

# Digital evidence and disclosure: tactics and techniques

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Martin Howe QC and Jaani Riordan

Barristers, 8 New Square

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# Overview

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- 1 Identifying anonymous defendants: *Norwich Pharmacal* orders
- 2 Identification using digital 'self-help' tools
- 3 Gathering digital evidence
- 4 Advanced search techniques
- 5 Metadata analysis of files and emails

# (1) Identifying anonymous defendants

# *Norwich Pharmacal* disclosure

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- 1 Elements:
  - a) Arguable wrongdoing;
  - b) Defendant 'mixed up in' wrongdoing as a facilitator;
  - c) Disclosure necessary to seek some legitimate redress; and
  - d) Proportionate in all the circumstances to order disclosure.
  
- 2 An equitable remedy against any person who 'without incurring any personal liability, becomes involved in a wrongful act of another': *Ashworth Hospital Authority v MGN Ltd* [2002] 1 WLR 2033, 2039 (Lord Woolf CJ).
  
- 3 Rationale is to uphold the administration of justice and 'enable justice to be done': *British Steel Corp v Granada Television Ltd* [1981] AC 1096, 1132 (Templeman LJ)

## *Norwich Pharmacal* : the principle

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- 1 “if through no fault of his own a person gets mixed up in the tortious acts of others so as to facilitate their wrong-doing he may incur no personal liability but he comes under a duty to assist the person who has been wronged by giving him full information and disclosing the identity of the wrongdoers”: *Norwich Pharmacal Co v Customs & Excise Commissioners* [1974] AC 133, 175 (Lord Reid).
- 2 “New situations are inevitably going to arise where it will be appropriate for the jurisdiction to be exercised where it has not been exercised previously ... [I]t has become a valuable and mature remedy”: *Ashworth*, 2049 (Lord Woolf CJ).
- 3 Applies to any form of civil or criminal wrongdoing; an “arguable case” is required: *R (Mohamed) v Secretary of State* [2009] 1 WLR 2579, 2607 (Thomas LJ).

# The modern approach

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- 1 The modern approach involves proportionality, balancing interests of rights owner in enforcement of the relevant property right against interests of individuals in privacy or data protection.
- 2 See *Rugby Football Union v Viagogo Ltd* [2012] UKSC 55; [2013] FSR 23
  - (a) Balancing exercise however in practice firmly in favour of rights owner;
  - (b) Cf ECJ approach in *Promusicae v Telefonica de Espana* (C-275/06), and in *Bonnier Audio AB v Perfect Communication Sweden* (C-461/10).

## ***RFU v Viagogo: facts***

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- 1 Viagogo is a secondary market for tickets to sporting and other events, which allows people anonymously to resell tickets (usually at premiums over face value).
- 2 The Rugby Football Union sought disclosure of buyers' and sellers' data collected by the platform in the course of processing transactions for resold rugby tickets, which was contrary to the Union's stipulated terms of sale.
- 3 Viagogo's terms of use expressly permitted disclosure of users' data under compulsory legal processes, such as court-ordered disclosure.
- 4 The High Court, Court of Appeal and Supreme Court all agreed that disclosure was necessary and proportionate, and not outweighed by users' privacy interests.

Choose Your Delivery Method

Collect at a viagogo authorised pickup point - £5.95  
Detailed instructions will be sent via email.

Choose a Pickup Identity

Full Name

[e.g. Firstname Lastname]

Continue

Secure Checkout

Time Remaining: 03:13

New Zealand vs Australia - Rugby World Cup 2015 - Final

Saturday, 31 October 2015 16:00  
Twickenham Stadium, London, United Kingdom

Section: Cat A

Price/Ticket	£60,000.00
Number of Tickets (€60)	x 2
Subtotal	£120,000.00
Booking Fee	£18,000.00
VAT	£3,600.00
Shipping	£5.95
<b>TOTAL PRICE</b>	<b>£141,605.95</b>



All Tickets Are 100% Guaranteed

Buy with confidence. We guarantee that you'll get valid tickets in time for the event.

# TICKET PRICES ON VIAGOGO BEFORE ENGLAND VS IRELAND



## ***RFU v Viagogo*: Supreme Court decision**

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- 1 The RFU's stated purpose was to bring proceedings against sellers for breach of the ticketing conditions, conversion of the paper ticket, and jointly committing trespass with buyers who gained admission to matches with a resold ticket.
- 2 Claims for breach of contract and trespass were at least arguable, and this was a legitimate purpose for disclosure (even if the claim for damages may be insubstantial or may ultimately fail) in light of deterrent effect and wider public interest in preventing unauthorised ticket resale.
- 3 Disclosure not contrary to users' Article 8 ECHR rights: all disclosed users were arguable wrongdoers who had no legitimate interest in concealing arguable wrongdoing; a fair balance of the competing interests favoured disclosure.

“where a balance falls to be struck between [ECHR A1P1]/Article 17(2) of the *Charter* on the one hand and Article 8 ECHR/Article 7 of the *Charter* and Article 8 of the Charter on the other hand ... [the] approach is as follows: (i) **neither Article as such has precedence** over the other; (ii) where the values under the two Articles are in conflict, an **intense focus on the comparative importance of the specific rights** being claimed in the individual case is necessary; (iii) the **justifications** for interfering with or restricting each right must be taken into account; (iv) finally, **the proportionality test – or ‘ultimate balancing test’** - must be applied to each”

*Goldeneye (International) Ltd v Telefonica UK Ltd*  
[2012] EWHC 723 (Ch), [117] (Arnold J)

“I have no difficulty in accepting this as a **correct statement of the approach to the question of proportionality** in the *Norwich Pharmacal* context. ... [Here] all that will be revealed is the identity of those who have, apparently, engaged in the sale and purchase of tickets in stark breach of the terms on which those tickets have been supplied by the RFU. The **entirely worthy motive of the RFU in seeking to maintain the price of tickets at a reasonable level** not only promotes the sport of rugby, it is in the interests of all those members of the public who wish to avail of the chance to attend international matches. **The only possible outcome of the weighing exercise in this case, in my view, is in favour of the grant of the order sought.**”

*Rugby Football Union v Viagogo Ltd (in liq)*  
[2012] UKSC 30; [2012] 1 WLR 1333, [45] (Lord Kerr JSC)

# Proportionality: relevant factors

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- i. The strength of the cause of action;
- ii. The public interest in allowing the applicant to vindicate its legal rights;
- iii. Whether the making of the order will deter similar wrongdoing in the future;
- iv. Whether the information could be obtained from another source;
- v. Whether D knew or ought to have known that he was facilitating wrongdoing (or was himself a joint tortfeasor);
- vi. Whether the order might reveal the names of innocent persons as well as wrongdoers and what harm they would suffer as a result;
- vii. The degree of confidentiality of the information sought;
- viii. Users' privacy rights under Article 8 ECHR;
- ix. Users' data protection rights under the EU data protection regime and *Charter*;
- x. Any public interest in maintaining confidentiality (eg of journalistic sources).

# When disclosure has been refused

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- 1 Two recent (rare) cases where *Norwich Pharmacal* relief actually refused:
  - (a) [Burford Capital Ltd v London Stock Exchange Group plc](#) [2020] EWHC 1183 (Comm): Order refused against the LSE in favour of a company which believed that unlawful market manipulation had contributed to a steep fall in its share price. The order would have required the Stock Exchange to divulge the identity of every individual or entity which had been involved in placing orders to buy and sell the company's shares over a two-day period.
  - (b) [Mircom International v Virgin Media Ltd](#) [2019] EWHC 1827 (Ch): order refused against ISP in favour of licensees of copyrights in 'explicit pornographic films', who alleged that customers of the ISP had downloaded infringing copies using BitTorrent peer-to-peer file-sharing. Applicants sought disclosure of over 20,000 customers' details to send them letters before action. However, the same group of companies had sought and obtained disclosure in 2012 ([Golden Eye International Ltd v Telefonica UK Ltd](#) [2012] RPC 28) and 2015 – but there was no evidence of any claims being brought or how many letters if any were sent.

