Detecting UK ISP Filtering

UKNOF 38 12 September 2017 Sheffield, UK

Who am I

Gareth Llewellyn @NetworkString

Hats: AS28715 Dedicated ISP for operating UK Tor Exits

Open Rights Group Technical Volunteer (I am in no way an official representative of ORG)

Jun 2004 BT Introduces CleanFeed

CleanFeed



CleanFeed





CleanFeed Immediately identified as slippery slope



More importantly, what is to stop BT silently adding other categories to its blocked list?

Perhaps race hate sites, or sites that tell people how to hack the Cleanfeed service itself. And what will the company do if the government asks them to block access to a site hosting leaked documents, since they are just as illegal as child pornography?

BT has said it no plans to extend the project beyond child porn sites.

Because the announcement is about child abuse, anyone who dares to challenge it is instantly under suspicion as a supporter of paedophiles. But this should not stop us pointing out that Cleanfeed is a bad idea and must be stopped.

This is not just because it will not achieve its goal, although it seems that it will be easy to get around, but because it sets a precedent for ISP control over what their users can do online that is simply unacceptable.



Jun 2004 BT Introduces CleanFeed

2005 OFCOM publishes mobile 'framework'

https://www.ofcom.org.uk/research-anddata/media-literacy-research/childrens/ukcode

Jun 2004 BT Introduces CleanFeed

2005 OFCOM publishes mobile 'framework' Dec 2010 Gov threatens to legislate blocks

Ed Vaizey, the communications minister, is to meet internet providers, including BT, <u>Virgin Media</u> and TalkTalk, "in the near future" to discuss changing the way pornography enters private homes, the Department for Business, Innovation and Skills confirmed. The move is designed to protect children from being exposed to pornography on the net.

"This is a very serious matter. I think it is very important that it's the <u>ISPs</u> that some up with solutions to protect children," Vaizey told the Sunday Times.

"I'm hoping they will get their acts together so that we don't have to legislate, but we are keeping an eye on the situation and we will have a new communications bill in the next couple of years."



https://www.theguardian.com/society/2010/dec/19/broadband-sex-safeguard-children-vaizey

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THE HON MR JUSTICE ARNOLD Approved Judgment

20C Fox v BT

 For the avoidance of doubt paragraph 1(i) and (ii) is complied with if the Respondent uses the system known as Cleanfeed and does not require the Respondent to adopt DPI based blocking utilising detailed analysis.

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"Sites like The Pirate Bay destroy jobs in the UK and undermine investment in new British artists," the British Phonographic Industry (BPI) said.

A sixth ISP, BT, requested "a few more weeks" to consider their position on blocking

Google Image Search: Pirate Bay Block



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 Jan 2014 Large UK ISPs enable "Parental Filters"

Poor Uptake

By July 2014 most customers were ignoring it;

5% of new BT customers signed up

8% opted in for Sky

4% for Virgin Media.

TalkTalk rolled out a parental-control system two years before the government required it and has had much better take-up of its offering, with 36%

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Digital Economy Act 2017

23 Regulator's power to require internet service providers to block access to material

(1)Where the age-verification regulator considers that a person ("the non-complying person") is-

- (a) contravening section 14(1), or
- (b) making extreme pornographic material available on the internet to persons in the United Kingdom, it may give a notice under this subsection to any internet service provider.
- (2) The notice must—
 - (a) identify the non-complying person in such manner as the age-verification regulator considers appropriate;
 - (b) state whether it is subsection (1)(a) that applies or subsection (1)(b) or both;
 - (c) require the internet service provider-
 - (I) to take steps specified in the notice, or
 - (ii) (if no such steps are specified) to put in place arrangements that appear to the provider to be appropriate, so as to prevent persons in the United Kingdom from being able to access the offending material using the service it provides;
 - (d) provide such information as the regulator considers may assist the internet service provider in complying with any requirement imposed by the notice;
 - (e) provide information about the arrangements for appeals to which section 16(6)(d) applies;
 - (f) provide such further particulars as the regulator considers appropriate.

