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Bellingcat's Digital Toolkit

Open Source Verification and Investigation Tools and Methods

Welcome to Bellingcat's openly and freely available digital list of tools and methods we use for verification and open source research. You can follow our work on our website, Twitter and Facebook. **Feel free to suggest tools not yet listed here!** This is version 3.3 (March 26, 2018).

A condensed version of the digital toolkit accessible for anyone with an internet connection, made by H I Sutton, Aliaume Leroy, and Tony Roper. Download here in higher resolution.

The list includes satellite and mapping services, tools for verifying photos and videos, websites to archive hyperlinks, and much more. The list is long, and may seem daunting. There are guides at the end of the document, highlighting the methods and use of these tools in further detail. We also provide tailored digital forensics workshops.

Currently, I'm trying to find a better way to thematically structure this list and I'm working on a more extensive guide with simple case-studies to the tools we use most. This will be an openly available and digital guide in English and hopefully Arabic too. I will share a link here once it is published. Feel free to contact me with questions or suggestions via email (christiaantriebert@bellingcat.com) or Twitter (@trbrtc).

Maps, Satellites & Streetview

Name	Description	Pros	Cons	Link
Bing Maps	Microsoft satellite and mapping service.	More recent and higher resolution imagery than Google, e.g. in Afghanistan and Iraq.	Difficult to check the date of the imagery (this tool doesn't work anymore)	bing.com/maps
converting coordinates	Convert geographic coordinates between			synnatschke.de/geo-tools/coordinate-converter.php

	vendor.	the catalogus, search tool very easy to use.		
DualMaps	Combines Google's road maps, aerial view, and street view in one embeddable tool.			data.mashedworld.com/dualmaps/map.htm
EarthExplorer				earthexplorer.usgs.gov
find2places	Allows querying Google Maps API for two specific places in precise distance from each other within given radius. Useful for geolocating photos and videos.		It's a script, no user-friendly interface.	github.com/musafir-py/find2places
Geograph	Georeferenced images.			geograph.org
GeoNames	Database of location names.	Wide variety of different spellings in various languages.		geonames.org
Google Earth Pro		Add a Bing Maps satellite imagery layer. Historical imagery.		[software] Training guides here.
Google Earth Engine	Open-access satellite imagery and analytical framework	Virtually any satellite imagery collected from NASA, NOAA, USGS, etc. is available	Moderate and coarse resolution imagery rather than high-resolution commercial imagery; Learning curve with Javascript	https://earthengine.google.com/
Google Maps		StreetView, many large cities in U.S., Europe, modelled in 3D.	No historical satellite imagery, but historic streetview images available in many places.	maps.google.com
Google Photos (formerly Panoramio)				
HERE WeGo		More recent satellite imagery than Google in e.g. Iraq.		wego.here.com
Mapchecking	Calculate amount of people that are standing in selected Google Maps area.			mapchecking.com
Mapillary	Crowdsourced street level photos.	Useful addition to Google Streetview.	Little to no coverage in countries like Syria, Iraq, etc.	mapillary.com
OpenStreetCam				openstreetcam.org
OpenStreetMap				openstreetmap.org
Radiant Earth				radiant.earth

Name	Description	Pros	Cons	Link
		Ability to explore a variety of GIS variables eg NDVI or NDWO.		
TerraServer	Satellite imagery vendor.	Highest resolution available (0.3m).	$ to preview high-resolution satellite imagery.	terraserver.com
Wikimapia	Crowdsourced information related to geographic locations.	Possibility to switch between Google/Bing/OSM. Massive amount of UCG information.	Can be laggy, and need to refresh page after a view searches.	wikimapia.org
Yandex Maps				yandex.com/maps