## ***Mircom v Virgin Media: reasoning***

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- 1 There were serious defects in Cs' evidence:
  - (a) IP addresses were not in evidence
  - (b) Expert reports were from 2010 and 2017 in other cases
  - (c) Exhibits post-dated the dates of witness statements
  - (d) US expert report lacked a statement of truth
- 2 Although Arnold J held that Cs had a genuine intention to vindicate their IP rights in 2012, their failure to sue anyone since then is inconsistent with holding such an intention: [\[58\]](#)
- 3 Cs' lack of evidence made it impossible to perform the "delicate balancing exercise" required: [\[59\]](#)

“The situation in the *Goldeneye* case can be readily distinguished from the present case. There, unwitting customers ... might find themselves identified as possible downloaders of pornography and demands made of them for payment of the service. ... [S]ome customers who had not engaged at all in downloading the material might feel constrained to make the payment demanded in order to avoid the embarrassment of being accused of that activity. In the present case, by contrast, all that is sought is the names and addresses of persons who have sold or bought tickets for international rugby matches in contravention of unambiguously stated rules that they should not do so.”

*Rugby Football Union v Viagogo Ltd (in liq)*  
[2012] UKSC 30; [2012] 1 WLR 1333, [43] (Lord Kerr JSC)

# Disclosure against financial intermediaries

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- 1 Consider disclosure orders against banks, credit card issuers etc to identify destination of money, not just ISPs or hosts: e.g. *Domestic and General Group Ltd v Bank of Scotland plc* [2018] EWHC 3604 (QB) (identification of rogue traders impersonating appliance companies selling appliance care warranties).
- 2 Relief is not limited to facilitators, but can extend to others who are more than mere witnesses, e.g. police investigating possible offences: *Various Claimants v News Group Newspapers* [2014] Ch 400 (Mann J).
  - (a) There the Court had jurisdiction to grant disclosure against a third party who, although not having participated in or facilitated the defendant's wrongdoing, had an engagement with it such as to make the third party more than a mere witness or bystander;
  - (b) Since the police had been under a duty to acquire information about the offending act, had provided information to the applicants pursuant to a perceived obligation to do so, and had not opposed the applicants' claim, they had sufficient engagement for the court to have jurisdiction to make the order for discovery sought against them.

# Possible targets for disclosure

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- 1 Internet Service Providers
- 2 Hosts and network suppliers
- 3 Website/server operators
- 4 Content distribution networks
- 5 Payment intermediaries, credit card issuers and banks
- 6 Online marketplaces
- 7 Search engines
- 8 Social networks and platforms

## (2) Identification using digital sources

# Basic concepts

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- 1 The Internet: a network of networks
- 2 IP addresses: IPv4 (52.157.237.131), IPv6 (2a00:1450:4009:815::200e)
- 3 Namespaces: the domain name system (**DNS**); DNS servers; domain names
- 4 Packets; routing; analysing network architecture

# IP and DNS searches

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- 1 IP address WHOIS databases
  - a) [IANA](#) and Regional Internet Registry (e.g. [RIPE](#)) databases
  - b) Basic IP geolocation data ([example](#))
- 2 DNS searches
  - a) DNS zone information ([example](#))
  - b) Reverse DNS lookup ([example](#))
- 3 Traceroute ([example](#))
- 4 Difficult cases: [CDNs](#) and reverse proxies

Microsoft Windows [Version 10.0.17763.504]  
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\q>nslookup  
Default Server: csp3.zte.com.cn.mynet  
Address: fe80::1dc0:1c2a:33f5:4c0b

> twobirds.com  
Server: csp3.zte.com.cn.mynet  
Address: fe80::1dc0:1c2a:33f5:4c0b

Non-authoritative answer:  
Name: twobirds.com  
Address: 52.157.237.131

Domain name



> set type=ns  
> twobirds.com  
Server: csp3.zte.com.cn.mynet  
Address: fe80::1dc0:1c2a:33f5:4c0b

Non-authoritative answer:  
twobirds.com nameserver = ns2.rackspace.com  
twobirds.com nameserver = ns.rackspace.com

Hosting organisation



ns.rackspace.com internet address = 69.20.95.4  
ns2.rackspace.com internet address = 65.61.188.4

> set type=a  
> twobirds.com ns.rackspace.com  
Server: ns.rackspace.com  
Address: 69.20.95.4

DNS nameserver



Name: twobirds.com  
Address: 52.157.237.131

>

# IP addresses: Registries and NICs

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Delegated from the Internet Assigned Numbers Authority (**IANA**) are five Regional Internet Registries (RIRs) / network information centres (**NICs**):

- 1 Africa NIC (**AfriNIC**): Africa
- 2 American Registry for Internet Numbers (**ARIN**): for the United States, Canada, Caribbean (parts), Antarctica
- 3 Asia-Pacific NIC (**APNIC**): East/South/South-East Asia, Aus/NZ, Oceania
- 4 Latin America and Caribbean (**LACNIC**): Latin America / Caribbean (Parts)
- 5 Réseaux IP Européens Network Coordination Centre (**RIPE NCC**): Europe, Central Asia, Russia, and West Asia

## ARIN Whois/RDAP



» Search [www.arin.net](#) instead

Search Filter: **Automatic**

all requests subject to [terms of use](#)

"52.157.237.131"

### Network: NET-52-145-0-0-1

**Source Registry** ARIN  
**Net Range** 52.145.0.0 - 52.191.255.255   
**CIDR**  
 52.145.0.0/16  
 52.146.0.0/15  
 52.148.0.0/14  
 52.152.0.0/13  
 52.160.0.0/11  
**Name** MSFT  
**Handle** NET-52-145-0-0-1  
**Parent** NET-52-0-0-0-0  
**Net Type** DIRECT ASSIGNMENT   
**Origin AS** *not provided*  
**Registration** Tue, 24 Nov 2015 18:09:07 GMT (Tue Nov 24 2015 local time)  
**Last Changed** Tue, 24 Nov 2015 18:09:07 GMT (Tue Nov 24 2015 local time)  
**Self** <https://rdap.arin.net/registry/ip/52.145.0.0>  
**Alternate** <https://whois.arin.net/rest/net/NET-52-145-0-0-1>  
**Port 43 Whois** whois.arin.net

#### Related Entities ▼ 1 Entity

**Source Registry** ARIN  
**Kind** Org  
**Full Name** Microsoft Corporation   
**Handle** MSFT  
**Address** One Microsoft Way  
 Redmond  
 WA  
 98052  
 United States  
**Roles** Registrant  
**Registration** Fri, 10 Jul 1998 03:00:00 GMT (Fri Jul 10 1998 local time)  
**Last Changed** Sat, 28 Jan 2017 13:32:29 GMT (Sat Jan 28 2017 local time)  
**Comments**  
 To report suspected security issues specific to traffic emanating from Microsoft online services, including the distribution of malicious content or other illicit or illegal material through a Microsoft online service, please submit reports to:  
 \* <https://cert.microsoft.com>.  
 For SPAM and other abuse issues, such as Microsoft Accounts, please contact:  
 \* [abuse@microsoft.com](mailto:abuse@microsoft.com).  
 To report security vulnerabilities in Microsoft products and services, please contact:  
 \* [secure@microsoft.com](mailto:secure@microsoft.com).

