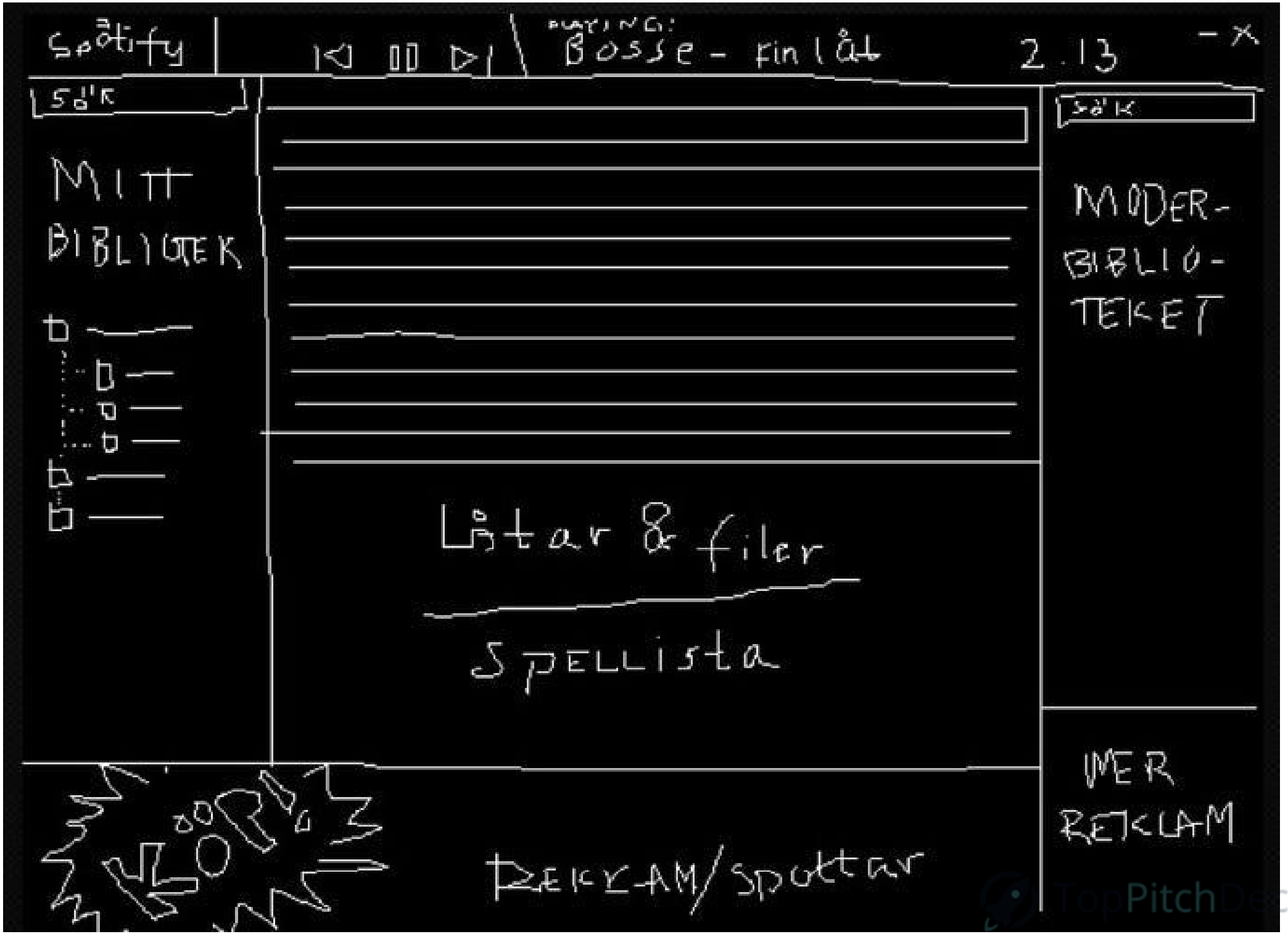
Isolation

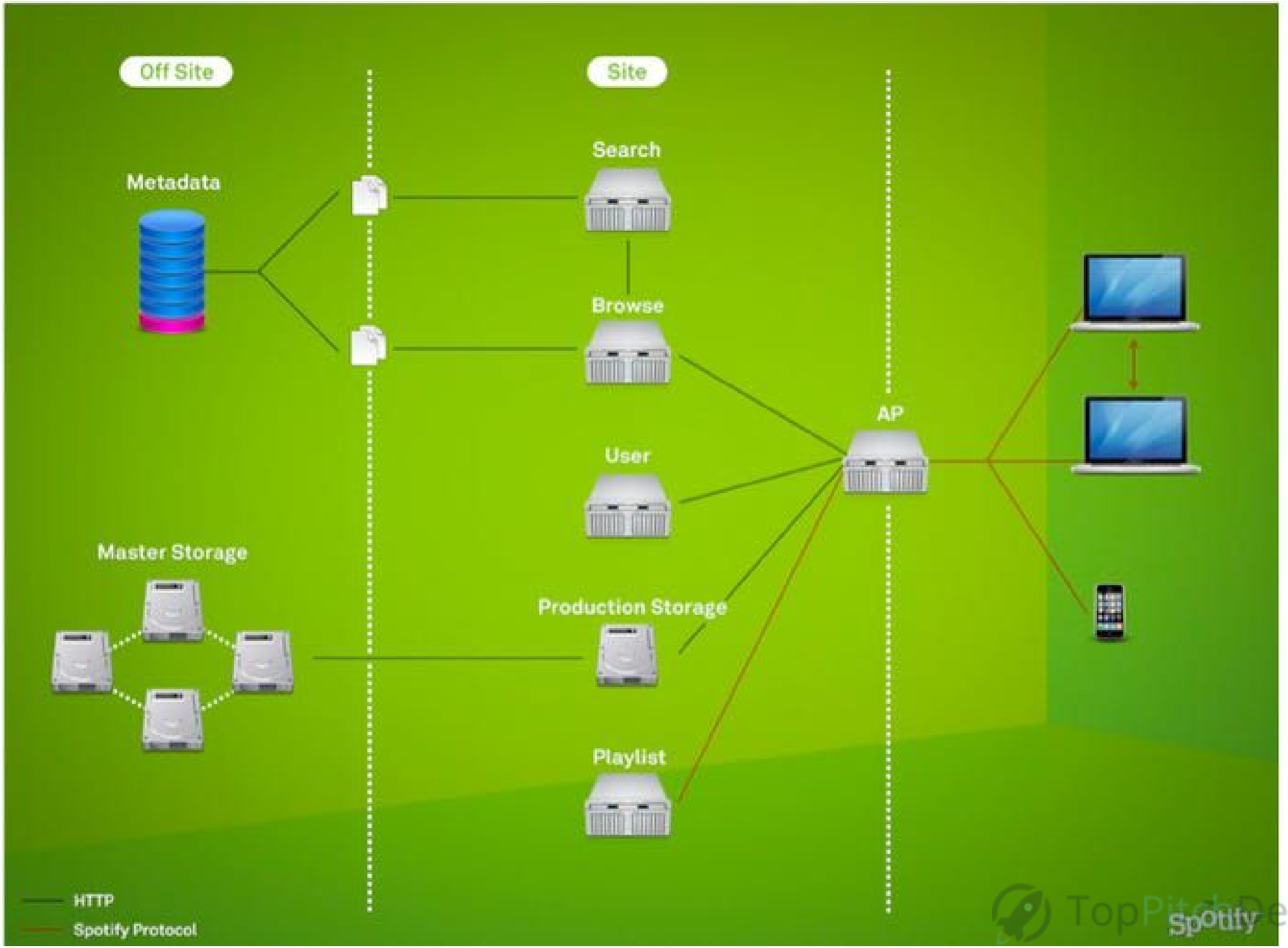
Pitch ck

Getting the right tool for the job

Spotify

