

24. Chaos Communication Congress, 2007

# Tracker fahrn

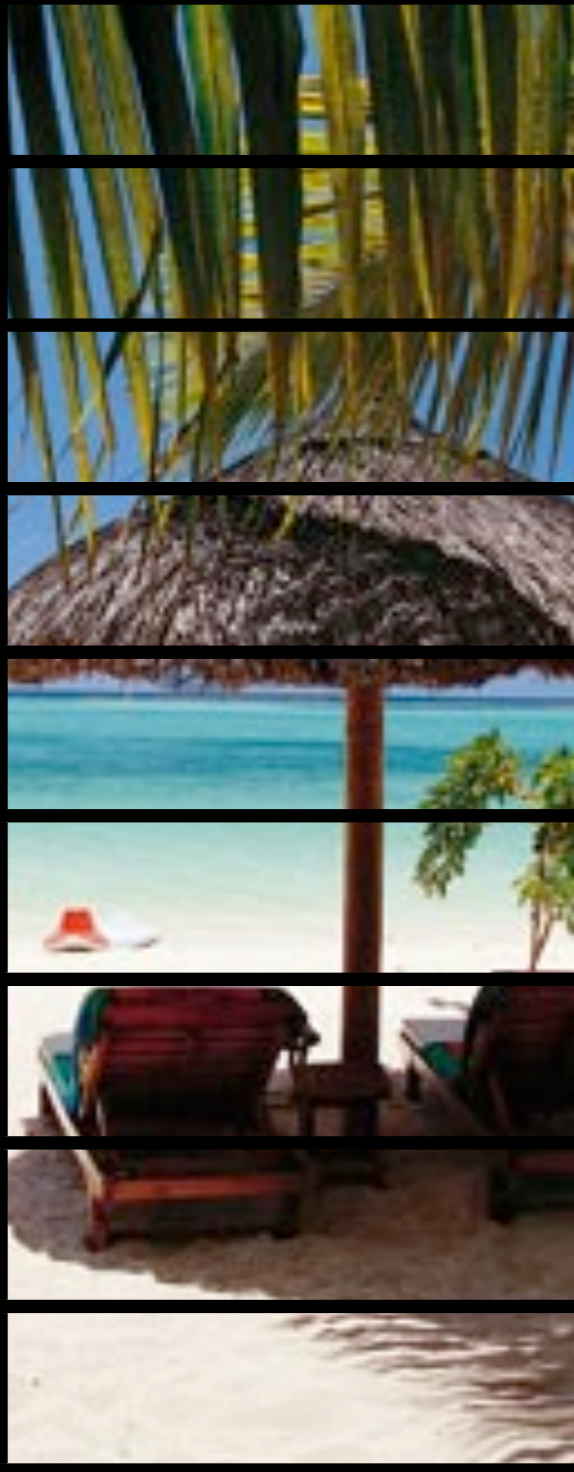
We Track Harder - We Track More!

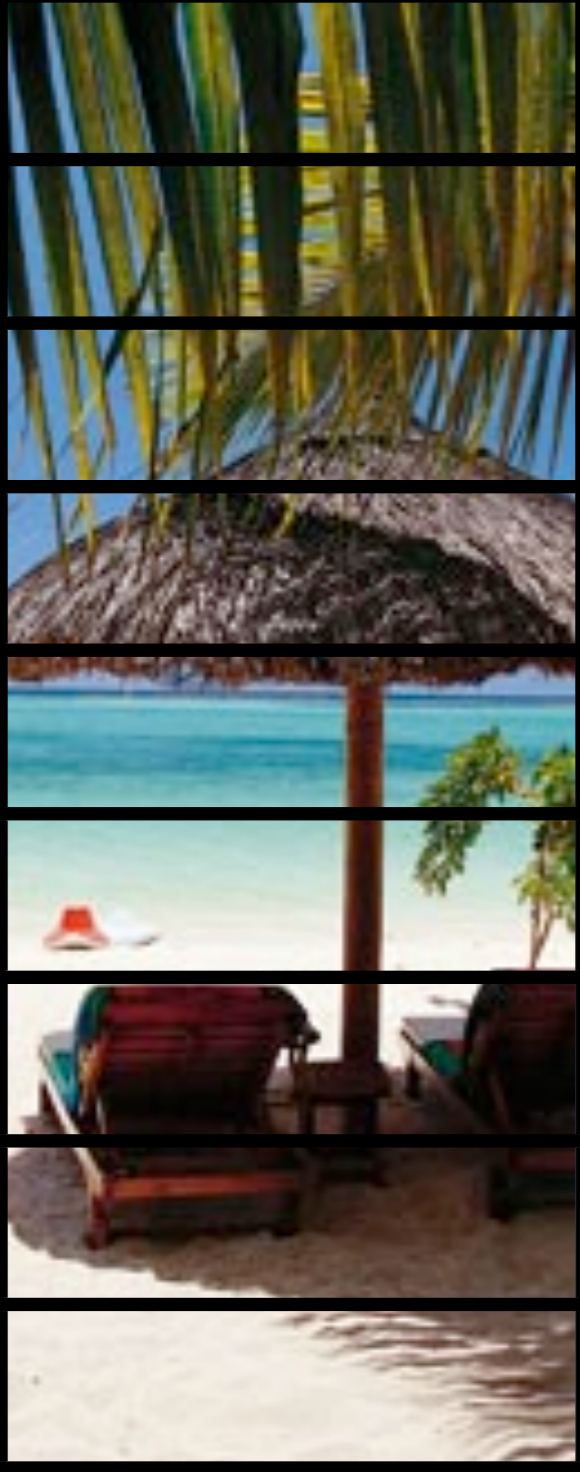
cryx, denis & erdgeist  
abuse@denis.stalker.h3q.com

# Bittorrent Infrastruktur

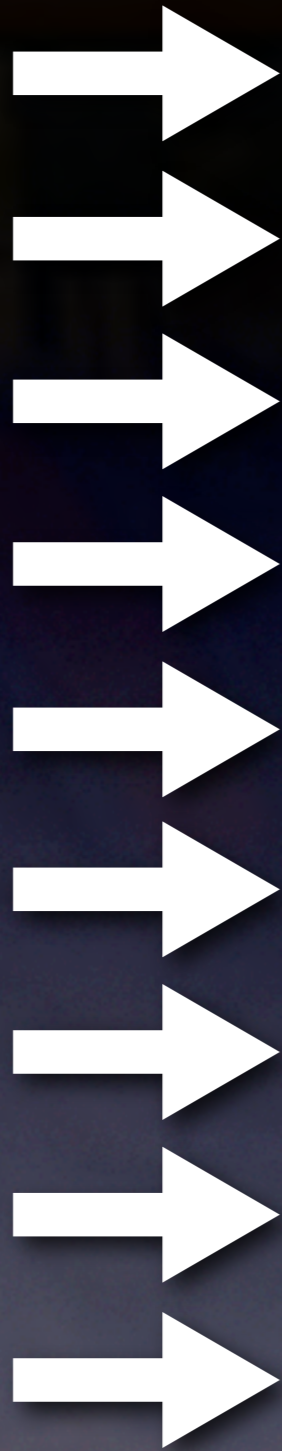
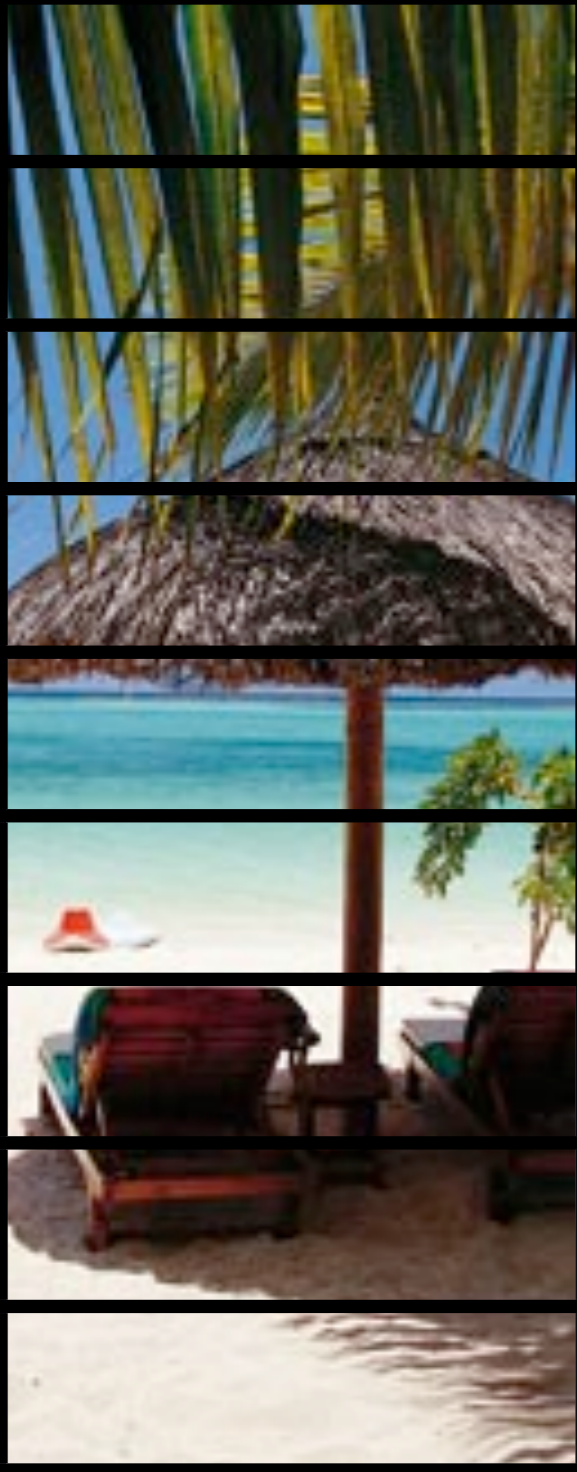
- Peers
  - Ihr
- Tracker
  - [denis.stalker.h3q.com](http://denis.stalker.h3q.com),  
\*[tracker.thepiratebay.org](http://tracker.thepiratebay.org)
- Indexer/Suchmaschinen
  - [mininova.org](http://mininova.org),  
[isohunt.com](http://isohunt.com),  
[thepiratebay.org](http://thepiratebay.org)