#### Related

[Report Whois Inaccuracy](#)

[Whois/RDAP Documentation](#)

[ARIN Technical Discussion Mailing List](#)

[FAQs](#) 

# WHOIS record analysis

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- 1 Contact information
  - a) Administrative contact (owner)
  - b) Technical contact (operator)
  
- 2 Metadata
  - a) When created (useful for identifying start of activity)
  - b) When last updated (e.g. following transfer)
  
- 3 Monitoring changes (e.g. [DailyChanges](#))

# Basic concepts: domain names

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## 1 Domain name registries

- a) ICANN: regulates all registries and operates the Uniform Dispute Resolution Policy (**UDRP**)
- b) Nominet: administers the .uk namespace, and operates the Nominet DRP

## 2 Types of domain names

- a) Top-level domains (**TLDs**) (.com, .net, .biz)
- b) Country-code top-level domains (.uk, .eu, .au) (**ccTLDs**)
- c) Generic top-level domains (**gTLDs**) (.lawyer, .london, .apple)

# Domain name WHOIS

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- 1 Domain names are normally registered via **registrars**
- 2 As a condition of registration, registrants must provide their identity to be listed in the WHOIS database; this database can be queried to identify persons linked to a domain name of interest
- 3 Limitations
  - a) Anonymising proxy registration services
  - b) No checks on accuracy
  - c) Can normally be amended without prior approval

ft.com

whois information

Whois

DNS Records

Diagnostics

cache expires in 1 days, 0 hours, 0 minutes and 0 seconds

## Registrar Info

Name	CSC CORPORATE DOMAINS, INC.
Whois Server	whois.corporatedomains.com
Referral URL	www.cscprotectsbrands.com
Status	clientTransferProhibited http://www.icann.org/epp#clientTransferProhibited

## Important Dates

Expires On	2021-11-29
Registered On	1994-11-30
Updated On	2020-03-31

## Name Servers

ns-1447.awsdns-52.org	205.251.197.167
ns-1984.awsdns-56.co.uk	205.251.199.192
ns-52.awsdns-06.com	205.251.192.52
ns-530.awsdns-02.net	205.251.194.18

## Similar Domains

ft.co | ft.co.hu | ft.co.il | ft.co.in | ft.co.jp | ft.co.kr | ft.co.nz | ft.co.tz | ft.co.uk | ft.co.za | ft.com | ft.com.au | ft.com.br | ft.com.cn | ft.com.hk | ft.com.my | ft.com.pe | ft.com.pl | ft.com.sa | ft.com.sg |

## Registrar Data

We will display stored WHOIS data for up to 30 days.

Make Private Now

## Registrant Contact Information:

Name	The Financial Times Limited
Organization	The Financial Times Limited
Address	
City	London
State / Province	ENG
Postal Code	EC4M 9BT
Country	GB
Phone	+44.2078733000
Fax	+44.2078733928
Email	company.secretary@ft.com

## Administrative Contact Information:

Name	The Financial Times Limited
Organization	The Financial Times Limited
Address	
City	London
State / Province	ENG
Postal Code	EC4M 9BT
Country	GB
Phone	+44.2078733000

Get a \$7.99 .COM domain with promo code NAME799

Find the perfect domain at  
name.com

## Site Status

Status Active

Server Type

## Suggested Domains for ft.com

<input type="checkbox"/> ft.social	\$9.99
<input type="checkbox"/> shopft.social	\$9.99
<input type="checkbox"/> ft.news	\$19.99
<input type="checkbox"/> shopft.rocks	\$3.99
<input type="checkbox"/> ftgroup.rocks	\$3.99

Purchase Selected Domains

Get a \$7.99 .COM domain with promo code NAME799

Find the perfect domain at  
name.com

- Registrar
- Abuse contact
- Domain status (locked/unlocked)
- Registrant (GDPR...)
- Admin and tech contacts
- Name server (usually provided by the web host)

# Difficult cases

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Archived DNS records



SSL certificate analysis

DOMAIN

DNS Records

Historical Data

Subdomains 1,308

Sign up for an API key now!

FT ft.com

## Historical Data

A AAAA MX NS SOA TXT

IP Addresses	Organization	First Seen	Last Seen	Duration Seen
151.101.66.109 <a href="#">Q</a> 151.101.2.109 <a href="#">Q</a> 151.101.194.109 <a href="#">Q</a> 151.101.130.109 <a href="#">Q</a>	Fastly	2017-08-09 (2 years ago)	2020-07-09 (today)	2 years
151.101.65.63 <a href="#">Q</a> 151.101.193.63 <a href="#">Q</a> 151.101.129.63 <a href="#">Q</a> 151.101.1.63 <a href="#">Q</a>	Fastly	2016-11-24 (3 years ago)	2017-08-09 (2 years ago)	8 months
151.101.65.133 <a href="#">Q</a> 151.101.193.133 <a href="#">Q</a> 151.101.129.133 <a href="#">Q</a> 151.101.1.133 <a href="#">Q</a>	Fastly	2016-10-14 (3 years ago)	2016-11-24 (3 years ago)	1 month
151.101.64.230 <a href="#">Q</a> 151.101.192.230 <a href="#">Q</a> 151.101.128.230 <a href="#">Q</a> 151.101.0.230 <a href="#">Q</a>	Fastly	2016-09-09 (3 years ago)	2016-10-14 (3 years ago)	1 month
216.146.46.11 <a href="#">Q</a> 216.146.46.10 <a href="#">Q</a>	Oracle Corporation	2015-08-13 (4 years ago)	2016-09-09 (3 years ago)	1 year
-	-	2015-02-01 (5 years ago)	2015-08-13 (4 years ago)	6 months
216.146.46.11 <a href="#">Q</a> 216.146.46.10 <a href="#">Q</a>	Oracle Corporation	2014-12-01 (5 years ago)	2015-02-01 (5 years ago)	2 months
64.210.200.110 <a href="#">Q</a> 62.25.64.118 <a href="#">Q</a>	CenturyLink Communications, LLC Now maintained by Cable & Wireless Worldwide	2014-08-17 (5 years ago)	2014-08-18 (5 years ago)	1 day
62.25.64.118 <a href="#">Q</a> 165.193.122.234 <a href="#">Q</a>	Now maintained by Cable & Wireless Worldwide CenturyLink Communications, LLC	2014-05-15 (6 years ago)	2014-08-05 (5 years ago)	2 months
62.25.74.216 <a href="#">Q</a> 165.193.122.234 <a href="#">Q</a>	Now maintained by Cable & Wireless Worldwide CenturyLink Communications, LLC	2012-06-21 (8 years ago)	2014-04-13 (6 years ago)	1 year

- Moved hosts in June 2012
- Moved to Oracle server in 2014
- Moved to Fastly server in September 2016
- Still hosted there in July 2020

DOMAIN

DNS Records

Historical Data

Subdomains 1,308

Sign up for an API key now!

FT ft.com

## Historical Data

A AAAA MX NS SOA TXT

Mail Servers	Organization	First Seen	Last Seen	Duration Seen
aspmx.l.google.com 🔍 alt4.aspmx.l.google.com 🔍 alt3.aspmx.l.google.com 🔍 alt2.aspmx.l.google.com 🔍 alt1.aspmx.l.google.com 🔍	Google LLC	2017-05-26 (3 years ago)	2020-07-09 (today)	3 years
-	-	2015-02-01 (5 years ago)	2015-08-13 (4 years ago)	6 months
ft.com.s200b2.psmtpl.com 🔍 ft.com.s200b1.psmtpl.com 🔍 ft.com.s200a2.psmtpl.com 🔍 ft.com.s200a1.psmtpl.com 🔍	-	2011-10-15 (8 years ago)	2015-02-01 (5 years ago)	3 years
ft.com.mail8.psmtpl.com 🔍 ft.com.mail7.psmtpl.com 🔍 ft.com.mail6.psmtpl.com 🔍 ft.com.mail5.psmtpl.com 🔍	-	2008-09-01 (11 years ago)	2011-10-15 (8 years ago)	3 years

- Currently using Google hosted email service
- Previously using Postini email filtering (also Google)
- Can inform temporal scope of disclosure requests – or application for third party disclosure

# Historical WHOIS/DNS tools

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- 1 SecurityTrails ([here](#))
- 2 DomainTools ([here](#))
- 3 Whoxy ([here](#))
- 4 WhoisRequest ([here](#))



Certificates

parsed.names: rocket-internet.com AND tags.raw: trusted

PD

### Quick Filters

For all fields, see [Data Definitions](#)

#### Tag:

- 15 CT
- 15 Google CT
- 15 Leaf
- 15 Currently Trusted
- 15 Unexpired

More

#### Issuer:

- 6 COMODO CA Limited
- 5 GlobalSign nv-sa
- 2 DigiCert Inc
- 2 GeoTrust Inc.