TonPitch

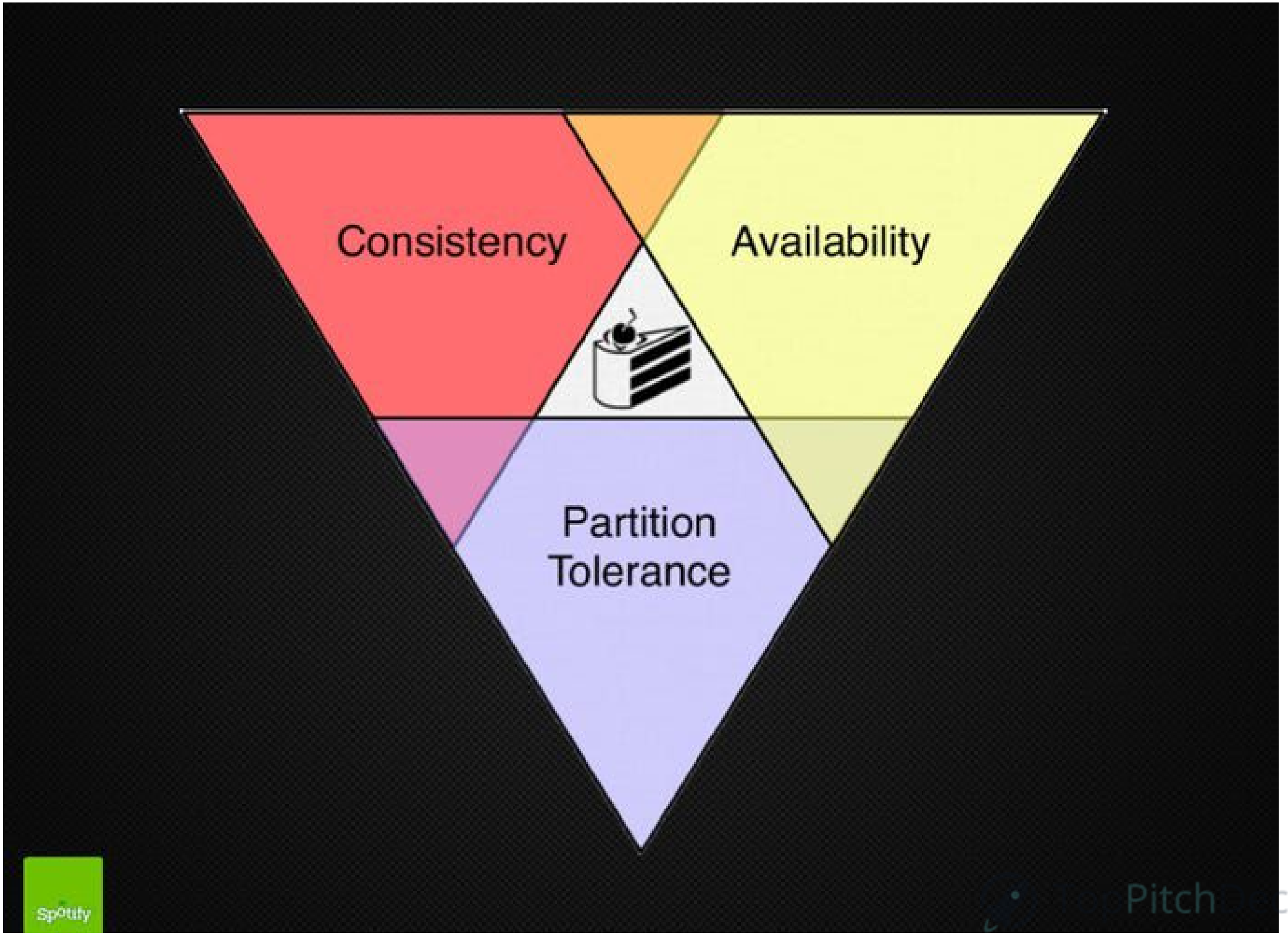

Spotify
PLAYING:
Bosse - fin låt
2.13
SÖK
MITT BIBLIOTEK
Låtar & filer
Spellista
SÖK
MODER-BIBLIO-TEKET
REKLAM/spoltar
MER REKLAM


Off Site
Site
Search
Metadata
Browse
AP
User
Master Storage
Production Storage
Playlist
HTTP
Spotify Protocol
Spotify