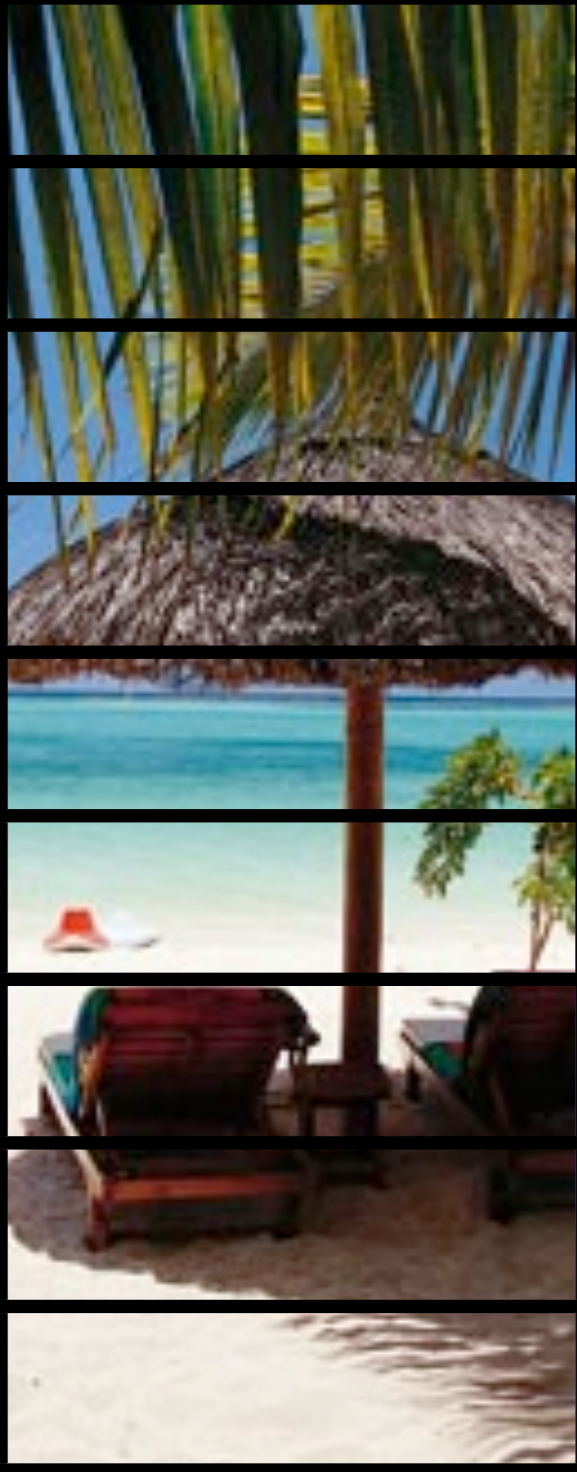






0x2342CC24C3

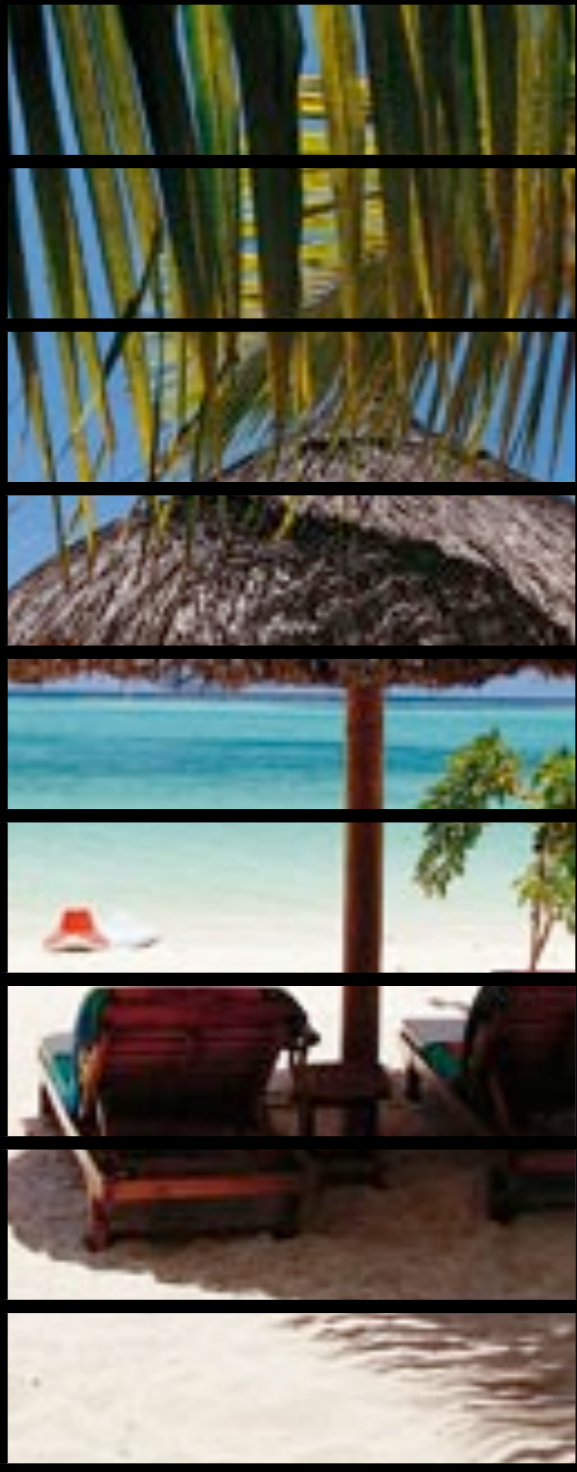




0x2342CC24C3

0x045f8ae2ad



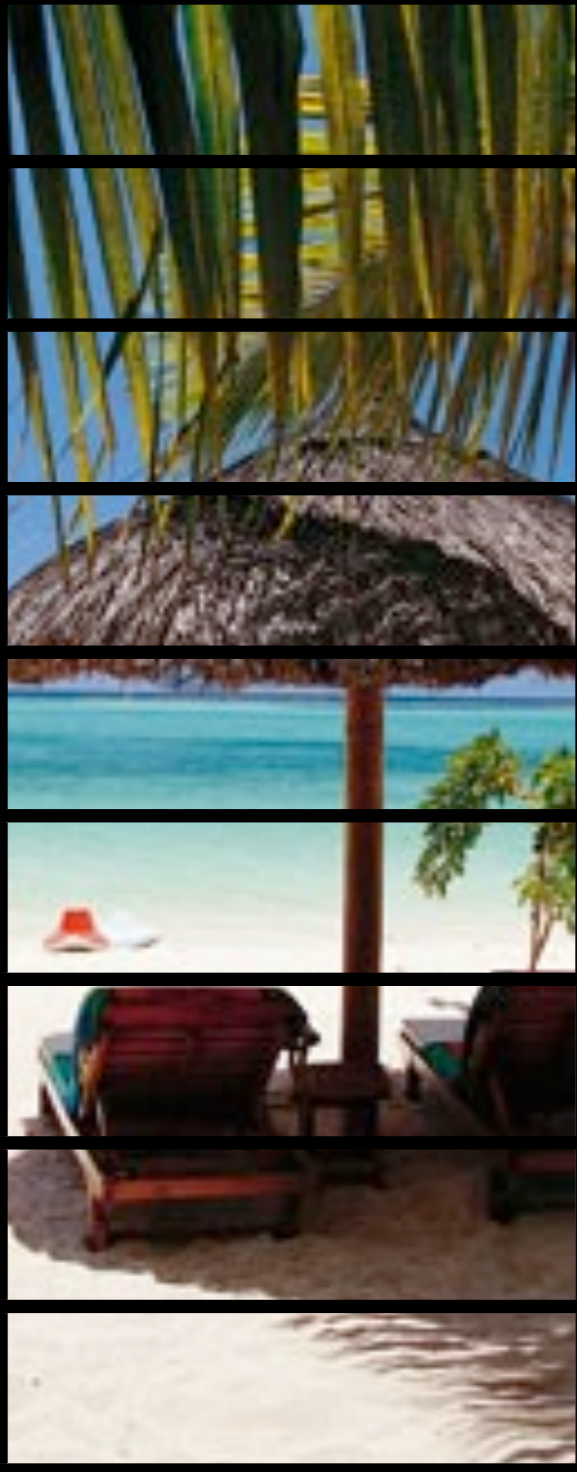


0x2342CC24C3

0x045f8ae2ad

0x93844d8cf9



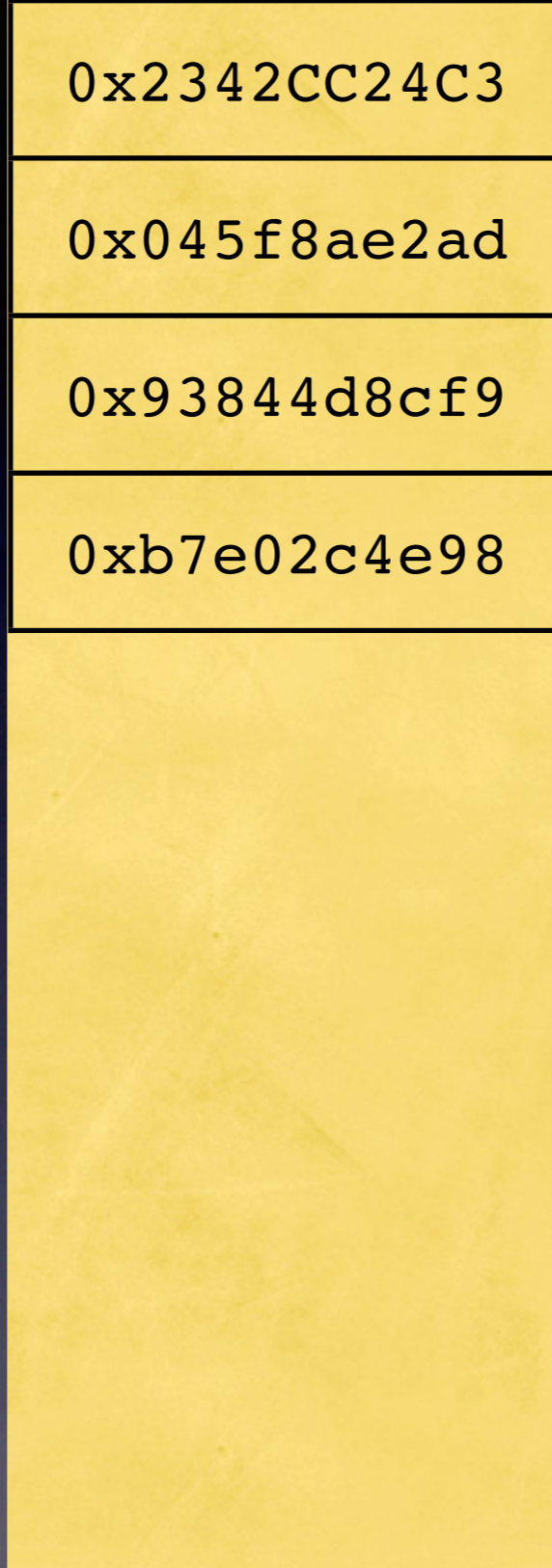


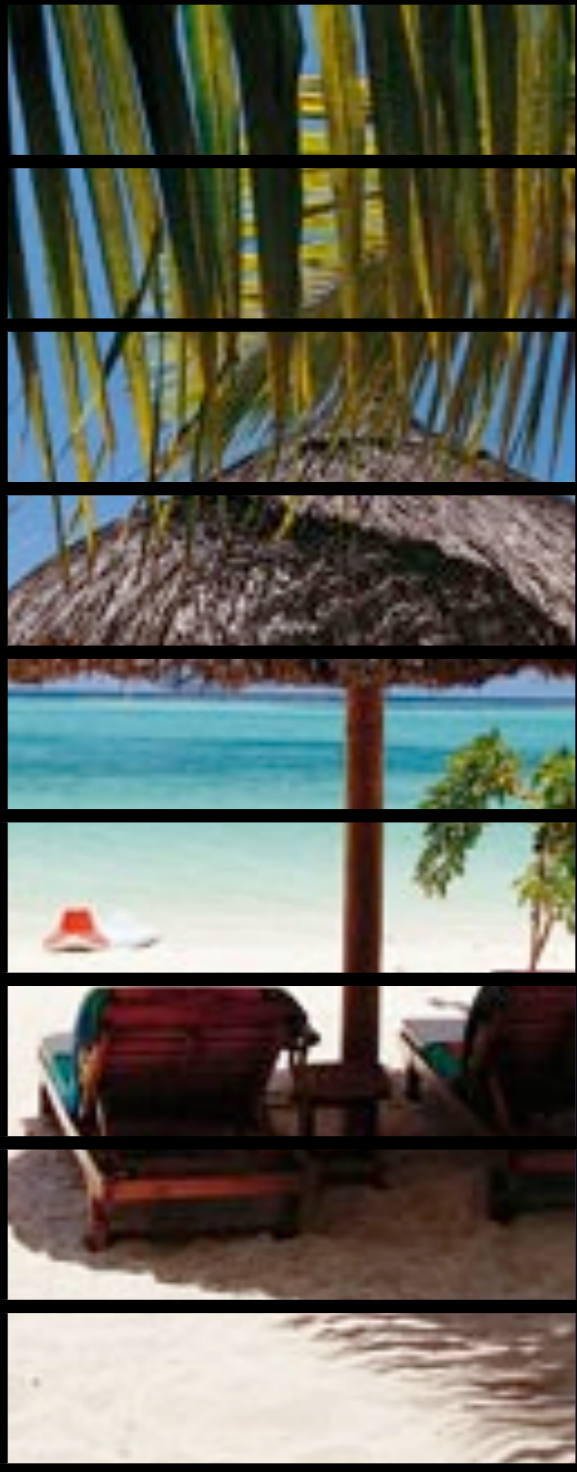
0x2342CC24C3

0x045f8ae2ad

0x93844d8cf9

0xb7e02c4e98





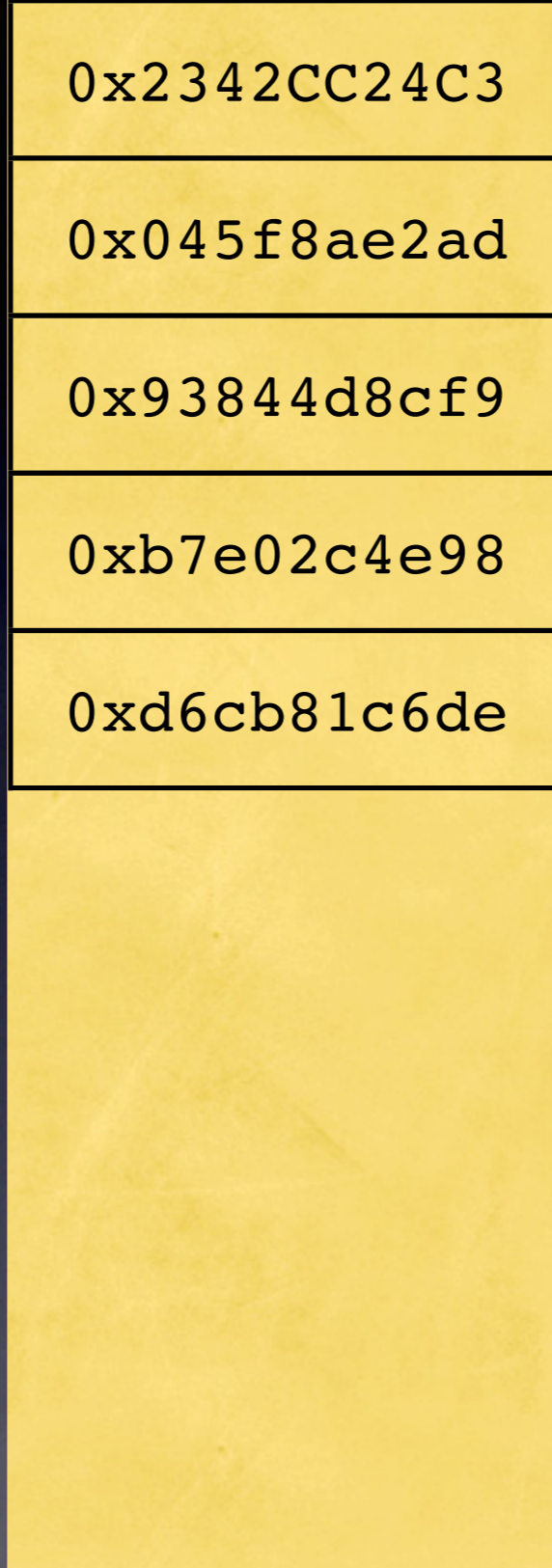
0x2342CC24C3

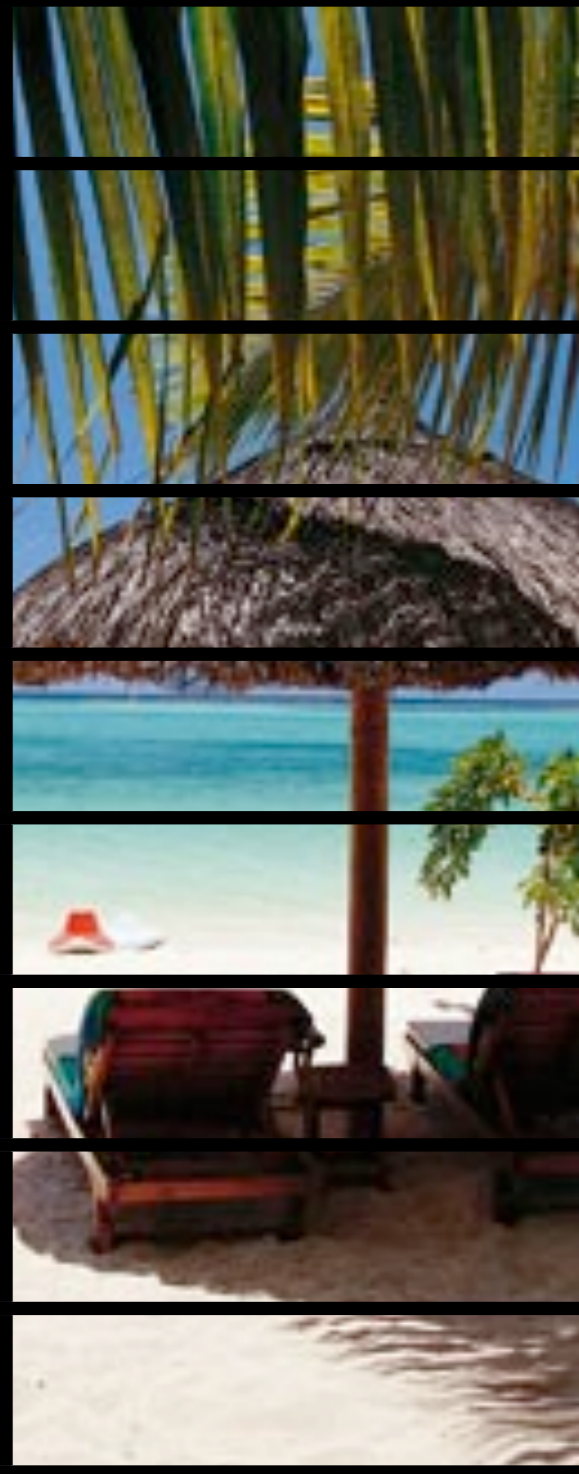