Geobased Searches

Name	Description	Pros	Cons	Link
Echosec	Geobased searches.	Twitter, VKontakte, Foursquare	$ (doesn't list Facebook, genuine Instagram)	echosec.net
Liveuamap	Interactive live map of conflict news.	Variety of countries available: Afghanistan, Iraq, Syria, U.S., Ukraine, Venezuela, etc.		liveuamap.com
Photo-Map.RU	Geotagged VKontakte posts.	VKontakte		photo-map.ru
SnRadar	Geotagged VKontake posts.	VKontakte		snradar.azurewebsites.net/search
Twitter	Insert in search box: geocode: [coordinates],[radius-km], for example: geocode:36.222285,43.998233,2km (only works with km, so 500m = 0.5km)	There's a tool for it too.	Easy to fake.	
WarWire	Geobased searches.	Twitter, VKontakte, Instagram	$ (but does list Instagram)	warwire.net
YouTube	Geobased searches		Unclear whether it shows where it was uploaded, from which server, or only filters on keywords (e.g. "Paris" in title shows up in Paris).	youtube.github.io/geo-search-tool/search.html

Images, Videos and Metadata

Name	Description	Pros	Cons	Link	Guides
Amnesty YouTube Dataviewer	Reverse image (video still) search		Searches for a number of still, not each frame	amnestyusa.org/sites/default/custom-scripts/citizenevidence	Advanced Guide on Verifying Video Content

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Exiftool	Read and manipulate metadata for a vast number of file types. Note: no GUI	Floss, Cross platform and very easy to integrate in scripts.	Yet to encounter any (Have only used on GNU/Linux).	https://www.sno.phy.queensu.ca/~phil/exiftool/	See forum and FAQ on link page
Foca	Extracts metadata.	Windows based, open sourced 2017.	No native linux support. (needs wine installed within linux)	elevenpaths.com/labstools/foca/index.html	NullByte
FotoForensics	Image forensics tool.	Simple, web based.	Public access, information not private.	fotoforensics.com	
GooFile	Extract metadata.	Simple to use.	Doesn't work well outside Kali	tools.kali.org/information-gathering/goofile	Ascii cinema
Image Forensics	Web based image forensics tool.	Can easily identify fake or doctored images	Public access, information not private.	29a.ch/photo-forensics/#level-sweep	
InVID	Verification plugin to help journalists verify images and videos. Contextual data, Metadata, reverse search (Google, Yandex, Baidu), image forensic, Magnifie)r			invid-project.eu (plugins for Chrome, Firefox (Windows, Mac OS X, Linux)	https://www.youtube.com/w v=nmgbFODPiBY
Irfanview	Extract metadata.	Windows based	No native linux support	irfanview.com	
Jeffrey's Image Metadata Viewer	Extract metadata, online.	Only requires web browser.	Public access, information not private.	exif.regex.info/exif.cgi	
Reveal Image Verification Assistant	Forensic providing eight filters to detect still images alterations.	Web-based image tool. Also available within InVID verification plugin.		http://reveal-mklab.iti.gr/reveal/index.html	Documented with examples explanations of the different filters. Developed in Reveal project.
reverse image search	Locates similar images on the internet	Easy, simple and works!	Recommended plugin: RevEye, which searches Google, Yandex, Baidu and Bing.	https://www.tineye.com/	
SpiderPig	Extract metadata.	Command line interface and scriptable.	Requires dependencies and knowledge of web technologies.	github.com/hatlord/Spiderpig	

Social Media

Facebook

Name	Description	Pros	Cons	Link	Guides
Graph.tips	Automatically advanced searches for Facebook profiles.			graph.tips/beta	
Who posted what?	Find posts on Facebook			whopostedwhat.com	
IntelTechniques	Various tools for analyzing Facebook profiles and pages.			inteltechniques.com/menu.html	
Facebook livemap	Live broadcasts around the world.			facebook.com/livemap	
Search Tool	Find accounts by name, email, screen name, and phone.			netbootcamp.org/facebook.html	
StalkScan	Automatic advanced searches per Facebook profile.			stalkscan.com	
Video Downloader Online	Download Facebook videos.			fbdown.net	
Skopenow	Social Media Investigations - name, phone, email, username searches.			Skopenow.com	

Instagram

Name	Description	Pros	Cons	Link	Guides
Websta	Find other locations in Instagram's database near a particular location.			websta.me	Use direct URL with a ID, e.g. websta.me/location/1

LinkedIn

Name	Description	Pros	Cons	Link	Guides
Socilab	Visualise and analyse your own LinkedIn network.			sociliab.com	

