Web Archiving Workflows

DigitalPreservationCoalition

This training session was developed in partnership by the International Internet Preservation Consortium (IIPC) and the Digital Preservation Coalition (DPC)

netpreserve.org

Workflows We Will Cover

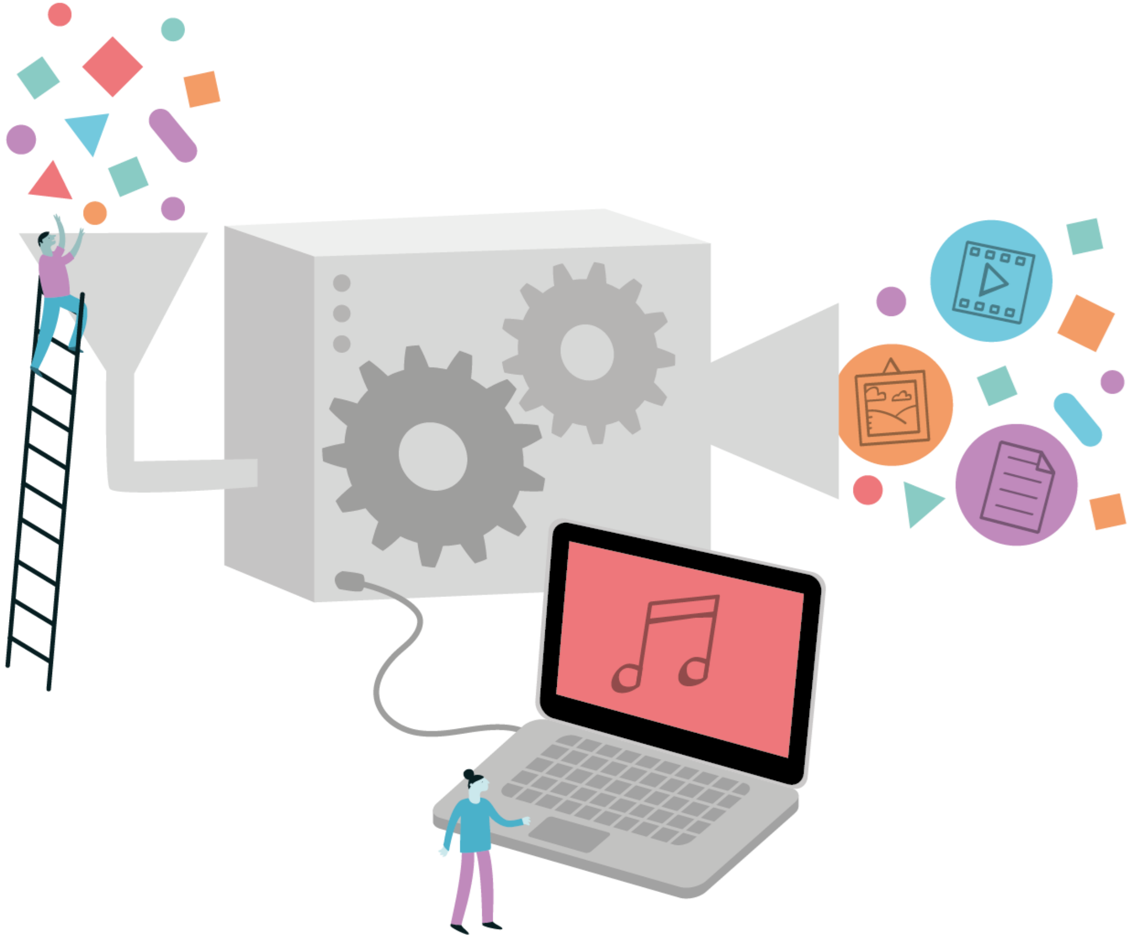
Capture
Preserve
Playback

Capture: live web content is downloaded & stored

Preserve: downloaded files are checked, converted to a stable file type if necessary, and looked after over time

Playback: the archived web content is accessed through a tool that allows users to interact with it like the original