0x045f8ae2ad

0x93844d8cf9

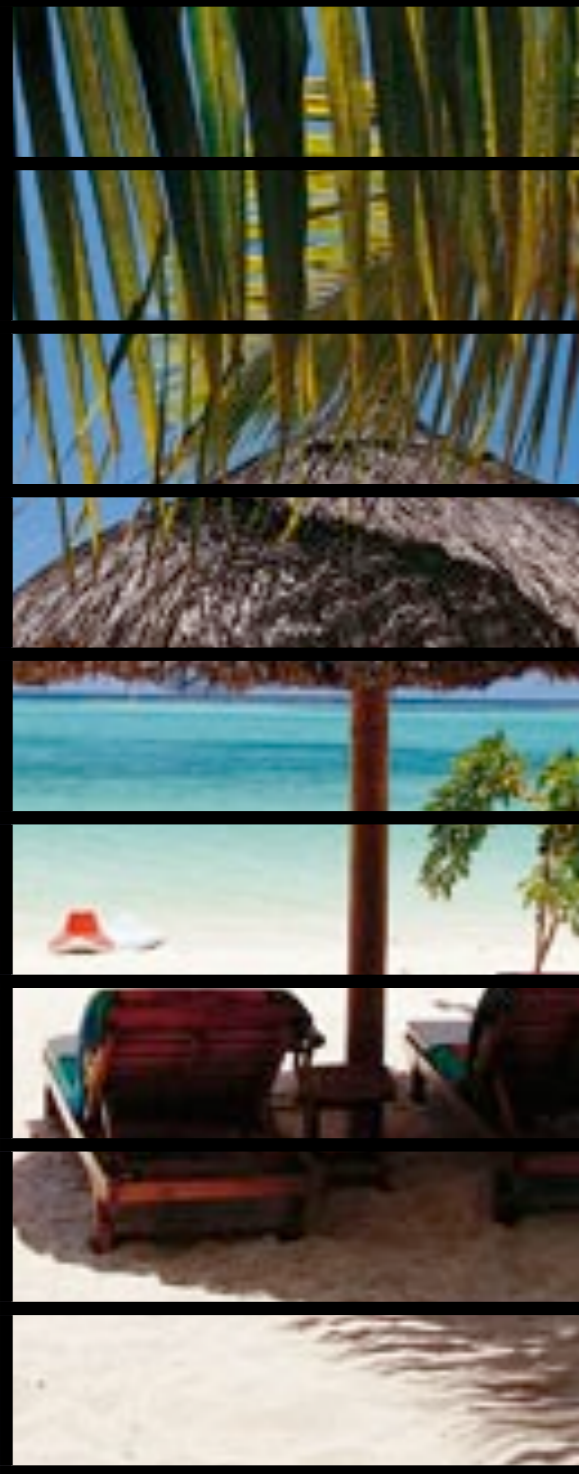
0xb7e02c4e98

0xd6cb81c6de

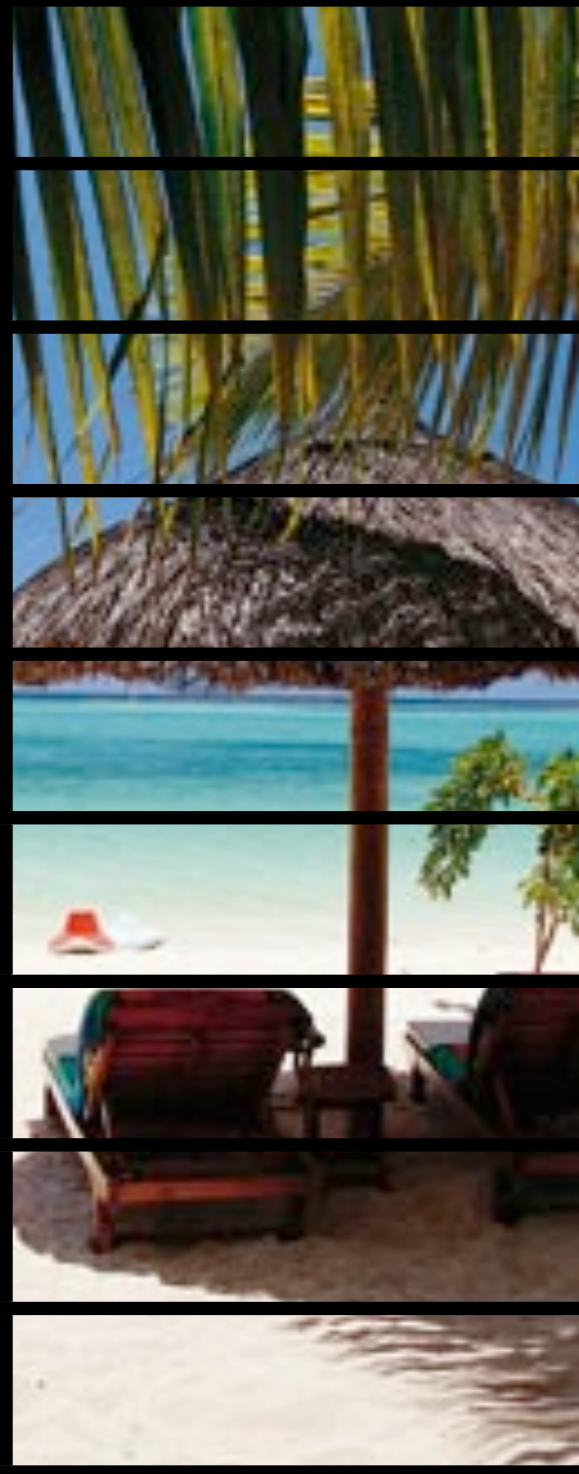




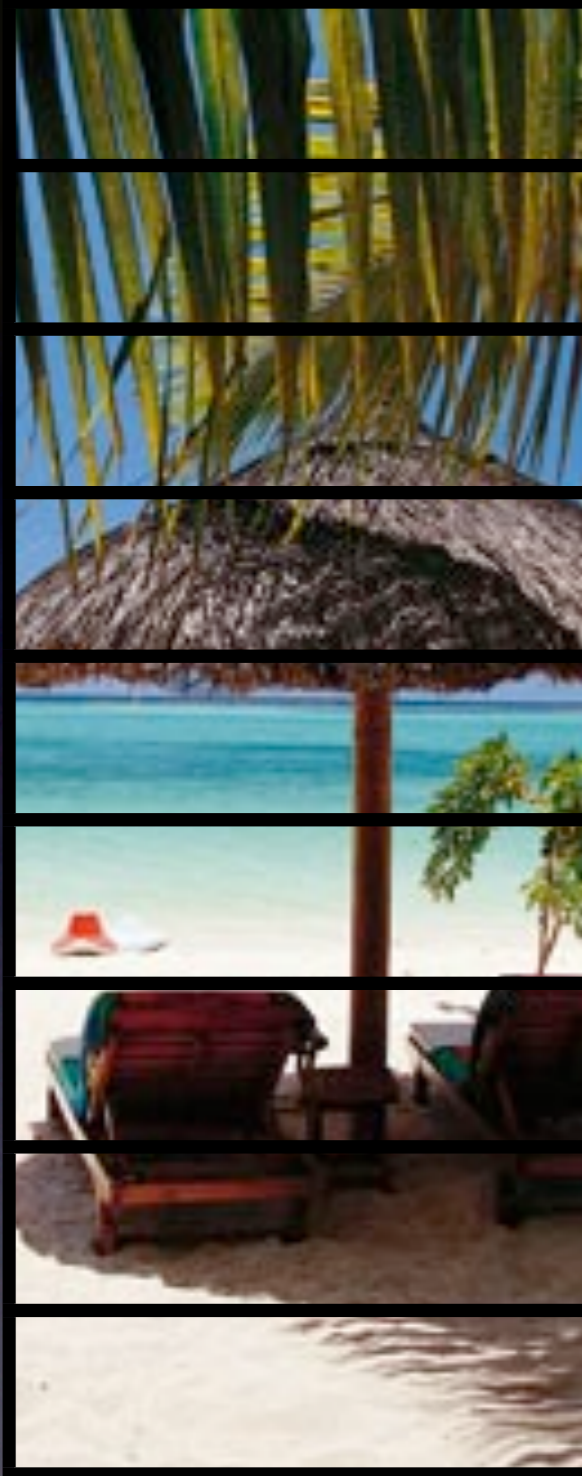
0x2342CC24C3
0x045f8ae2ad
0x93844d8cf9
0xb7e02c4e98
0xd6cb81c6de
0xe82a932d78



0x2342CC24C3
0x045f8ae2ad
0x93844d8cf9
0xb7e02c4e98
0xd6cb81c6de
0xe82a932d78
0xe3c91dfacd



0x2342CC24C3
0x045f8ae2ad
0x93844d8cf9
0xb7e02c4e98
0xd6cb81c6de
0xe82a932d78
0xe3c91dfacd
0x19648fc6b4