### Certificates

Page: 1/1 Results: 15 Time: 155ms

#### CN=password.rocket-internet.com

- RapidSSL TLS RSA CA G1
- 2018-07-25 – 2020-07-24
- password.rocket-internet.com
- parsed.names: password.rocket-internet.com

#### CN=\*.rocket-internet.com

- RapidSSL SHA256 CA - G2
- 2016-04-04 – 2019-05-04
- \*.rocket-internet.com, rocket-internet.com
- parsed.names: rocket-internet.com

#### CN=\*.rocket-internet.com

- RapidSSL SHA256 CA - G2
- 2016-04-04 – 2019-05-04
- \*.rocket-internet.com, rocket-internet.com
- parsed.names: rocket-internet.com

## Found 9 companies

ckl holdings limited

GO

exclude inactive

[Advanced Options](#)

 **C.K.L HOLDINGS LIMITED** (United Kingdom, 20 Mar 2002- ,  The Print Centre Johnson Street, Howe Bridge, Atherton, M46 0RB)

 **inactive C.K.L. HOLDINGS (PTE) LIMITED** (Singapore, 28 May 1975- ,  65 CHULIA STREET #13-02 OCBC CTR, 049513)

 **CKL HOLDINGS (QLD) PTY LTD** (Australia, 11 Apr 2011- ,  BRISBANE, Queensland, 4000)

 **inactive CKL HOLDINGS LIMITED** (New Zealand, 11 Apr 2007-18 Nov 2008,  O'neill Devereux, 248 High Street, Dunedin)

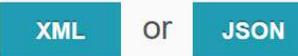
 **CKL HOLDINGS PTE. LTD.** (Singapore, 2 Mar 1983- ,  119 DEFU LANE 10, 539230)

 **CKL HOLDINGS PTY LTD** (Australia, 12 Jun 2003- ,  CARINGBAH, New South Wales, 2229)

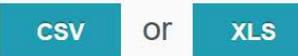
Share This Search



Get as Open Data



[Enterprise Users](#)



### Filtered by jurisdiction

- 3 [Australia](#)
- 1 [Israel](#)
- 1 [New Zealand](#)
- 2 [Singapore](#)
- 1 [Thailand](#)
- 1 [United Kingdom](#)

### Filter by data held

- 1 [Accounts Statement](#)

## (3) Gathering digital evidence

# Common pitfalls

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- 1 Not taking an archived copy (or waiting until letter before action)
- 2 Storing incomplete metadata
- 3 Poor screenshots (partial page, no date, etc)
- 4 Not using a VPN
- 5 Content Delivery Networks

# Recording UI interactions

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- 1 Screenshots
  - a) Whole screen, active window, and snippets
  - b) Whole page using browser extensions (e.g. AwesomeScreenshot)
  - c) Limitations – metadata, printing, dynamic content
- 2 Videos of user activity
- 3 Archived snapshots
- 4 Avoid printing (unless you want to modify the page)

# Archiving web data

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- 1 There are a variety of tools to take local snapshots of online data
  - a) wget – original command line tool; capture an entire site and any referenced dependencies
  - b) GUI versions available for Windows (e.g. [VisualWget](#))
  - c) Screenshots can be automated: e.g. Stillio (web-based tool to capture every X hours/days/weeks)
  
- 2 Beware of limitations associated with each
  - a) Will not capture databases/back-end content; live links will not work
  - b) Scripting and stylesheets may not work
  - c) Saved page may not resemble live web view

# Finding older versions

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- 1 Wayback Machine and website caches
  - a) [WBM extension](#) for Chrome – essential tool
  - b) Date range analysis
  - c) Redirects: Error 301 (moved permanently), Error 302 (moved temporarily)
  - d) Active pages (200 OK status code)
- 2 Google: `cache:www.company.com`
- 3 Historical DNS records (see above)

Wayback Machine x

Secure | https://web.archive.org/web/20160101000000\*/www.giordano.com/EU

ABOUT CONTACT BLOG PROJECTS HELP DONATE JOBS VOLUNTEER PEOPLE

INTERNET ARCHIVE **WayBackMachine** Explore more than 332 billion web pages saved over time

www.giordano.com/EU

DONATE

Saved 49 times between March 3, 2016 and March 4, 2018.

[Summary of giordano.com](#) · [Site Map of giordano.com](#)



1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018

JAN	FEB	MAR	APR
1 2	1 2 3 4 5 6	1 2 3 4 5	1 2
3 4 5 6 7 8 9	7 8 9 10 11 12 13	6 7 8 9 10 11 12	3 4 5 6 7 8 9
10 11 12 13 14 15 16	14 15 16 17 18 19 20	13 14 15 16 17 18 19	10 11 12 13 14 15 16
17 18 19 20 21 22 23	21 22 23 24 25 26 27	20 21 22 23 24 25 26	17 18 19 20 21 22 23
24 25 26 27 28 29 30	28 29	27 28 29 30 31	24 25 26 27 28 29 30
31			

MAY	JUN	JUL	AUG
1 2 3 4 5 6 7	1 2 3 4	1 2	1 2 3 4 5 6
8 9 10 11 12 13 14	5 6 7 8 9 10 11	3 4 5 6 7 8 9	7 8 9 10 11 12 13
15 16 17 18 19 20 21	12 13 14 15 16 17 18	10 11 12 13 14 15 16	14 15 16 17 18 19 20
22 23 24 25 26 27 28	19 20 21 22 23 24 25	17 18 19 20 21 22 23	21 22 23 24 25 26 27
29 30 31	26 27 28 29 30	24 25 26 27 28 29 30	28 29 30 31
		31	

SEP	OCT	NOV	DEC
1 2 3	1	1 2 3 4 5	1 2 3
4 5 6 7 8 9 10	2 3 4 5 6 7 8	6 7 8 9 10 11 12	4 5 6 7 8 9 10
11 12 13 14 15 16 17	9 10 11 12 13 14 15	13 14 15 16 17 18 19	11 12 13 14 15 16 17
18 19 20 21 22 23 24	16 17 18 19 20 21 22	20 21 22 23 24 25 26	18 19 20 21 22 23 24

No results before early 2016 (can reasonably infer – at least here – that /EU sub-page did not exist before then)

Wayback Machine

Secure | [https://web.archive.org/web/20160101000000\\*/www.giordano.com/GB/en-US](https://web.archive.org/web/20160101000000*/www.giordano.com/GB/en-US)

ABOUT CONTACT BLOG PROJECTS HELP DONATE JOBS VOLUNTEER PEOPLE

INTERNET ARCHIVE  
**Wayback Machine**

Explore more than 332 billion web pages saved over time

DONATE

Saved 340 times between February 20, 2016 and June 8, 2018.