Blocked.org.uk Launch Video

DEPARTMENT OF DIRTY

https://youtu.be/60eKauWFFPk

July 2014 - Blocked.org.uk

July 2014 - Blocked.org.uk Nov 2013 - Bowdlerize.co.uk

Bowdlerize.co.uk

Thomas Bowdler (11 July 1754 – 24 February 1825) was an English physician best known for publishing a version of Shakespeare that was more appropriate for 19th century women and children than the original.

The eponymous verb bowdlerise (or bowdlerize) has associated his name with the censorship of elements deemed inappropriate for children

Bowdlerize.co.uk



To better profile which ISPs are censoring and which aren't it would be useful to have meta data about the ISP used to check URLs.

By volunteering this information it will give a clearer picture of the scope of censorship.

WiFi Network:	WLAN1-A4C863	
_MyNow B	roadband	
Mobile Network:	Unknown	
SIM Network:	Unknown	

Send ISP data with results







Bowdlerize.co.uk

- Concerns about building a "shopping list" of 'illegal' websites
- Concerns from users about "being put on a list"
- Concerns of legality regarding Copyright Designs and Patents Act

Found Blocked.org.uk

Checked each URL manually on a phone

Report Censorship Help us Complain Join

Report blocks

Network operators are <u>default censoring</u> the mobile Internet, in case children access adult material. But often the wrong websites are blocked. Help us report when that happens.

Submit a URL:

Address of incorrectly blocked page:

Your network provider:	
Vodafone	
Your name: (optional)	
Your email: <i>(optional</i>)	
rour eman. (optional)	
Additional info:	

Stay in touch with the Open Rights Group. Here is our privacy policy.

Submit

We'll pass reports (anonymously) to the network operators.

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Bowdlerize.co.uk > blocked.org.uk

Donated all code (server side and client side) to Open Rights Group

📮 openrigi	ntsgroup / Blo	cking-Middleware					tar 20 ¥ For	rk 9
<> Code	() Issues 1)ា Pull requests 0	Projects 0	🗉 Wiki	Insights 👻	,		
First pass at implementing https://wiki.openrightsgroup.org/wiki/Cens Browse files orship_Monitoring_Project_API						files		
ဖို master 🤇	🔿 oldmaster							
Networ	ksAreMadeOfSt	ring committed on 7 Dec	2013	1 parer	nt e088988	commit 64000d2f220c303315a	ba6f861281e53b70	9fff70
E Showing 1	9 changed files	with 765 additions and	0 deletions.				Unified	Split

Blocked.org.uk How It Works



Raspberry PI









Results

http://pornhub.com

ISP	Result	Last check on	Last blocked on
AAISP	ok	2017-08-25 11:02:26	No record of prior block
BT-Light	blocked	2017-08-25 11:02:26	2017-08-25 11:02:26
BT-Moderate	blocked	2014-07-03 15:51:50	2014-07-03 15:51:50
BT-Strict	blocked	2017-08-25 11:02:26	2017-08-25 11:02:26
EE	blocked	2017-08-22 13:10:49	2017-08-22 13:10:49
02	blocked	2017-08-25 11:02:28	2017-08-25 11:02:28
Plusnet	ok	2017-08-25 11:02:26	No record of prior block
Sky filter default	blocked	2017-08-25 11:02:26	2017-08-25 11:02:26
TalkTalk Kidsafe	ok	2017-08-25 11:02:26	2017-08-2101:37:49
TalkTalk Strict	blocked	2014-07-02 20:42:31	2014-07-02 20:42:31
Three	blocked	2017-04-14 22:00:17	2017-04-14 22:00:17
uno Communications	ok	2017-08-25 11:02:26	No record of prior block
VirginMedia	blocked	2017-03-27 10:25:44	2017-03-27 10:25:44
Vodafone	blocked	2017-08-25 11:02:32	2017-08-25 11:02:32

Tell us more

If you can provide us with more information about the site, and how it being over- or under-blocked has affected you personally, then it will help ORG campaign against censorship.