0x2342CC24C3

0x045f8ae2ad

0x93844d8cf9

0xb7e02c4e98

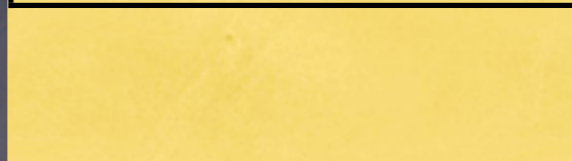
0xd6cb81c6de

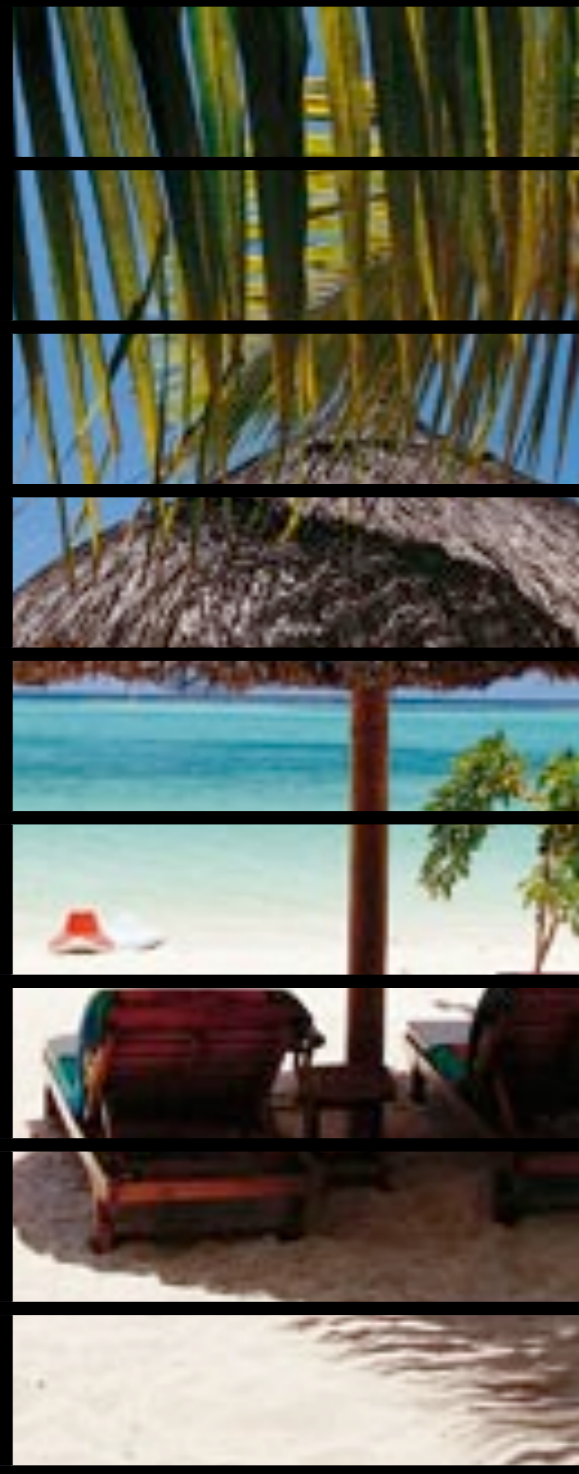
0xe82a932d78

0xe3c91dfacd

0x19648fc6b4

0x99832fe1f2





0x2342CC24C3

0x045f8ae2ad

0x93844d8cf9

0xb7e02c4e98

0xd6cb81c6de

0xe82a932d78

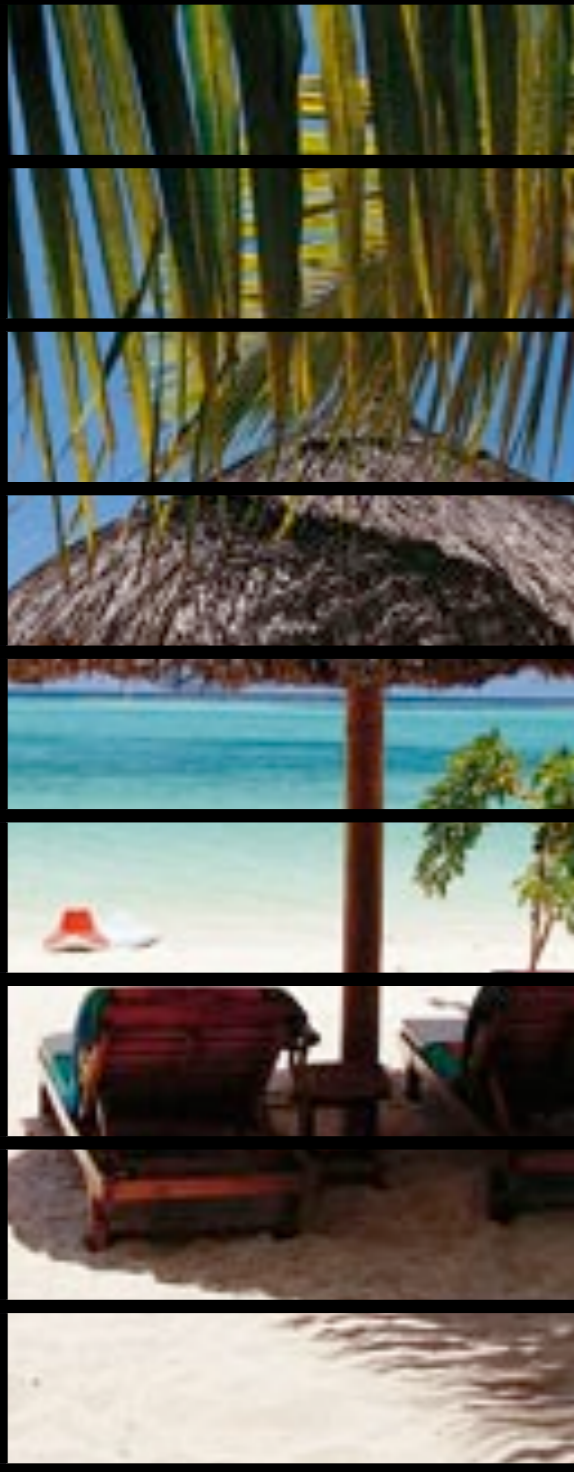
0xe3c91dfacd

0x19648fc6b4

0x99832fe1f2

urlaubsbilder.zip





0x2342CC24C3

0x045f8ae2ad

0x93844d8cf9

0xb7e02c4e98

0xd6cb81c6de

0xe82a932d78

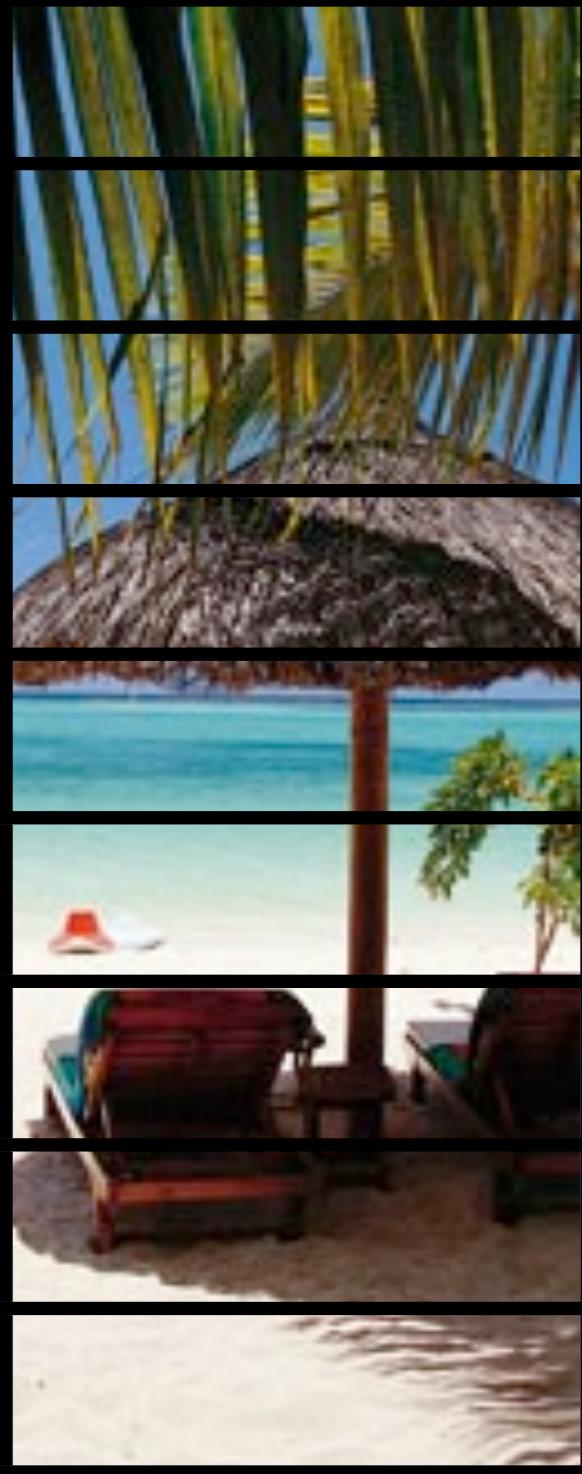
0xe3c91dfacd

0x19648fc6b4

0x99832fe1f2

urlaubsbilder.zip





0x2342CC24C3

0x045f8ae2ad

0x93844d8cf9

0xb7e02c4e98

0xd6cb81c6de

0xe82a932d78

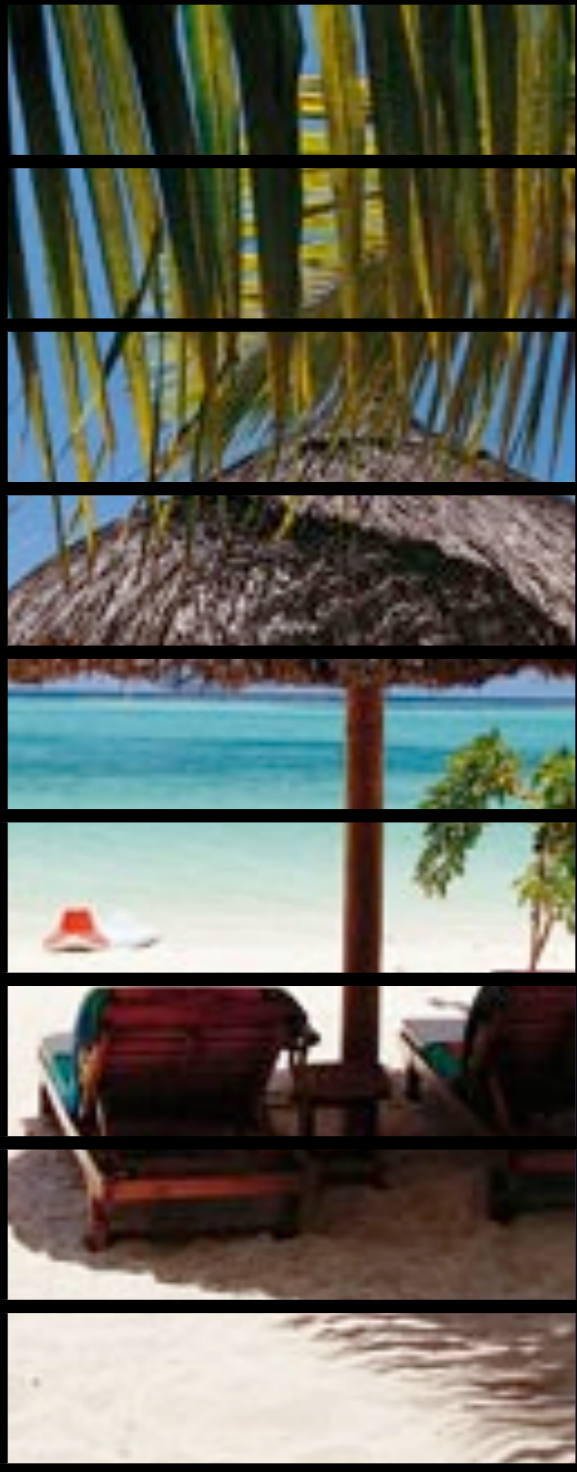
0xe3c91dfacd

0x19648fc6b4