[Summary of giordano.com](#) · [Site Map of giordano.com](#)

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
JAN																															
FEB																															
MAR																															
APR																															
MAY																															
JUN																															
JUL																															
AUG																															
SEP																															
OCT																															
NOV																															
DEC																															

Green circles indicate redirect responses; blue indicates OK response

https://web.archive.org/ x

Secure | https://web.archive.org/web/20160220205307/http://www.giordano.com/GB/en-US/

ABOUT CONTACT BLOG PROJECTS HELP DONATE JOBS VOLUNTEER PEOPLE

SIGN IN Search

INTERNET ARCHIVE  
**WayBackMachine**

Loading...

```
http://www.giordano.com/GB/en-US/ |  
20:53:07 February 20, 2016  
  
Got an HTTP 302 response at crawl time  
  
Redirecting to...  
  
/error.aspx?aspxerrorpath=/GB/en-US/
```

Impatient?

 The Wayback Machine is an initiative of the Internet Archive, a 501(c)(3) non-profit organization, building a digital library of Internet sites and other cultural artifacts in digital form. Other projects include Open Library & archive-it.org.

Your use of the Wayback Machine is subject to the Internet Archive's Terms of Use.

As at this date, users would be redirected to a page which was probably an error message

## Limitations of WBM

---

- 1 Wayback Machine crawler only saves front-end material (e.g. HTML and images); no forms or databases
- 2 Crawler located in the US (therefore using a US IP address range) so will see US-facing content
- 3 Not all linked resources are archived (e.g. stylesheets and scripts) which can make navigation hard; no orphan pages
- 4 Websites can avoid archiving using Robots Exclusion Protocol

## (4) Advanced search

Google   



**All** News Maps Videos Images More Settings Tools

2 results (0.29 seconds)

**Terms and Conditions of Use - Spotify**  
<https://www.spotify.com/legal/end-user-agreement/> ▼  
Your agreement with us includes these Terms and any additional terms that you agree to, as discussed in the Entire Agreement section below, other than terms ...

**Terms and Conditions - SubletU**  
<https://www.subletu.org/tac.html> ▼  
Your agreement with us includes these Terms and any additional terms that you agree to, as discussed in the Entire Agreement section below, other than terms ...

*In order to show you the most relevant results, we have omitted some entries very similar to the 2 already displayed.  
If you like, you can [repeat the search with the omitted results included](#).*

Searches related to "Your agreement with us includes these Terms and any additional terms"

- [spotify law enforcement](#)
- [spotify com privacy policy](#)

United Kingdom | ● **N1, London** - Based on your past activity - Use precise location - Learn more

# Advanced search techniques

---

- 1 Using `site:*` search
- 2 Using `inurl:*` search, `intitle:*`,
- 3 Modifiers (e.g. `filetype:pdf`, `-keyword`)
- 4 Ranges (e.g. “`sodium 0.05..1.5`”), recency (`&tbs=qdr:s/h/d/w/y`)
- 5 Google Alerts (instant notice of new results), Google Trends
- 6 Reverse image search

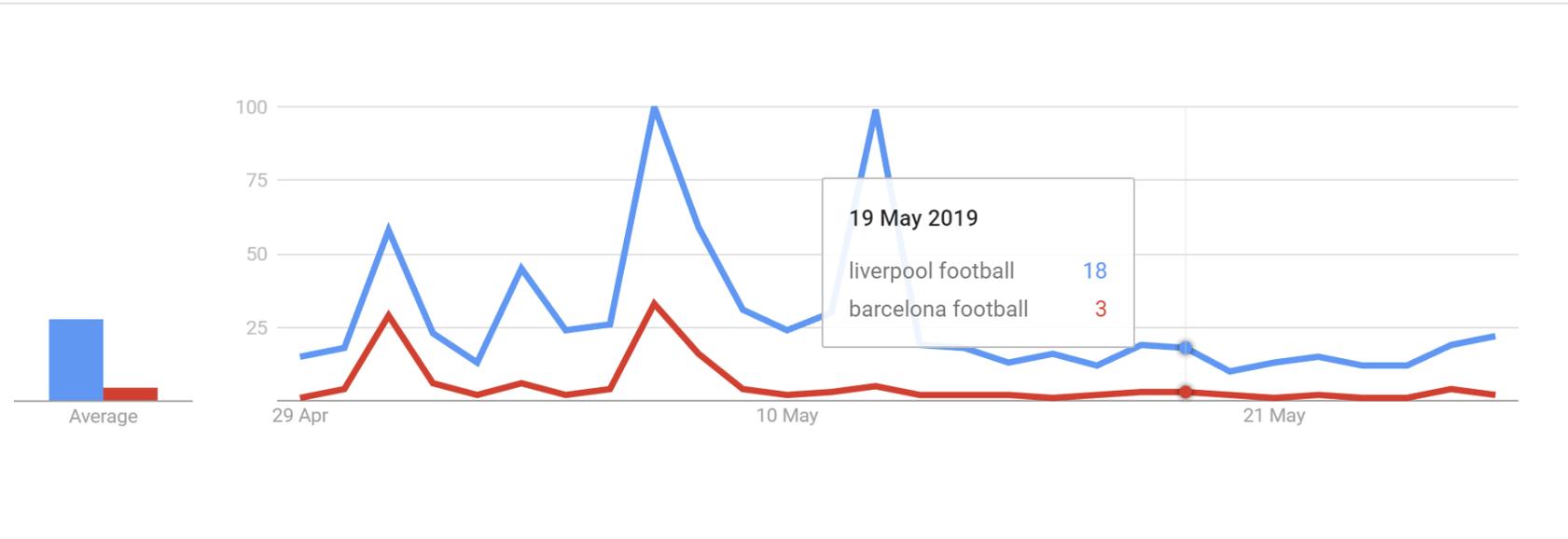
liverpool football  
Search term

barcelona football  
Search term

+ Add comparison

United Kingdom Past 30 days Sports Web Search

Interest over time



Compared breakdown by sub-region

Sub-region

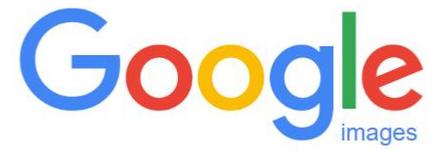
ARE YOU COMING TO BED?

I CAN'T. THIS  
IS IMPORTANT.

WHAT?

SOMEONE IS WRONG  
ON THE INTERNET.





**Search by image** ✕

Search Google with an image instead of text. Try dragging an image here.

**Paste image URL** **Upload an image**

**Search by image**

All **Images** Maps Shopping More Settings Tools

About 25,270,000,000 results (1.12 seconds)



Image size:  
300 × 330  
Find other sizes of this image:  
[All sizes](#) - [Small](#) - [Medium](#)

Possible related search: [someone is wrong on the internet](#)

### xkcd: Duty Calls

<https://xkcd.com/386/>

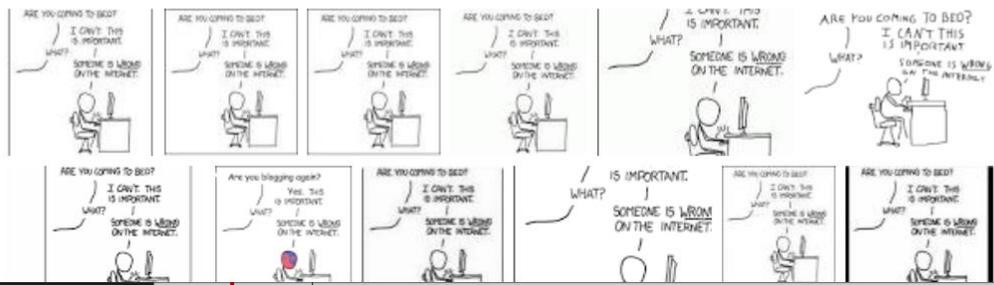
< Prev · Random · Next > · >]. Permanent link to this comic: <https://xkcd.com/386/> Image URL (for hotlinking/embedding): [https://imgs.xkcd.com/comics/duty\\_calls](https://imgs.xkcd.com/comics/duty_calls).