How would you categorise the organisation that runs the site? (optional)

Select a category	٣
What type of site is it, e.g. blog or news? (optional)	
Select a type	•
Which of these (if any) best describes the site content? (optional)	
Select content	٣
Has this site been blocked in error?	
Select option	•
Please explain how this site being over- or under-blocked has affecte your organisation (optional)	ed you or

I'm happy for ORG to contact me about this report.

Please email me regular blocking reports for this URL.

□ I'd like to join the ORG mailing list (view privacy policy).

Your email (required if you want to receive emails from us)

Submit details



Results

http://pornhub.com

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Plusnet	ok	2017-08-25 11:02:26	No record of prior block
Sky filter default		2017-08-25 11:02:26	2017-08-25 11:02:26
TalkTalk Kidsafe	ok	2017-08-25 11:02:26	2017-08-2101:37:49
TalkTalk Strict	blocked	2014-07-02 20:42:31	2014-07-02 20:42:31
Three	blocked	2017-04-14 22:00:17	2017-04-14 22:00:17
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Submit details

Detection

https://github.com/openrightsgroup/Blocking-Middleware/tree/master/config

```
{
   "rules": [
                  "isp": "Name of ISP1",
                  "match": [
                      "regex",
       },
{
                  "isp": "Name of ISP2",
                  "match": [
                     "regex",
       }
}
```



Detection - Mobile

T-Mobile:

http://www.t-mobile.co.uk/service/wnw-mig/entry/
http://tmobile.ee.co.uk/common/system_error_pages/outage_wnw.html
http://ee-outage.s3.amazonaws.com/outage-v1/outage-v1.html
http://ee-outage.s3.amazonaws.com/content-blocked/content-blocked-v1.html

EE:

http://www.t-mobile.co.uk/service/wnw-mig/entry/
http://tmobile.ee.co.uk/common/system_error_pages/outage_wnw.html
http://ee-outage.s3.amazonaws.com/outage-v1/outage-v1.html
http://ee-outage.s3.amazonaws.com/content-blocked/content-blocked-v1.html
http://ee-outage.s3.amazonaws.com/content-blocked/content-blocked-nobranding.html
https://myaccount.ee.co.uk/anonymous-content-lock

Vodafone:

http://online.vodafone.co.uk/dispatch/Portal/ContentControlServlet?type=restricted
http://online.vodafone.co.uk/en_GB/assets/static/contentcontrol/branded/restricted_a
ccess.html

http://online.vodafone.co.uk/en_GB/assets/static/contentcontrol/unbranded/restricted
_access.html

Detection – Fixed Line (Why we use regex)

"re:url:^http://blockpage\\.bt\\.com/pcstaticpage/blocked\\.html",
"re:url:^http://www\\.ukispcourtorders\\.co\\.uk/",
"re:body:^ Error \\- site blocked ",
"re:body:^ Error .*? site blocked"

OONI (Open Observatory of Network Interference)



Which websites are blocked?

WEB CONNECTIVITY

This test examines whether access to websites is blocked through DNS tampering, TCP connection RST/IP blocking or by a transparent HTTP proxy.

DNS CONSISTENCY

This test compares the DNS query results from a DNS resolver which is considered to be reliable with one that is tested for tampering.

HTTP HOST

This test examine whether the domain names of websites are blocked.

HTTP REQUESTS

This test tries to detect online censorship based on a comparison of HTTP requests over Tor and over the network of the user.

Which Instant Messaging Apps are blocked?

FACEBOOK MESSENGER

This test is designed to examine the reachability of Facebook Messenger within a tested network.

TELEGRAM

This test is designed to examine the reachability of Telegram's app and web version within a tested network.

WHATSAPP

This test is designed to examine the reachability of both WhatsApp's app and the WhatsApp web version within a tested network.

Which censorship technologies are in my network?

HTTP HEADER FIELD MANIPULATION

This test tries to detect the presence of network components ("middle box") which could be responsible for censorship and/or traffic manipulation.