Consistency
Availability
Partition tolerance

http://ksat.me/a-plain-english-introduction-to-cap-theorem/

Pitch ck


Consistency
Availability
Partition
Tolerance

user

Pitch ck

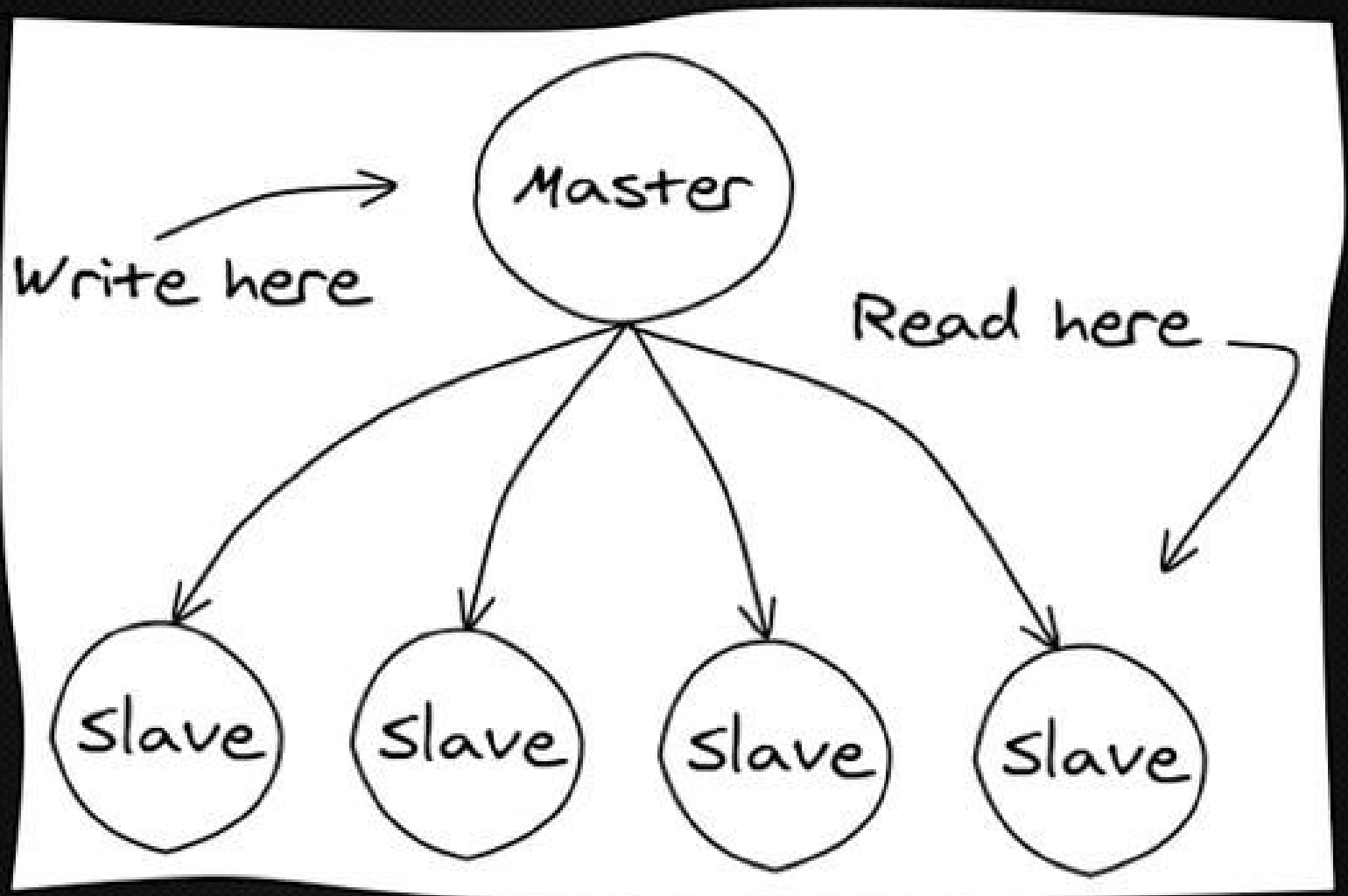
user

PostgreSQL

Spotify

Pitch ck

user



Spotify
Pitch

search

Spotify
Pitch ck

search

Lucene index in memory

Spotify

Pitch

search

replaced daily

Spotify

Pitch

search

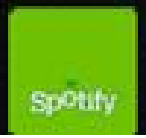
read only

Spotify

Pitch ck

search

scales horizontally



Pitch ck

search

sort of

Spotify

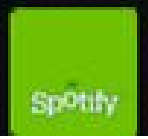
Pitch ck

search

How do you replace an index in memory when you are using all of it?