0x99832fe1f2

urlaubsbilder.zip





0x2342CC24C3

0x045f8ae2ad

0x93844d8cf9

0xb7e02c4e98

0xd6cb81c6de

0xe82a932d78

0xe3c91dfacd

0x19648fc6b4

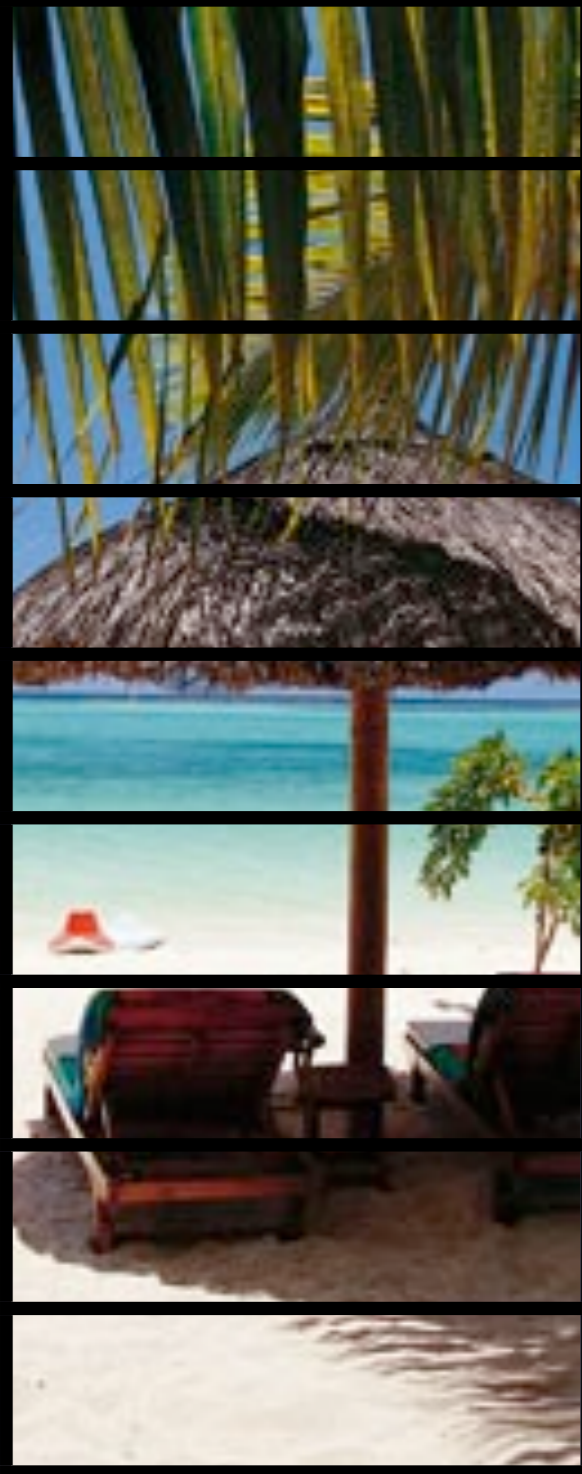
0x99832fe1f2

urlaubsbilder.zip



urlaubsbilder.torrent





0x2342CC24C3

0x045f8ae2ad

0x93844d8cf9

0xb7e02c4e98

0xd6cb81c6de

0xe82a932d78

0xe3c91dfacd

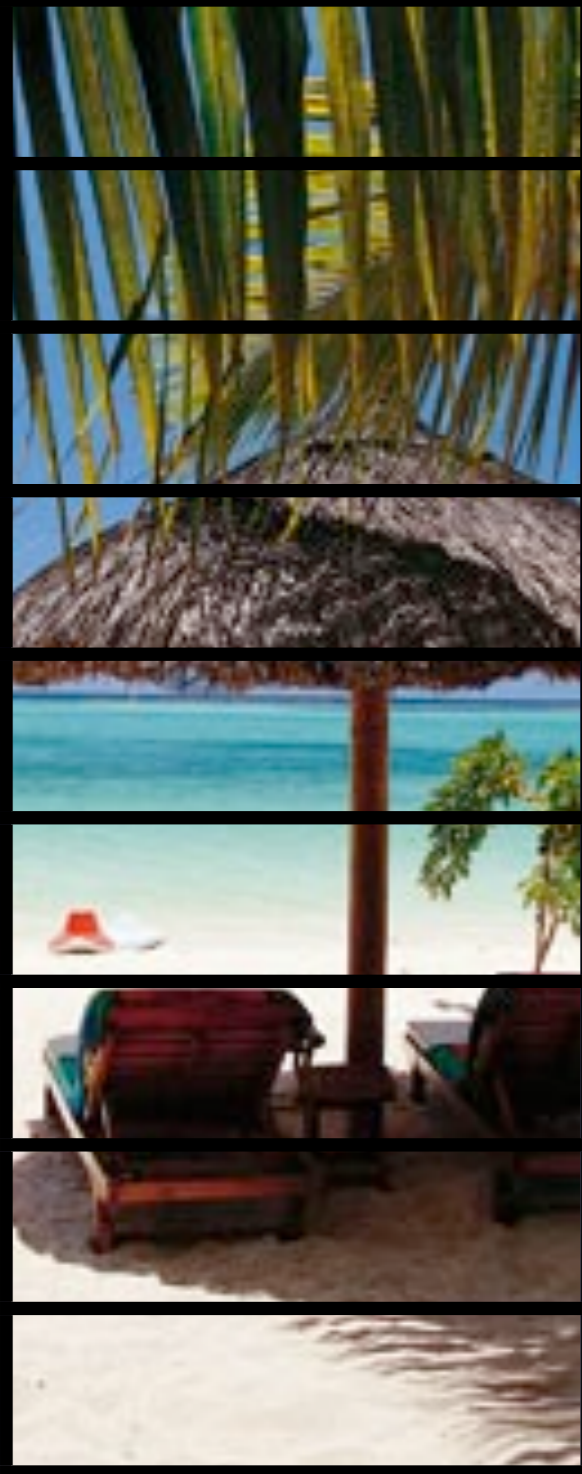
0x19648fc6b4

0x99832fe1f2

urlaubsbilder.zip

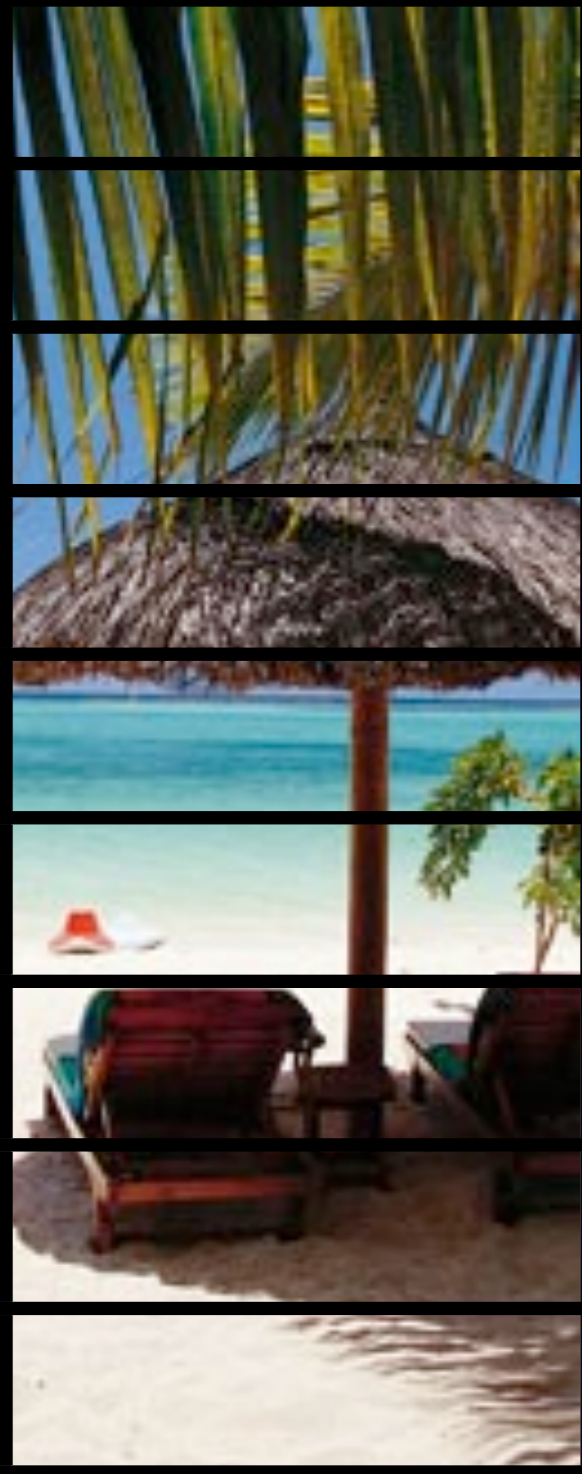
urlaubsbilder.torrent





0x2342CC24C3
0x045f8ae2ad
0x93844d8cf9
0xb7e02c4e98
0xd6cb81c6de
0xe82a932d78
0xe3c91dfacd
0x19648fc6b4
0x99832fe1f2
urlaubsbilder.zip





0x2342CC24C3

0x045f8ae2ad

0x93844d8cf9

0xb7e02c4e98

0xd6cb81c6de

0xe82a932d78