### Someone is wrong on the internet | FT Alphaville

<https://ftalphaville.ft.com/series/Someone%20is%20wrong%20on%20the%20internet>

Part of the **Someone is wrong on the internet** series. The best of Morgan Stanley's Adam Jonas · A paean to the Tesla bull turning bearish. yesterday. By: Jamie ...

### Visually similar images



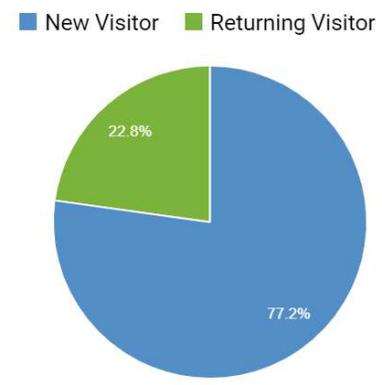
# Analytics

---

- 1 Requires inspection from website operator
- 2 Conventional approach: analytics database is a 'document' within CPR r 31.4; extracting records/reports does not involve creating new documents
  - a) Audience overview (basic demographics)
  - b) Key audience metrics (bounce rate, returning users, session duration)
  - c) User paths (navigation within the site and drop-off at each stage)
  - d) Referrers (direct, search engine) and user-agents (desktop, mobile, etc)

- Home
- Customization
- REPORTS
- Realtime
- Audience**
- Overview**
- Active Users
- Lifetime Value BETA
- Cohort Analysis BETA
- Audiences
- User Explorer
- Demographics
- Interests
- Geo
- Discover
- Admin

Users <b>12,760</b>	New Users <b>10,903</b>
Sessions <b>15,685</b>	Number of Sessions per User <b>1.23</b>
Pageviews <b>67,410</b>	Pages / Session <b>4.30</b>
Avg. Session Duration <b>00:02:54</b>	Bounce Rate <b>42.94%</b>



Demographics	Language	Users	% Users
Language	1. en-us	7,576	59.49%
Country	2. en-gb	1,039	8.16%
City	3. es-es	439	3.45%
System	4. fr-fr	314	2.47%
Browser	5. zh-tw	284	2.23%
Operating System	6. de-de	236	1.85%
Service Provider	7. zh-cn	228	1.79%
Mobile	8. pt-br	198	1.55%

-  Home
-  Customization
- REPORTS
-  Realtime
-  Audience
  - Overview
  - Active Users
  - Lifetime Value BETA
  - Cohort Analysis BETA
  - Audiences
  - User Explorer
  - ▼ Demographics
  - ▼ Interests
  - ▲ Geo
-  Discover
-  Admin

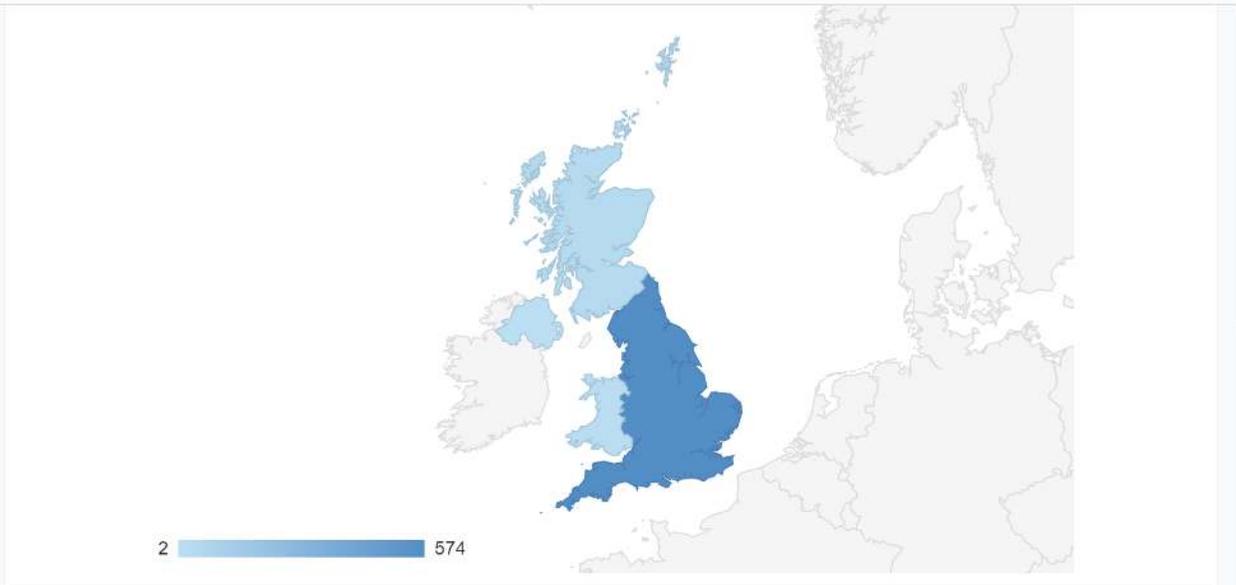
Primary Dimension: **Country** [City](#) [Continent](#) [Sub Continent](#)

Secondary dimension       

Country <sup>?</sup>	Acquisition			Behavior			Conversion
	Users <sup>?</sup> ↓	New Users <sup>?</sup>	Sessions <sup>?</sup>	Bounce Rate <sup>?</sup>	Pages / Session <sup>?</sup>	Avg. Session Duration <sup>?</sup>	Transac <sup>?</sup>
	12,760 <small>% of Total: 100.00% (12,760)</small>	10,918 <small>% of Total: 100.14% (10,903)</small>	15,685 <small>% of Total: 100.00% (15,685)</small>	42.94% <small>Avg for View: 42.94% (0.00%)</small>	4.30 <small>Avg for View: 4.30 (0.00%)</small>	00:02:54 <small>Avg for View: 00:02:54 (0.00%)</small>	100.00%
1.  United States	5,602 (43.68%)	4,417 (40.46%)	7,234 (46.12%)	29.24%	5.50	00:03:37	16
2.  India	865 (6.74%)	795 (7.28%)	963 (6.14%)	55.56%	3.18	00:01:59	1
3.  United Kingdom	635 (4.95%)	558 (5.11%)	699 (4.46%)	56.94%	3.14	00:01:55	0
4.  Canada	481 (3.75%)	437 (4.00%)	559 (3.56%)	32.20%	4.49	00:02:39	1
5.  Spain	328 (2.56%)	296 (2.71%)	420 (2.68%)	51.43%	2.99	00:03:06	0
6.  Germany	326 (2.54%)	282 (2.58%)	385 (2.45%)	65.71%	2.88	00:01:45	0
7.  Japan	313 (2.44%)	278 (2.55%)	364 (2.32%)	52.47%	3.48	00:01:42	0
8.  Taiwan	296 (2.31%)	244 (2.23%)	388 (2.47%)	45.10%	4.60	00:03:53	0
9.  France	281 (2.19%)	256 (2.34%)	381 (2.43%)	59.84%	2.98	00:03:10	0
10.  Brazil	244 (1.90%)	229 (2.10%)	272 (1.73%)	57.72%	2.97	00:01:52	0

Show rows:  Go to:  1 - 10 of 132  

- Home
- Customization
- REPORTS
- Realtime
- Audience**
  - Overview
  - Active Users
  - Lifetime Value <sup>BETA</sup>
  - Cohort Analysis <sup>BETA</sup>
  - Audiences
  - User Explorer
  - Demographics
  - Interests
  - Geo**
    - Language
    - Location**
    - Behavior
    - Technology
- Discover
- Admin