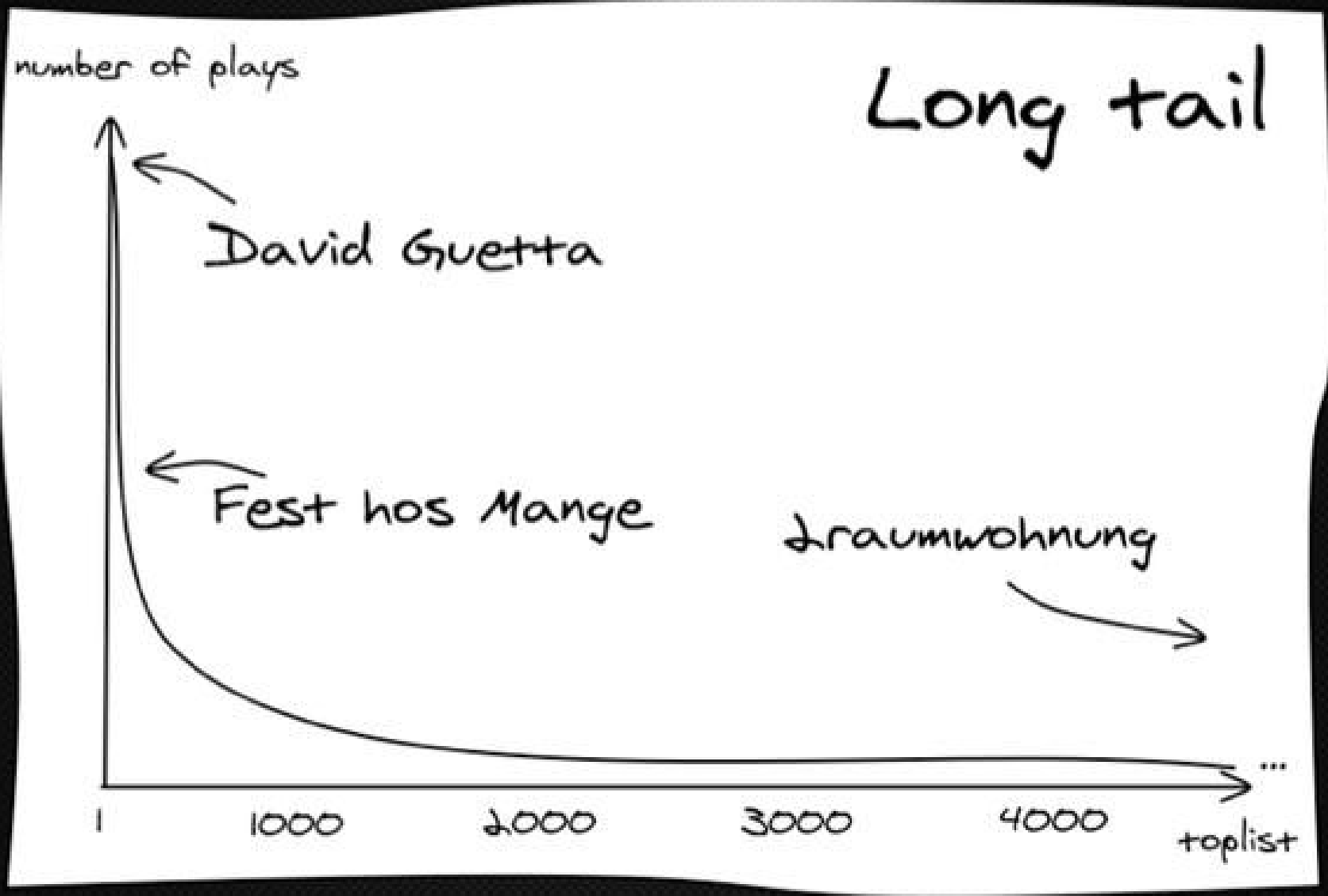
Pitch ck

storage



Pitch ck

storage


number of plays
Long tail
David Guetta
Fest hos Mange
2raumwohnung
1
1000
2000
3000
4000
...
toplist