Snapchat

Name	Description	Pros	Cons	Link	Guides
Snap Map	Searchable map of geotagged snaps.			map.snapchat.com	

Tumblr

Name	Description	Pros	Cons	Link	Guides
Tumblr Originals	Find original posts per Tumblr, thus excluding reblogs.			studiomoh.com/fun/tumblr_originals	

Twitter

Name	Description	Pros	Cons	Link	Guides
InVID verification plugin	InVID plugin provides a Twitter advanced search by time interval up	Allows to document		InVID verification plugin	Automates the conve between calendar da

		without APIs and time limit. Allows to search for content within a user-defined time range after a breaking news.			
Onemilliontweetmap	Tweets map per locations up to 6 hours old, keyword search option.			onemilliontweetmap.com	
Treeverse	Chrome extension to visualise Twitter conversations.			t.co/hGvska63Li	
Tweetreach	Find reach of tweets.		Advanced search operators available, same as Google advanced search.	tweetreach.com	
Twitter advanced search	Search by date, keywords, etc.			twitter.com/search-advanced	
Twitter geobased search	geocode:[coordinates],[radius-km], for example: geocode:36.222285,43.998233,2km	There's a tool for it too.			
Twlets	Download anyone's tweets, followers and likes in an Excel sheet.	Easy and quick to use, there's a Chrome extension too.	Goes up to 3,200 tweets, followers and likes.	twlets.com	
quarter tweets	Geobased Twitter search.			qtrtweets.com/twitter[a]	

YouTube

Name	Description	Pros	Cons	Link	Guides
Amnesty YouTube Dataviewer	Reverse image (video still) search and exact uploading time.		Searches for a number of still, not each frame is included (thus results may be left out).	amnestyusa.org/sites/default/custom-scripts/citizenevidence	Advanced Guide on Verifying Vi Content
Geo Search Tool	Search for YouTube videos based on location.			youtube.github.io/geo-search-tool/search.html	

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Air					
Name	**Description**	**Pros**	**Cons**	**Link**	**Guides**
AirNav RadarBox	Tracking flights, including private and military jets.			radarbox24.com	
ADS-B Exchange Global Radar	Tracking flights.	Includes a number of military aircraft.		global.adsbexchange.com/VirtualRadar/desktop.html	
FlightAware				flightaware.com	
FlightRadar24	Tracking (civilian) flights.		$ to go back in 12 month archive.	flightradar24.com	
PlaneFinder				planefinder.net	
Marine					
MarineTraffic				marinetraffic.com	
VesselFinder				vesselfinder.com	
Railway					
Trains	Full interactive maps of various railway networks in European countries.			Denmark, France, Germany, Netherlands	
Misc					
WikiRoutes	Public transport database.			wikiroutes.info	

Date & Time					
Name	**Description**	**Pros**	**Cons**	**Link**	**Guides**
SunCalc	Make approximation of time of the day using shadow direction.			suncalc.net / suncalc.org	
Wolfram|Alpha	Does a load of things, including **weather forecasts** per day and location.			wolframalpha.com	

Individuals, WhoIs, IPs, Website Analysis[b]					
Name	**Description**	**Pros**	**Cons**	**Link**	**Guides**
Passive DNS	Collects, stores and analyses data from thousands of	Complete unadulterated historical and	15 API calls day, 15 web based searches a day.	community.riskiq.com	

	monitors every reachable server and device on the Internet.	knowledge of internet connected devices.			
Domain Tools				domaintools.com	
DNS History	Collection of historical DNS information.	Free, simple and easy to use.	Sometimes limited in availability.	DNS History	
DNS cyrillic check	Check if malicious or cyrillic domains are registered	Free, simple and easy to use.		https://holdintegrity.com/checker	
DNS Trails	The World's Largest Repository of historical DNS data	Free, simple and easy to use.		dnstrails.com	
Geo IP Tool	Check your own IP, handy to check if your VPN is working,			geoiptool.com	
Shodan	Internet of things search engine.	Can find heaps of misconfigured network connected devices.	Lives in the grayzone...	shodan.io	

- **IXMaps**, IXMaps

- Network-Tools

- Open Site Explorer

- **People search**

    ○ **Peekyou**, peekyou.com

    ○ **Pipl**, the world largest people search engine, find persons behind an e-mail address, social media username, or phone number, pipl.com