0xe3c91dfacd

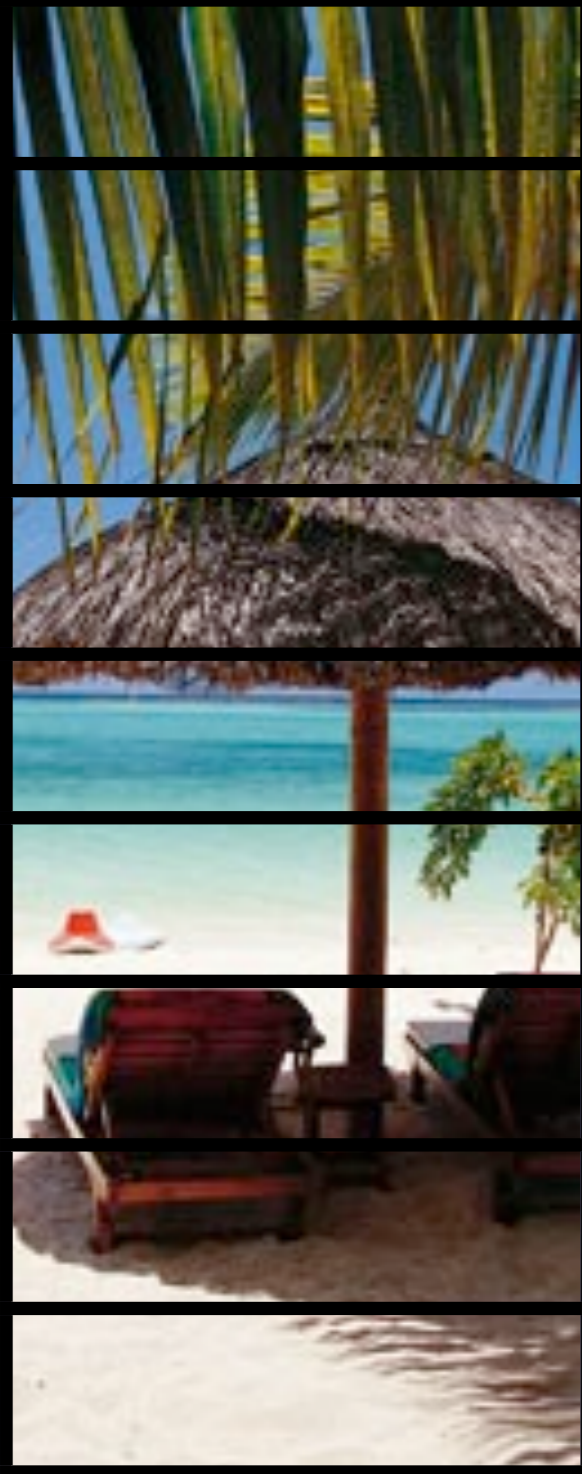
0x19648fc6b4

0x99832fe1f2

urlaubsbilder.zip

urlaubsbilder.torrent





0x2342CC24C3

0x045f8ae2ad

0x93844d8cf9

0xb7e02c4e98

0xd6cb81c6de

0xe82a932d78

0xe3c91dfacd

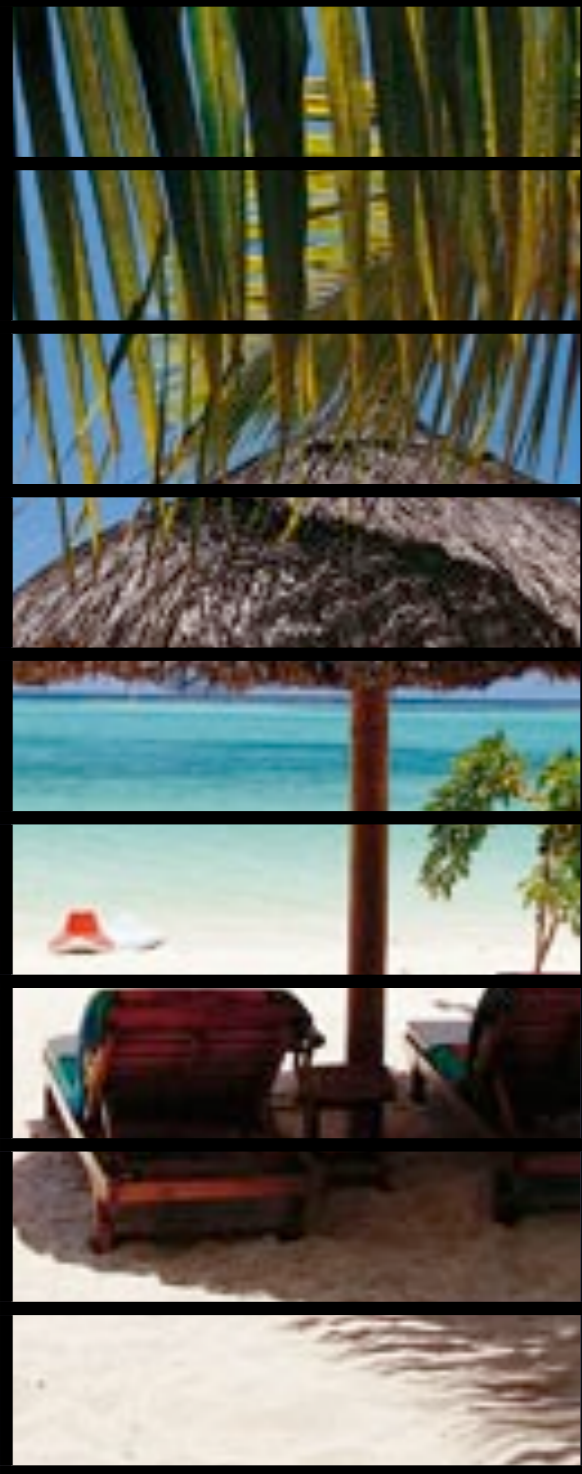
0x19648fc6b4

0x99832fe1f2

urlaubsbilder.zip

urlaubsbilder.torrent





0x2342CC24C3
0x045f8ae2ad
0x93844d8cf9
0xb7e02c4e98
0xd6cb81c6de
0xe82a932d78
0xe3c91dfacd
0x19648fc6b4
0x99832fe1f2
urlaubsbilder.zip



urlaubsbilder.torrent



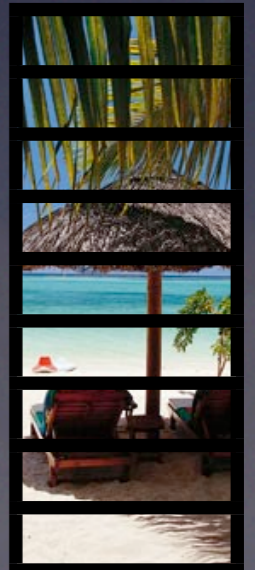
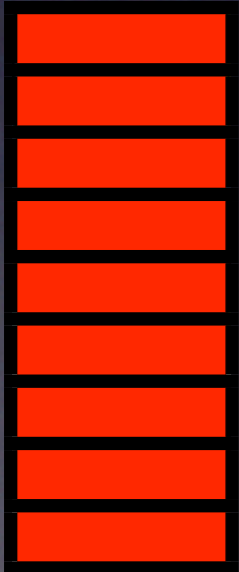
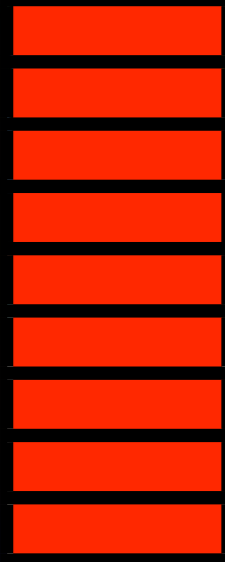


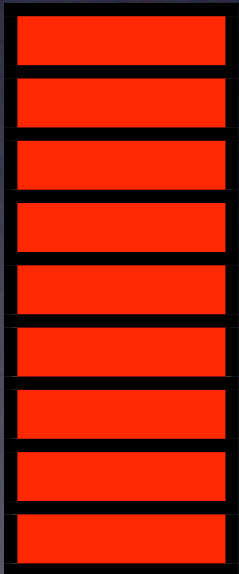
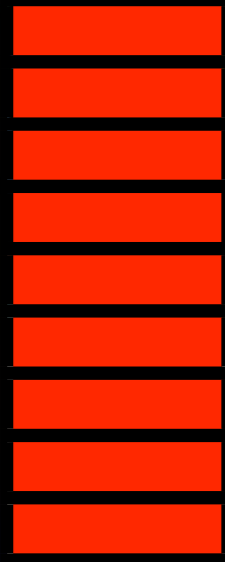
urlaubs-  
bilder.torrent