HTTP INVALID REQUEST LINE

This test tries to detect the presence of network components ("middle box") which could be responsible for censorship and/or traffic manipulation.






- **DNS blocking:** If the DNS responses (such as the IP addresses mapped to host names) do not match
- **TCP/IP blocking:** If a TCP session to connect to websites was not established over the network of the user
- **HTTP blocking:** If the HTTP request over the user's network failed, or the
- **HTTP status codes don't match, or all of the following apply:
 - The body length of compared websites (over the control server and the network of the user) differs by some percentage
 - The HTTP headers names do not match
 - The HTML title tags do not match





- Tests Google DNS
- Tests ISP

- Intercepted by the likes of Nominum etc so relies on additional tests / control server
- GeoDNS etc also leads to false positives



OONI HTTP Host Header

- Is the host name blocked?
- detect the presence of "middle boxes"
- assess which censorship circumvention techniques are capable of bypassing the censorship

 This test implements a series of techniques which help it evade getting detected from censors and then uses a list of domain names (such as bbc.co.uk) to connect to an OONI backend control server.



OONI HTTP Request Comparison

- Body length
- The HTTP request over the user's network fails
- The HTTP headers do not match

 Fails when Tor Exit is discriminated against (e.g. CloudFlare Captcha)



OONI HTTP Header Manipulation

- HTTP headers with variations in capitalization.
- Such requests are sent to a backend control server which echos back

- Like for like echo is good
- Interception software will likely normalize the invalid headers that we are sending or add extra headers.



OONI HTTP invalid request line

 Instead of sending a normal HTTP request, this test sends an invalid HTTP request line containing an invalid HTTP version number, an invalid field count and a huge request method – to an echo service listening on the standard HTTP port.

Why bother?

Over/Under Blocking



Pete Hamilton @peterejhamilton

Follow

 \sim

@O2 it appears you block @nspcc and @childline for children under "Parental Control". urlchecker.o2.co.uk/urlcheck.aspx what!?

Check the O2 policy for http://childline.org.uk	a website. Continue
O2 customer profile	O2 policy
Open Access	Allowed
Default Safety	Allowed
Parental Control	Blocked

12:09 pm - 21 Dec 2013 From Hammersmith and Fulham, England



The telecoms company O2 has been forced to amend its so-called "porn filter" after it inadvertently blocked access to charity sites including ChildLine, the NSPCC and the Samaritans.

Over/Under Blocking

 \equiv **PinkNews** Share on **facebook** Community BT gives parents tool to block kids from learning about sexual health and

gay rights

🔊 Joseph Patrick McCormick

🗂 20th December 2013, 3:36 PM



The BT Broadband site allows parents to block specific categories

Parental controls for users of BT broadband includes an option to block "gay and lesbian lifestyle" sites, as well as sexual health information.

Over/Under Blocking

BBC	Sign in		News	Sport	Weather	iPlayer	тν	Radi		
NEWS										
Home UK	World Business	Politics	Tech	Science	Health	Education	En	tertainr		
UK England N. Ireland Scotland Alba Wales Cymru										
Porn filters block sex education websites By Mike Deri Smith BBC Newsnight										

[...] Among the sites TalkTalk blocked as "pornographic" was BishUK.com, an award-winning British sex education site, which receives more than a million visits each year.

(1) 18 December 2013 UK

< Share

TalkTalk also lists **Edinburgh Women's Rape and Sexual Abuse Centre** website as "pornographic."

Making things better

(Distribution of clue...)

HTTP/451

V451 UNAVAILABLE

What is Error 451? Why do we need Error 451?

UK Blocking Orders

SITE BLOCKED FOR LEGAL REASONS

Courts can order your Internet Service Provider to block certain websites.

In the UK, this is usually because the websites contain material that infringes copyright. In other parts of the world, websites are targeted for their political content.

ISPs often don't say why a website is blocked and court orders are rarely voluntarily published. So when sites are blocked, it's really hard to find out why.