    ○ **Yasni**, yasni.com

    ○ **Zaba Search**, only US, zabasearch.com

    ○ publicrecords.searchsystems.net

    ○ cemetery.canadagenweb.org/search.html

    ○ opencorporates.com

- Robtex

- Search IRC

- Shodan Computer Search

- Utrace

- ViewDNS

- **DNS Historical Data**, research.dnstrails.com

Archiving, Downloading & Internet Storage

Name	Description	Pros	Cons	Link	Guides
Archive.is	Let's you archive any webpage.			Archive.is	
DMCA	Search takedown notices			lumendatabase.org	
Gruber	Slideshare downloader			http://grub.cballenar.me/	
Historic Breach Database List				https://publicdbhost.dmca.gripe/random/	
Wayback Machine	Archives websites. Download an entire website from the Wayback Machine.			github.com/hartator/wayback-machine-downloader	

Miscellaneous

Name	Description	Pros	Cons	Link	Guides
BlockExplorer	Following a bitcoin trail or following a bitcoin account ?			https://blockexplorer.com	
Check	Collaborative fact-checking.			checkmedia.org	User guide, Bellingcat's Check team
Document Redaction	Useful for removing potentially harmful content in Pdfs before viewing, like traceback.			github.com/firstlookmedia/pdf-redact-tools	
Google Search Operators	Such as searching for a specific filetype (e.g. PDF) or on a specific website.			googleguide.com/advanced_operators_reference.html	
Hunch.ly	Research sidekick.		$$$	hunch.ly	
Insecam	Network live IP video cameras directory.			insecam.org/en/	
LittleSis	Database of who-knows-who at the heights of			littlesis.org	

	analyses legal complaints and requests for removal of online materials, helping Internet users to know their rights and understand the law. These data enables us to study the prevalence of legal threats and let Internet users see the source of content removals.				
Maltego	Interactive data mining tool that renders directed graphs for link analysis.	Used in online investigations for finding relationships between pieces of information from various sources located on the Internet.	$$$	paterva.com/web7	
Montage	For collaborative working.			montage.storyful.com	
Malicious URL Tester	Testing unknown URLS			safeweb.norton.com	
OpenCorporates	Database of companies in the world.				
Tor Site Searcher	Search hidden tor sites via clearnet[c][d].			oint.ctrlbox.com	
People tracer			Site will be closed in March 2018.	peopletracer.co.uk	
TimelineJS by Knight Lab	Make an interactive timeline of events.			timeline.knightlab.com	
Unknown Hash ID	On investigation if you come across a hash but don't know what it is (and warrants further investigation) this will identify the type.			onlinehashcrack.com/hash-identification.php	
Visual				vis.occrp.org	

	property with the UK's leading resource. Browse houses and flats for sale and to rent, and find estate agents in any area.				

Guides & Handbooks

- **American Press Institute Fact-Checking Resources**, americanpressinstitute.org/training-tools/fact-checking-resource

- **Bellingcat's resources**, www.bellingcat.com/category/resources/how-tos, for example:

- **Exposing the Invisible**, a project by the Tactical Tech Collective, exposingtheinvisible.org

    ○ Includes multiple guides (website data scraping, Google Dorking etc.), resource links, and examples of successful investigations in various fields

- **First Draft News**' resources, some of which have been written by Bellingcat members, firstdraftnews.com/resources, for example:

    ○ How to Get Started in Online Investigations

- **Flash Environmental Assessment Tool,** for identifying harmful substances and their effect on the environment after industry has been destroyed: https://docs.unocha.org/sites/dms/Documents/FEAT_Version_1.1.pdf

- **Poynter**, fact-checking how-to guides, factcheckingday.com/#how-to

- **Poynter**, fact-checker's code of principles, poynter.org/fact-checkers-code-of-principles

- **Verification Handbook** (PDF) is a great place to go to find tools to verify digital information, verificationhandbook.com

- **Washington Post**, fact-checker's guide, washingtonpost.com/news/fact-checker