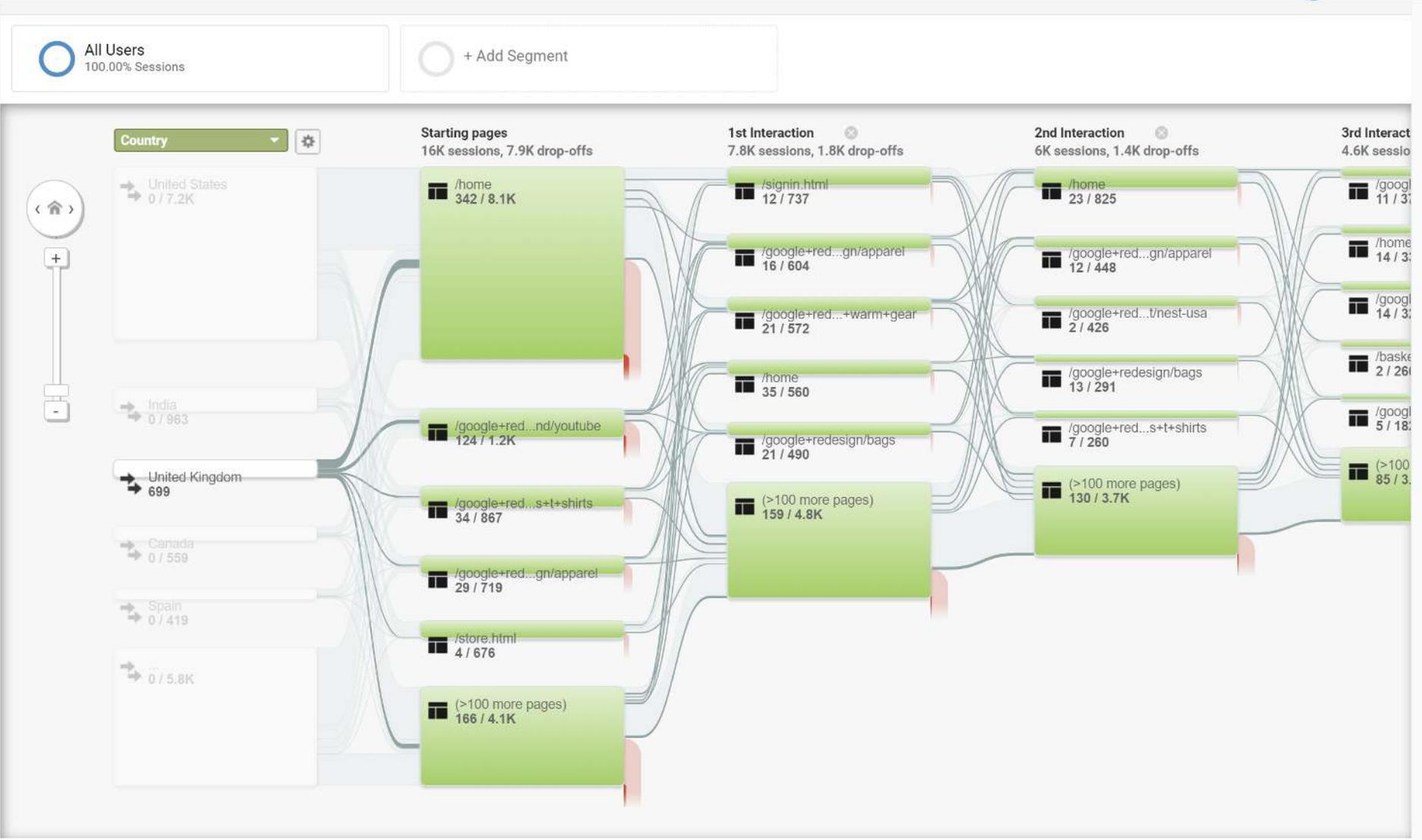


Primary Dimension: **Region** City Other

Secondary dimension

Region	Acquisition			Behavior			Conversions
	Users	New Users	Sessions	Bounce Rate	Pages / Session	Avg. Session Duration	Transactions
	635 % of Total: 4.98% (12,760)	558 % of Total: 5.12% (10,903)	699 % of Total: 4.46% (15,685)	56.94% Avg for View: 42.94% (32.60%)	3.14 Avg for View: 4.30 (-26.93%)	00:01:55 Avg for View: 00:02:54 (-34.18%)	% of Total: 0.00 (11)
1. England	574 (90.11%)	498 (89.25%)	630 (90.13%)	55.56%	3.18	00:01:55	0 (0.00%)
2. Scotland	37 (5.81%)	36 (6.45%)	42 (6.01%)	69.05%	2.57	00:01:54	0 (0.00%)
3. Wales	19 (2.98%)	17 (3.05%)	19 (2.72%)	73.68%	2.37	00:00:17	0 (0.00%)
4. Northern Ireland	5 (0.78%)	5 (0.90%)	6 (0.86%)	83.33%	1.00	00:00:00	0 (0.00%)
5. (not set)	2 (0.31%)	2 (0.36%)	2 (0.29%)	0.00%	15.00	00:24:46	0 (0.00%)

- Active Users
- Lifetime Value BETA
- Cohort Analysis BETA
- Audiences
- User Explorer
- Demographics
- Interests
- Geo
- Behavior
- Technology
- Mobile
- Cross Device BETA
- Custom
- Benchmarking
- Users Flow
- Acquisition
- Behavior
- Conversions
- Discover
- Admin



This report was generated on 5/29/19 at 1:03:00 AM - Refresh Report

# Website analysis: example Logs

---

## Access log

```
(1.0) 68.142.251.144 - - [30/Oct/2018:20:56:36 +1000] "GET /robots.txt HTTP/1.0" 404 271  
(1.1) 69.90.230.126 - - [31/Oct/2018:14:08:01 +1000] "GET /foo/wordpress/wp-rss2.php HTTP/1.1" 404 298  
(1.2) 66.194.6.73 - - [31/Oct/2018:19:49:23 +1000] "GET / HTTP/1.1" 200 4897
```

## Maintenance log

```
202.92.114.195 - - [20/Sep/2018:17:15:10 +1000] "POST  
/index.php?title=Special:Userlogin&action=submitlogin&returnto=Main_Page HTTP/1.1"  
200 1965
```

# Social media investigations

---

- 1 Facebook graph search
  - a) Powerful syntax for exploring social graph of users
  - b) Mostly public (for now) – but poorly documented
- 2 Twitter search
- 3 Looking for linked accounts (e.g. Google, Microsoft) or pages
  - a) Follow links
  - b) Search for same usernames and variations thereof
  - c) Identify common followers/graph overlap

# Location searches

---

- 1 IP geolocation
- 2 Google StreetView
- 3 StreetView history

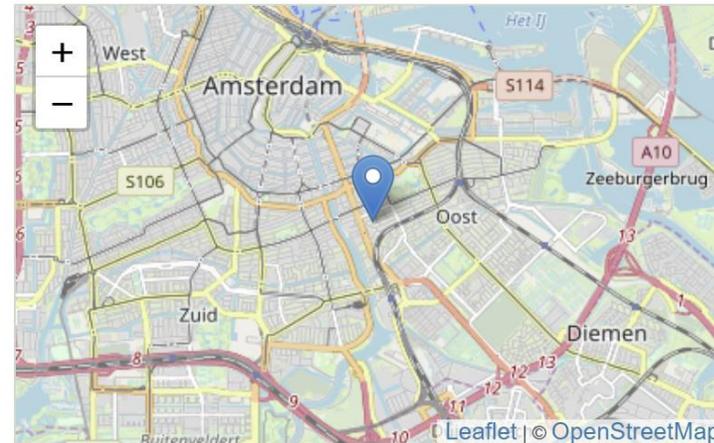


# IP LOCATION

INSTANTLY LOCATE ANY IP ADDRESS

This free online tool allows you to see the geographical location of any IP address. Just input the IP address and you will be shown the position on a map, coordinates, country, region, city and organization.