451 Unavailable is here to help ISPs make it clear why websites are blocked and to encourage courts to publish blocking orders.

Can you help to make Internet censorship more transparent?

Get Involved

ABOUT WIKI DONATE GET INVOLVEI

ERROR 451

UNAVAILABLE FOR LEGAL REASONS.

This request may not be serviced in the Roman Province

of Judea due to Lex3515, the Legem Ne Subversionem

HTTP/451 - RFC7725

[...] This status code can be used to provide transparency in circumstances where issues of law or public policy affect server operations. This transparency may be beneficial both to these operators and to end users. [...]

[...] Responses using this status code SHOULD include an explanation, in the response body, of the details of the legal demand: the party making it, the applicable legislation or regulation, and what classes of person and resource it applies to. [...]

[...] Clients cannot rely upon the use of the 451 status code. It is possible that certain legal authorities might wish to avoid transparency, and not only demand the restriction of access to certain resources, but also avoid disclosing that The demand was made. [...]



Pfft, doesn't apply to me

Mitigations:

- Tor
- Proxies
- •VPN
- Turn it off



And here's why you need to give a shit about #DEBill even if you know how to get round a porn block:



Can you get round a porn block? | Girl on the Net

Know how to get round a porn block? If you're even vaguely familiar with the internet, you probably do. But that doesn't mean porn laws don't affect you.

Follow

 \sim

girlonthenet.com

4:46 AM - 19 Nov 2016





Tor node operator arrested in Russia will be held on terrorism charges until June trial

Posted Apr 24, 2017 by Taylor Hatmaker (@tayhatmaker)



Proxies



Piracy police arrest Nottingham man, 20

C 7 August 2014 Technology

🛛 🗹 < Share

A man who allegedly ran a service that provided roundabout access to pirated films and music files has been arrested by City of London Police.

The 20-year-old from Nottingham is believed to have been running a proxy server that connected to addresses banned by service providers in the UK.

Several popular proxy sites have been taken down in the past few days, but no connection has been made to the arrest.

The police have placed warning notices on the sites concerned.

Police Arrest Operator of Torrent Site Proxies

BY ERNESTO ON AUGUST 6, 2014

With help from Hollywood, City of London Police have arrested the alleged operator of Immunicity and a range of torrent site proxies. The 20-year-old man was questioned at a local police station, and pending further investigation was released on bail.

Earlier today news broke that the proxy service Immunicity had been taken offline by the UK Police Intellectual Property Crime Unit (PIPCU). Several reverse proxies offering access to blocked sites such as The Pirate Bay and KickassTorrents suffered the same fate



C: 242

VPNs

The Telegraph

HOME NEWS SI

Technology

 $News \ | \ Reviews \ | \ Opinion \ | \ Internet \ security \ | \ Social \ media \ | \ Apple \ | \ Google \ | \ New$

↑ Technology

Apple removes VPN apps used to evade China's internet censorship

Cesolution Center From É Apple Yesterday at 11:53 PM Hello, We are writing to notify you that your application will be removed from the China App Store because it includes content that is illegal in China, which is not in compliance with the App Store Review Guidelines : 5. Legal Apps must comply with all legal requirements in any location where you make them available (if you're not sure check

where you make them available (if you're not sure, check with a lawyer). We know this stuff is complicated, but it is your responsibility to understand and make sure your app conforms with all local laws, not just the guidelines below. And of course, apps that solicit, promote, or encourage criminal or clearly reckless behavior will be rejected.

Turn the filters off

← → C i www.ukispcourtorders.co.uk

☆ 🗊 🔅

ACCESS TO THE WEBSITES LISTED ON THIS PAGE HAS BEEN BLOCKED PURSUANT TO ORDERS OF THE HIGH COURT

You have the right to apply to the High Court to vary or discharge the Orders below if you are affected by the blocks which have been imposed. Any application must be made to the High Court directly and must (i) clearly indicate your identity and status as an applicant; (ii) be supported by evidence setting out and justifying the grounds of the application, and (iii) be notified to all parties 10 days in advance.