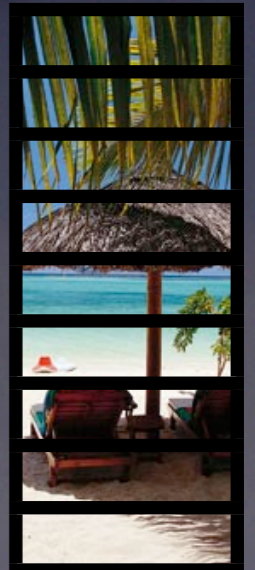
info hash:

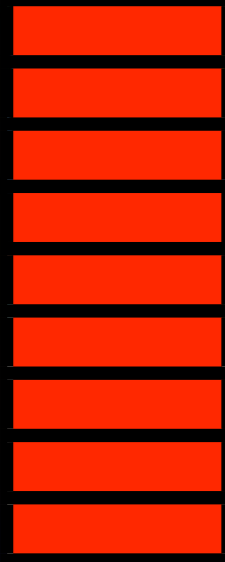
A7C3BC4367E447B52E88E11C05F863065C3F97E9



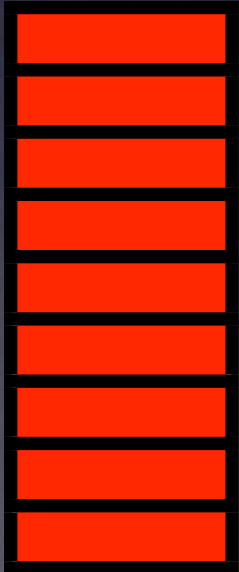
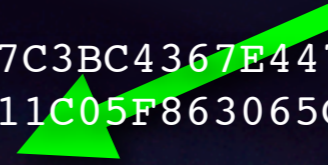


A7C3BC4367E447B52E88  
E11C05F863065C3F97E9

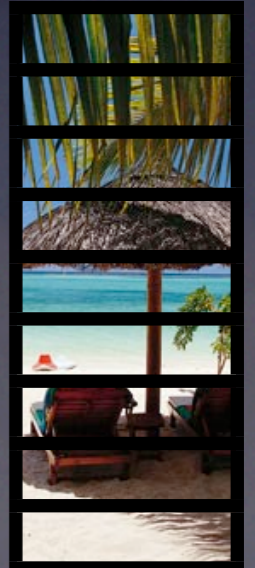


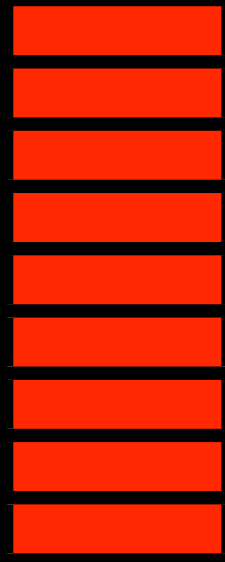
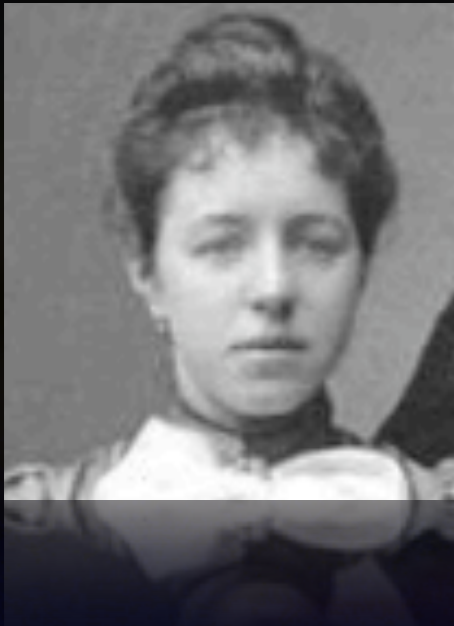


A7C3BC4367E447B52E88  
E11C05F863065C3F97E9

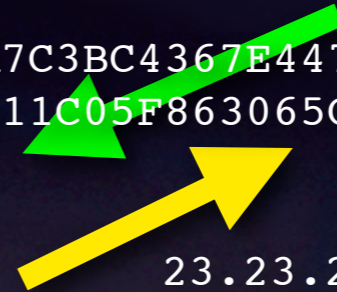


A7C3BC4367E447B52E88  
E11C05F863065C3F97E9

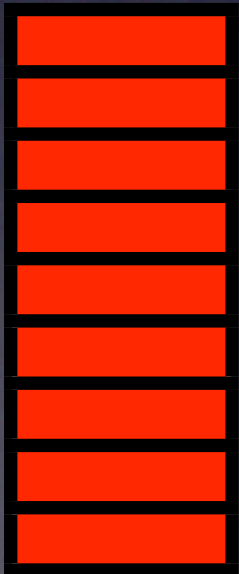




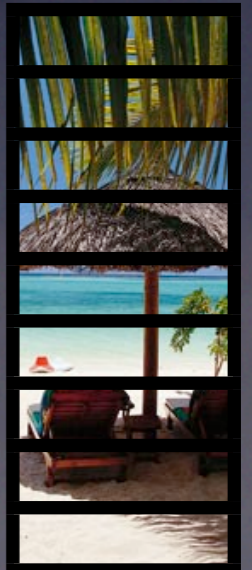
A7C3BC4367E447B52E88  
E11C05F863065C3F97E9

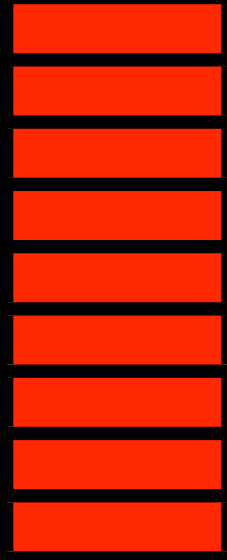


23.23.23.23:6881



A7C3BC4367E447B52E88  
E11C05F863065C3F97E9

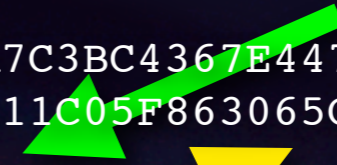




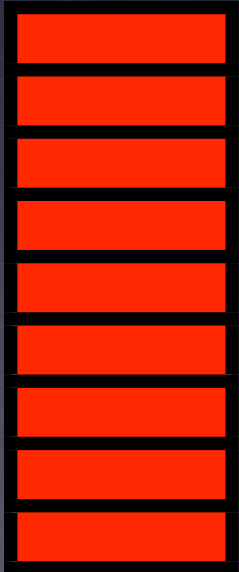
A7C3BC4367E447B52E88  
E11C05F863065C3F97E9



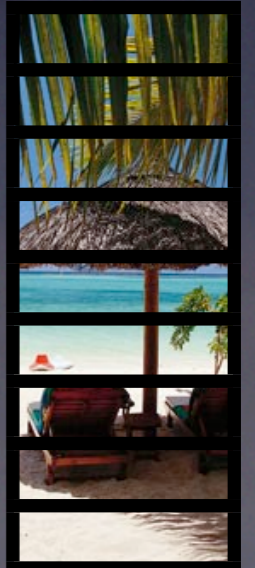
A7C3BC4367E447B52E88  
E11C05F863065C3F97E9

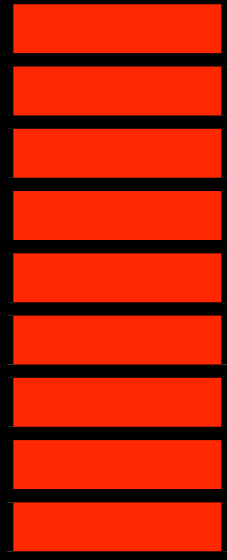


23.23.23.23:6881



A7C3BC4367E447B52E88  
E11C05F863065C3F97E9





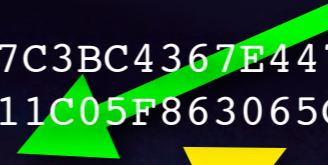
23.23.23.23:6881  
23.23.23.42:6881



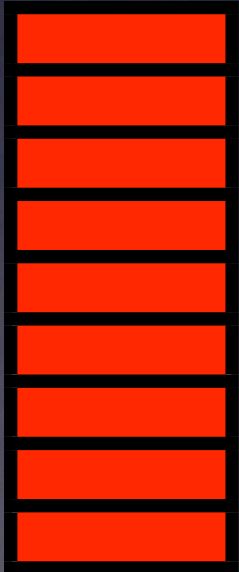
A7C3BC4367E447B52E88  
E11C05F863065C3F97E9



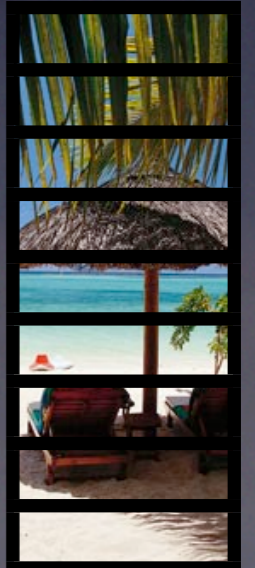
A7C3BC4367E447B52E88  
E11C05F863065C3F97E9

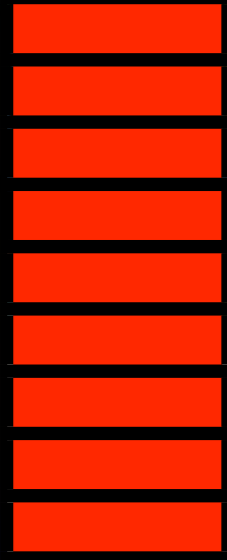


23.23.23.23:6881



A7C3BC4367E447B52E88  
E11C05F863065C3F97E9





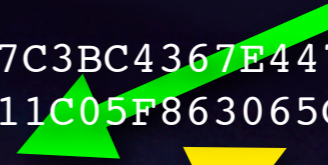
23.23.23.23:6881  
23.23.23.42:6881



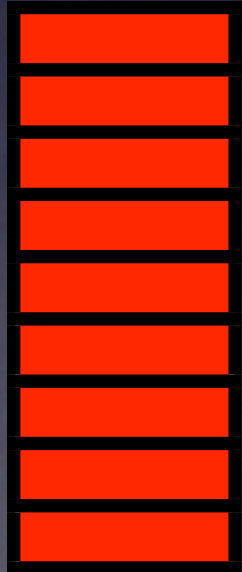
A7C3BC4367E447B52E88  
E11C05F863065C3F97E9



A7C3BC4367E447B52E88  
E11C05F863065C3F97E9



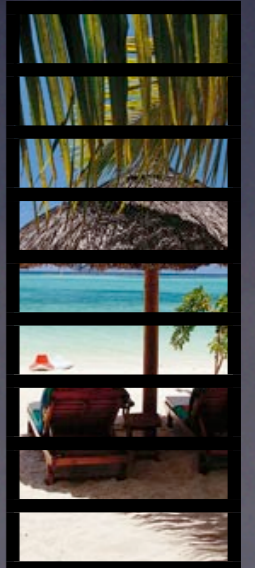
23.23.23.23:6881



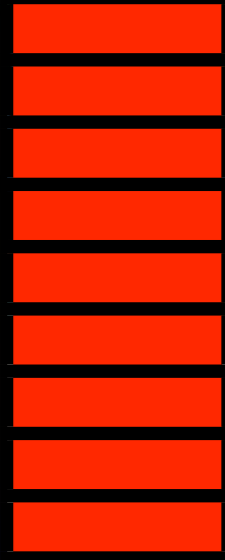
A7C3BC4367E447B52E88  
E11C05F863065C3F97E9