IP address	<b>52.157.237.131</b>
Latitude	52.3556
Longitude	4.9135
Country	Netherlands
Region	North Holland
City	Amsterdam
Organization	Microsoft Azure



## (5) Metadata analysis

# File metadata

---

- 1 Basic filesystem metadata
  - a) Useful for detecting obvious forgeries
  - b) Some useful information (eg last modified)
  - c) Relatively easy to modify – not foolproof
- 2 Images (EXIF data) analysis: <https://exifinfo.org/>
- 3 Detecting image editing using error analysis ([example](#))

# Filesystem analysis

---

- 1 With a disk image, more detailed forensic analysis is possible
  - a) Directory entry and cluster analysis (FAT, NTFS, ext2/ext3, UFS) ([details](#))
  - b) Temporary files; boot sector/master file table
  - c) Recovering deleted files
  - d) User area and application data files (e.g. browser cache, history, etc)
- 2 Binary file analysis – strings and HEX data
- 3 USB historian – to check what USB devices have been plugged in, when, and who was logged on

Display Times In:  Local Time Zone  GMT / UTC

Mode:  Counts  Details  snapshot

Layout Options:  Band by Type  One Event Per Row

Truncate Descriptions to (px):

Zoom: History:

Time Units: YEARS HOURS

Event Type: Base Type Sub Type

Description Detail: Short Medium Full

Filters Events

Hide Known Files

Text Filter

Event Type Filter

File System  Web Activity

Start: Mar 10, 2012 2:00:00 PM

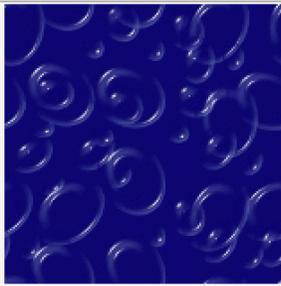
End: Mar 11, 2012 12:00:00 AM

1970-01-16 04:50:24 to 1970-01-16 04:50:25

Icon	Date/Time	Event ID	File ID	Result ID	Base Type	Sub Type	Known	Desc
	2012-03-10 19:19:23	39681	13409		File System	File Accessed	KNOWN	/img_...
	2012-03-10 19:23:39	44289	14759		File System	File Accessed	KNOWN	/img_...
	2012-03-10 19:23:25	57347	18428		File System	File Changed	KNOWN	/img_...
	2012-03-10 19:23:37	44165	14720		File System	File Accessed	KNOWN	/img_...
	2012-03-10 19:23:39	44169	14721		File System	File Accessed	KNOWN	/img_...

78

Hex Strings Metadata Results Text Media



SleuthKit/Autopsy

<http://www.sleuthkit.org/autopsy/>

Free Hex Editor Neo

File Edit View Select Operations Bookmarks NTFS Streams Tools History Window Help

avaria\_modified.avi\* X komputershiki.avi\* X

History

- Open
- Paste at 0xf6
- Paste at 0x119
- Write 0x23 at 0x177
- Write 0x42 at 0x178
- Write 0x34 at 0x179
- Write 0x23 at 0x17a
- Write 0x40 at 0x17b
- Set Size
- Delete at 0x95 - 0xb7
- Delete at 0x156
- Fill 0x31,0x32,0x33 at 0x164 - 0x187
- Fill 0x31,0x32,0x33 at 0x164 - 0x187
- Cut at 0x164 - 0x187
- Insert 0x32 at 0x177
- Insert 0x41 at 0x178
- Insert 0x23 at 0x179
- Insert 0x12 at 0x17a
- Insert 0x32 at 0x17b
- Insert 0x13 at 0x17c
- Insert 0x12 at 0x17d
- Insert 0x30 at 0x17e

File Attributes

Attribute	Value
File Name	Q:\2\avaria_modified
Archive	<input checked="" type="checkbox"/>
Hidden	<input type="checkbox"/>
System	<input type="checkbox"/>
Read-Only	<input type="checkbox"/>
Sparse	<input type="checkbox"/>
Temporary	<input type="checkbox"/>
Offline	<input type="checkbox"/>
Encrypted	<input type="checkbox"/>
Compressed	<input type="checkbox"/>
Has Reparse Point	<input type="checkbox"/>

Selection File Attributes

USB Historian v1.3

Computer Name	Friendly Name	Serial No	Mount Point 2	Drive Letter	Usb Stor Date Time
NOTEBOOK	Patriot Memory USB Device	07AC0F0137F...	[Andrew:27/07/2014 ...		26/05/2015 06:49:46
NOTEBOOK	Patriot Memory USB Device	07B31101655...	[Andrew:15/11/2014 ...		26/05/2015 06:49:46
NOTEBOOK	Apple iPod USB Device	000A2700102...	[Andrew:21/09/2014 ...	F:	26/05/2015 06:49:46
NOTEBOOK	GENERIC USB Mass Stor...	7&1bdfb34c&0	[Andrew:06/06/2015 ...		06/06/2015 21:19:55
NOTEBOOK	Kingston DataTraveler 2.0 ...	C8600088635...	[Andrew:06/06/2015 ...	E:	06/06/2015 21:20:19
NOTEBOOK	Samsung M3 Portable US...	00000000011...			23/06/2015 17:17:10
NOTEBOOK	SanDisk Cruzer USB Devi...	20042103310...	[Andrew:07/10/2014 ...		26/05/2015 06:49:46
NOTEBOOK	SanDisk Cruzer USB Devi...	20054963900...	[Andrew:14/09/2014 ...		26/05/2015 06:49:46
NOTEBOOK	SanDisk Cruzer USB Devi...	20060876910...	[Andrew:22/05/2014 ...		26/05/2015 06:49:46
NOTEBOOK	SanDisk Cruzer USB Devi...	25851105081...	[Andrew:22/05/2014 ...		26/05/2015 06:49:46
NOTEBOOK	SanDisk U3 Cruzer Micro ...	0000185E257...	[Andrew:13/04/2014 ...		26/05/2015 06:49:46
NOTEBOOK	SMI USB DISK USB Device	20101016000...	[Andrew:07/09/2014 ...		26/05/2015 06:49:46
NOTEBOOK	WD Ext HDD 1021 USB D...	57434156354...			23/06/2015 17:17:10

13 USB Devices Found.

## CPR r 32.19

---

It is also important to bear in mind the deeming effect of CPR r 32.19:

### 32.19

- (1) A party shall be **deemed to admit the authenticity of a document disclosed to him** under Part 31 (disclosure and inspection of documents) **unless he serves notice** that he wishes the document to be proved at trial.
- (2) A notice to prove a document must be served –
  - (a) by the latest **date for serving witness statements**; or
  - (b) **within 7 days of disclosure** of the document, **whichever is later**.

# Email investigations

---

- 1 The preceding techniques (DNS and IP address searches) work just as well for email addresses: e.g. [clerks@8newsquare.co.uk](mailto:clerks@8newsquare.co.uk)
- 2 However, there may be other information that is available from:
  - a) DNS servers
  - b) The email itself (headers)
  - c) Forensic markers relating to the email (e.g. in server logs)

# Conclusion

---

- 1 We have provided an overview of legal and investigatory techniques in cases involving digital evidence and online wrongdoing.
- 2 Court-ordered disclosure is often a useful tool to initiate or progress a claim; quite a lot can be learnt from basic sleuthing online, but this will often reach a dead-end which requires a court order to resolve.
- 3 Time is often critical in internet cases, so it is useful to gather data quickly, and know roughly what to look for.
- 4 A proper understanding of data and metadata analysis can be valuable in locating or evaluating digital evidence.

# Our next webinar

---

**Thursday 23 July at 4:30pm – [A Mouse's Tail](#)**

In the recent *Regeneron v Kymab* judgment, insufficiency has become the latest issue of patent law to be examined by the Supreme Court. Two counsel involved in the case, [Michael Tappin QC](#) and [James Whyte](#), will set out what was at stake and where the law stands now.

[Beth Collett](#) will moderate this session.

# Digital evidence and disclosure: tactics and techniques

---

Martin Howe QC and Jaani Riordan

Barristers, 8 New Square

9 July 2020