storage

lru cache in nginx

Spotify

Pitch

storage

better use of memory
with sharding

Spotify

Pitch

Storage

TopPitchDeck

storage

consistent hashing

Spotify

Pitch

playlist

Pitch ck

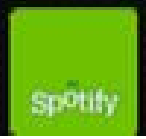
playlist

cassandra

Pitch ck

playlist

structured key-value store



Pitch ck

playlist

high throughput

Spotify

Pitch ck

playlist

choose redundancy and consistency level

Spotify

Pitch

playlist

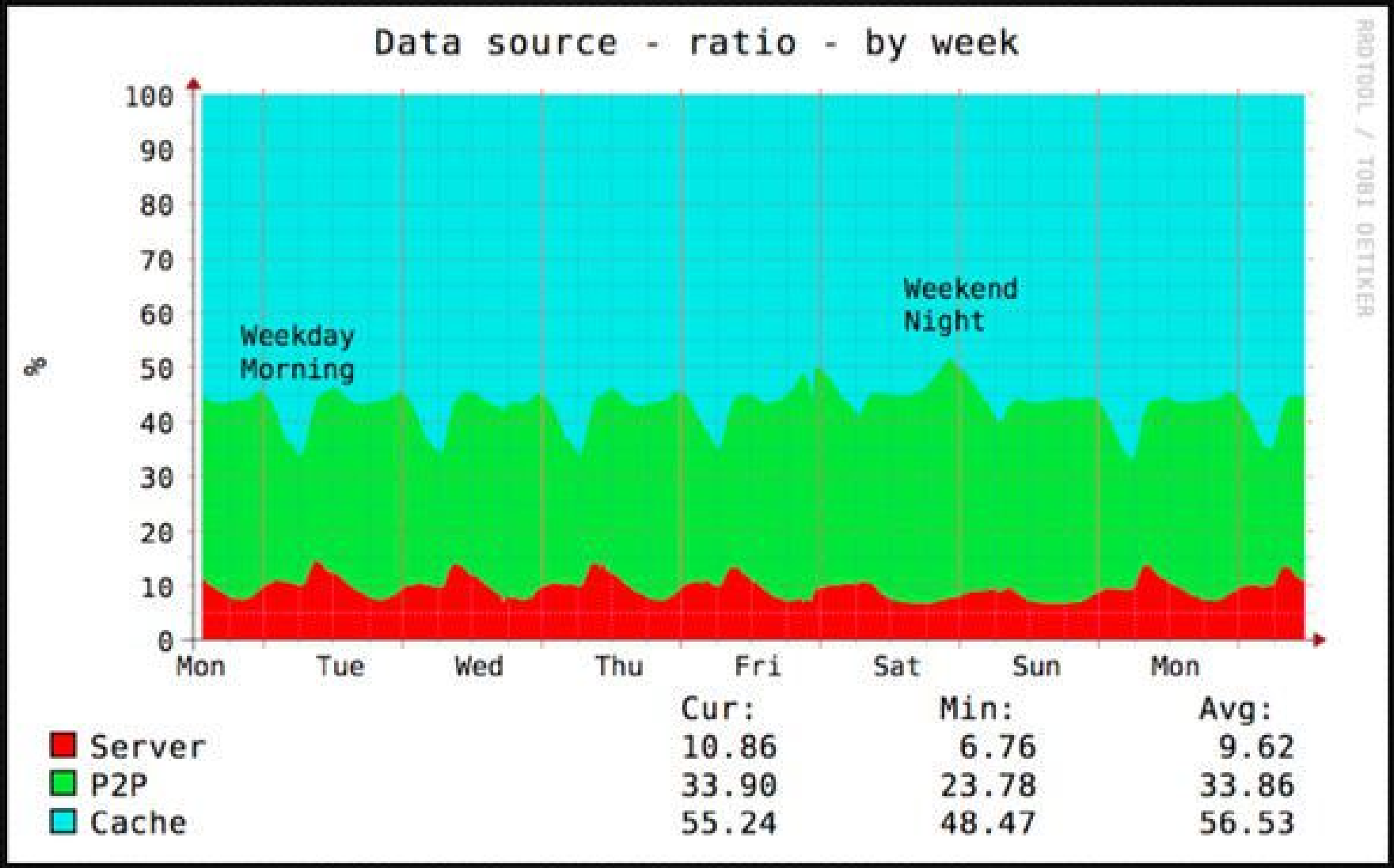
datacentre aware

Spotify

Pitch

p2p

Pitch

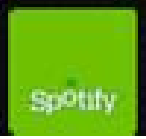

Data source - ratio - by week
RRDTOOL / TOBI OETIKER
%
100
90
80
70
60
50
40
30
20
10
0
Weekday
Morning
Weekend
Night
Mon
Tue
Wed
Thu
Fri
Sat
Sun
Mon
Cur:
Min:
Avg:
Server
10.86
6.76
9.62
P2P
33.90
23.78
33.86
Cache
55.24
48.47
56.53

thank you

Spotify

Pitch

Master Thesis?

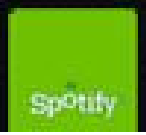


Pitch

Yes, please!

Pitch

or come and work for us



Pitch ck

Oh, and we have cake as well! :D

spotify.com/jobs

TopPitchDeck