- **Washington Post**, fact-checker tool, washingtonpost.com/news/fact-checker

- **WITNESS**

    ○ Activists' Guide to Archiving Video

    ○ Video As Evidence: Verifying Eyewitness Video

WEAPONS

- Open guide called "**Itrace**" by Conflict Armament Research, lots of information on different kinds of munitions and weapons presented graphically on a map format, itrace.conflictarm.com

Data Visualisation

Name	Description	Pros	Cons	Link	Guides
DataBasic.io	Web tools for			databasic.io/en	

Name	Description			Links	
DataWrapper	Easy to use chart and mapping tool			datawrapper.de	
Google Fusion Tables				fusiontables.google.com	
Maptia				maptia.com	
Visual investigative scenarios				vis.occrp.org	
RAWGraphs	Free webtool to quickly visualize your data			app.rawgraphs.io	
Open Desktop Semantic Search		Searches unstructured data well		opensemanticsearch.org/doc/desktop_search	
TrustServista	Online story verification and visualisation tool			www.trustservista.com	
Neo4j	Graph Platform			neo4j.com	

Online Security & Privacy

● Check for every digital service you use whether you have enabled **two factor authentication (2FA)**, twofactorauth.org

● Security in a box guide: https://securityinabox.org/en/

● **Tech Solidarity**, techsolidarity.org

    ○ Basic Security Guide, do and don'ts for basic security when using a laptop and/or mobile device, techsolidarity.org/resources/basic_security.htm

SEARCH ENGINES WHICH PROTECT PRIVACY

● **DuckDuckGo**, Internet search engine, protecting privacy, duckduckgo.com

● **StartPage**, Internet search engine, protecting privacy, startpage.com

● **Qwant**, Internet search engine, protecting privacy, qwant.com

Sources per Country

Iraq				
Name	**Description**	**Pros**	**Cons**	**Links**
Provinces of the so-called Islamic State				umap.openstreetmap.fr

Syria				
Name	**Description**	**Pros**	**Cons**	**Links**

	compiled by Noor Nahas of multimedia sources from Syrian opposition groups,			
Provinces of the so-called Islamic State,				umap.openstreetmap.fr

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Company Registries

● **French SIRENE**, provided by Investigative Dashboard, a queryable version of the french RCS (Business registry), with OpenRefine reconciliation tool. https://data.occrp.org/entities?filter:dataset=fr_sirene

● **Business registries in Europe**, on the European e-Justice portal, links to the national business registry of each EU member. https://e-justice.europa.eu/content_business_registers_in_member_states-106-en.do

● Portugal, https://publicacoes.mj.pt/DetalhePublicacao.aspx

https://challenge.burnerapp.com/

Expert/Source Tools

Name	Description	Pros	Cons	Link	Guides
Expertise Finder	Search engine for journalists to find experts (currently only academics in USA and Canada), contact information on page, no login, 30k experts listed			http://expertisefinder.com/	
Expert Guide	Academics open to media in Australia:		Australia only.	http://www.expertguide.com.au/	
Help a Reporter Out	Post a query and experts reply, mainly USA and Canada, quality of replies is hit or miss			https://www.helpareporter.com/	
She Source	Female experts, mainly USA.			http://www.womensmediacenter.com/shesource/	
Speakezee	Academics and those with PhDs, mainly UK:			https://www.speakezee.org	

- https://www.numberway.com/ - a list of urls to local White Pages and Yellow Pages, with description in English. Useful in finding people and companies (I've already placed it in the google doc)

- https://socialbearing.com/ - lots of Twitter statistics (mostely useful or comparative materials/reports).

Paint.net

Namechk.com

Very good for identifying online accounts with a username. Simply plug the username in and this tool will identify where there are users using that name.

[a]is anyone able to tell me how confidently we can use this? not able to find a lot of info from the developers. would appreciate a chat with someone familiar with it
[b]maybe borrow from this table for this section which covers a lot of this same ground https://docs.google.com/spreadsheets/d/18U1qcaPaqIF8ERVLI-g5Or3gUbv0qP_-JUtc0pbEs0E/edit#gid=0
[c]I think someone needs to dedup some of these entries
[d]Good one, will anyway clean up this specific list. Thanks!