A7C3BC4367E447B52E88  
E11C05F863065C3F97E9







23.23.23.23:6881  
23.23.23.42:6881

A7C3BC4367E447B52E88  
E11C05F863065C3F97E9



A7C3BC4367E447B52E88  
E11C05F863065C3F97E9

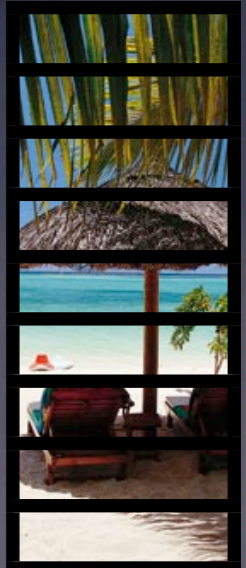
23.23.23.23:6881

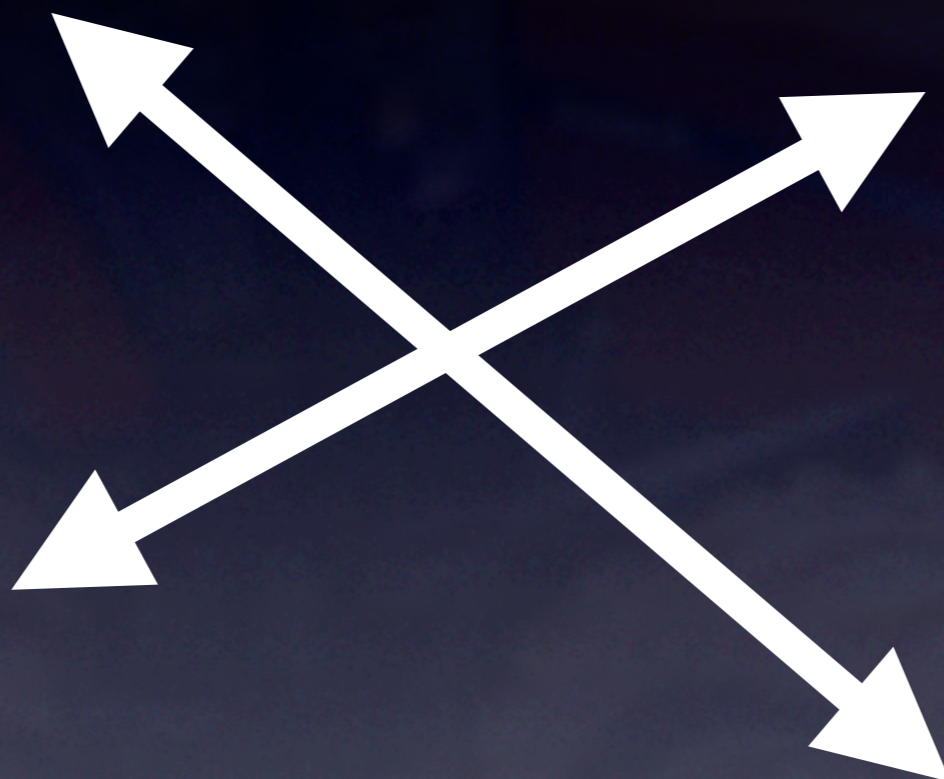
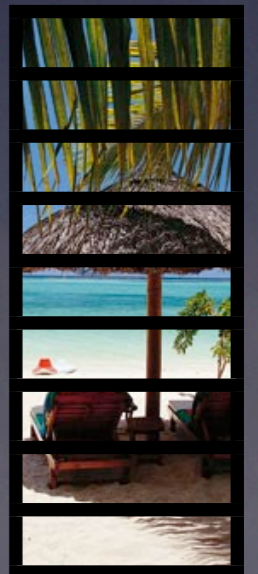
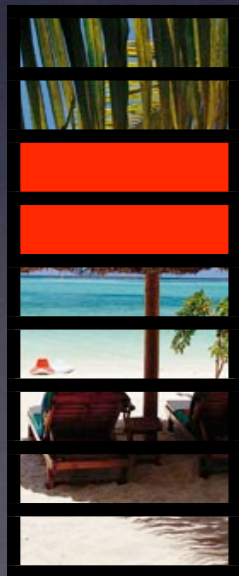
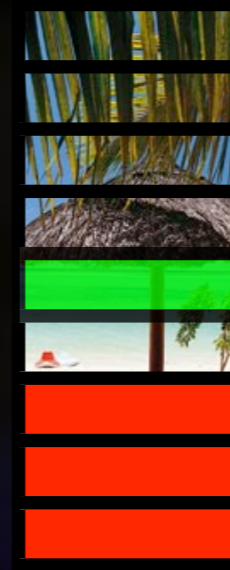
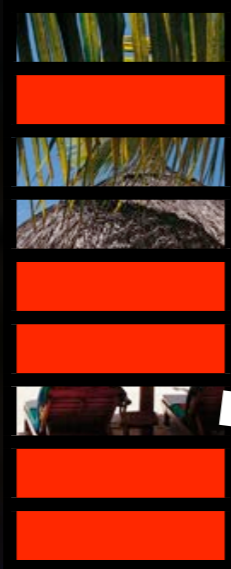


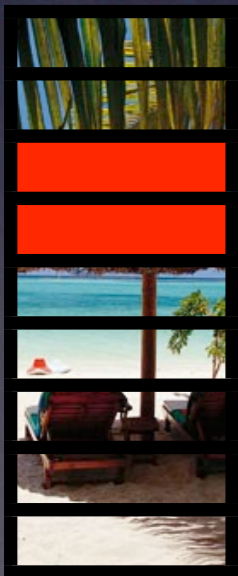
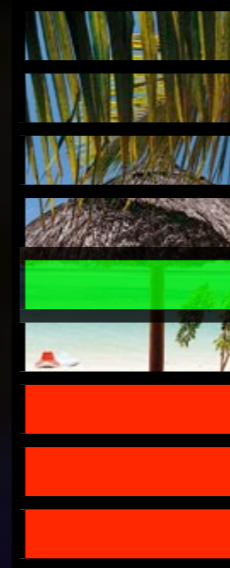
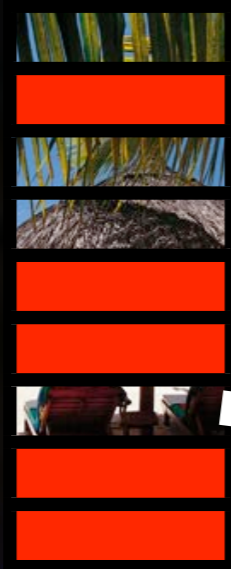
23.23.23.23:6881  
23.23.23.42:6881  
23.23.23.5:6881

A7C3BC4367E447B52E88  
E11C05F863065C3F97E9

A7C3BC4367E447B52E88  
E11C05F863065C3F97E9







# Unsere Motivation

... because we can!

# ... nee, ehrlich?

- Lizenz!
- bittorrent wichtige neutrale Technologie
- Eigenbedarf
- Denis' Router hat geruckelt, weil...
- we love to serve!



# Der Tracker im Küchenbetrieb

- anfänglich ein python-Tracker ohne Anmeldung unter [bittorrent.dyndns.org](http://bittorrent.dyndns.org)
- zu den ersten bekannten Nutzern kamen (woher auch immer...  
*“denis.stalker.h3q.com”*)  
unbekannte hinzu
- steile Zuwächse, bis dyndns zu viele DNS-Anfragen bekam und den Account sperrte

# Opentracker wird geboren:

denis: "der pythontracker performt langsam nich mehr auf meinem rechner!"

erdgeist: "ist doch eigentlich nur ein webserver, oder?"

# Designentscheidungen in Bram Cohens Protokoll

- Trennung in http-Tracker und tcp/binary peer2peer Teile
- bencoding
- Folgen: "Hochperformance-Tracker" in apache/php/mysql

GET /announce

?info\_hash=%7E%99%03Q%7D%D7%92%13%0E%2Az%1A%E9%A6%2C%F2%DE%E3%CB%80  
&peer\_id=M5-0-9--04ced8af43f0&port=23004&key=f1a6912a&uploaded=1007  
1891&downloaded=0&left=0&compact=1



# Design / Implementation opentracker Software

- Speicher only, 6 Bytes bleiben (fast) 6 Bytes
- Sortierte Listen
- eigener “http”-Parser
- Nach den ersten Optimierungen ist das OS das Bottleneck
- An den Grenzen der libowfat, von FreeBSD, von tcp

# Design / Implementation opentracker Software

- Filesharer sind die schlimmste denkbare Fuzzing-Attacke
- Clientschreiber kümmern sich nicht um Tracker, die muss man immer trietzen
- Schwarmverhalten
- Ärger durch Protokolltrennung

# Rechneranmietung / Rauswürfe

- nebenbei erwähnen: wir verdienen nix! ;)
- Anrufe beim Provider: "ihr habt da 'ne DDOS-Attacke"
- isohunt
- in einer Tracker-response kann man keine Werbung unterbringen
- Hetzners Router abgeraucht

# Stats / Number crunching

- Seit Beginn mehrere Milliarden Requests
- Kann gerade bis zu 8,5k req/s
- 5 Gig DNS-Traffic am Tag
- ca. 90k packets/sec
- $8\mu\text{W}/\text{Request}$

# Free Riders

- erster Free Rider in den Berliner Clubräumen
- erstmals gesehen von [torrenty.pl](http://torrenty.pl) (Sommer 2006)
- sonst gang und gäbe
- eigentlich amtlich dämlich für Bezahlservices

# the pirate bay

- erster face2face-Kontakt auf der oil of the 21st century
- Einladung in den Club mit Gespräch mit Peter
- drei tage später erste Piratebay-Rechner mit opentracker
- dann erste Feature Requests

**BLOCKBUSTER VIDEO**

- Ausschlaggebend: unsere Sonntagsnudeln

I ♥  
P2P

- Komplettumstellung
- Inzwischen 16 Rechner auf 6 reduziert

# "Anti-p2p"

- Great Wall of China
- mpaa, riaa
- Media-Defender
- perfect deniability
- counter stats
- peerguardian/bluetack
- *"i had always been told [in forums and blogs] to avoid your tracker, because that site was a hacker\phisher. so i guess that is not true then?"*

# Trackerführerschein selber machen

- Hardware auf der man Unix fahren kann, z. B. FreeBSD (oder sogar Linux, MacOSX oder Solaris)
- Runterladen, bauen und starten.
- Das wars schon!



# Ok, ernsthaft... Was braucht man für einen fetten Tracker?

- Einen ausreichend schnellen Rechner mit einer guten Netzwerkkarte mit 'offloading' Features.
- Etwas Mut
- Geld!
- Bier!!
- Einen brauchbaren ISP
- Etwas Ahnung von den Innereien eines OS/TCP

# Zukunft

- mehr auto-UDP
- v6
- Request for Reviews
- syncing
- gzip
- Mehr offene Tracker!  
Dazu jeden Sonntag mal  
runterfahren?
- Wenn tpb down ist,  
schwappt die Welle auf  
alle anderen Tracker

24. Chaos Communication Congress, 2007

# Tracker fahrn

We Track Harder - We Track More!

cryx, denis & erdgeist  
abuse@denis.stalker.h3q.com