Capture: Downloading and Storing Live Web Content

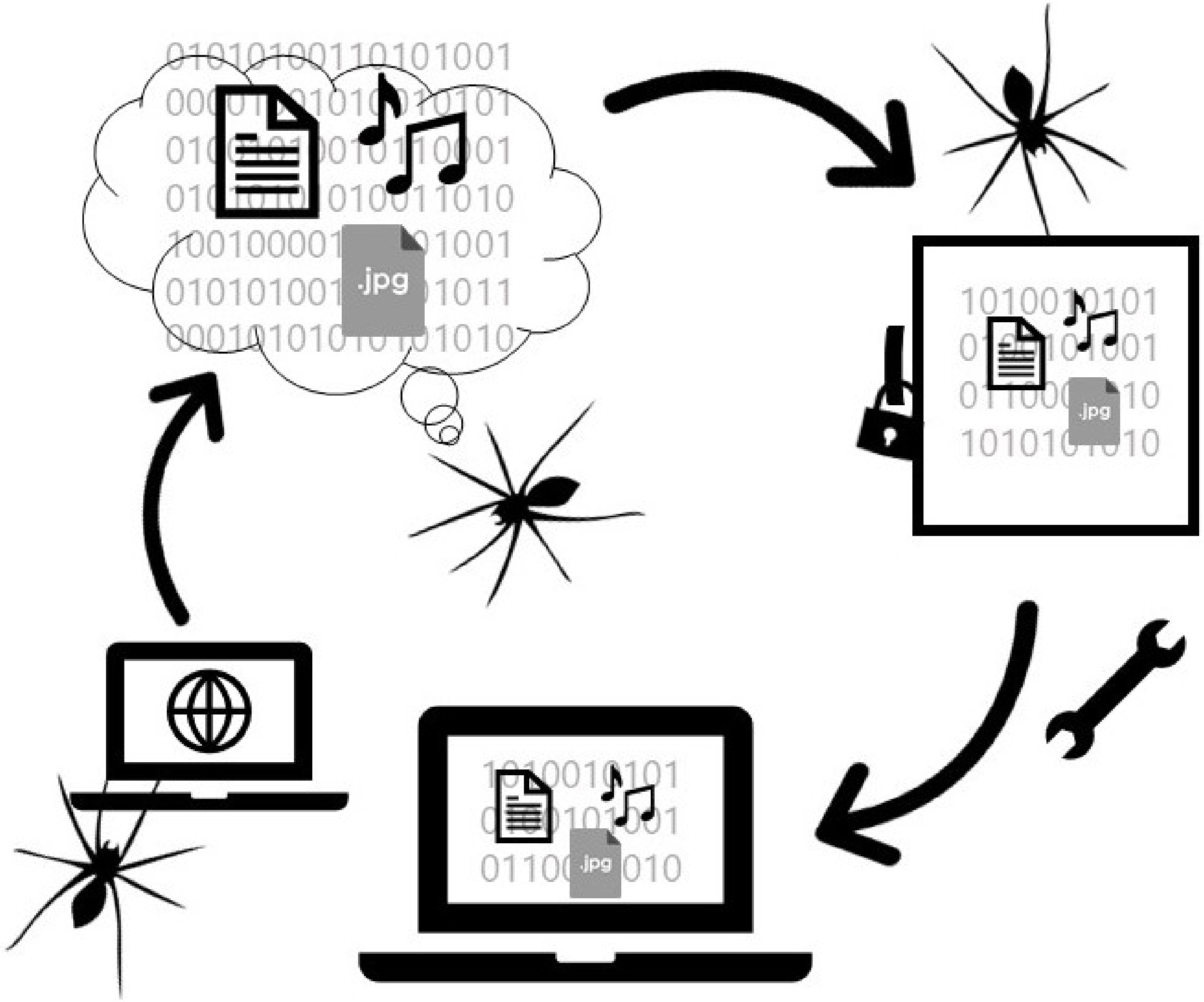


Intro to Crawling

Crawler or “Spider”

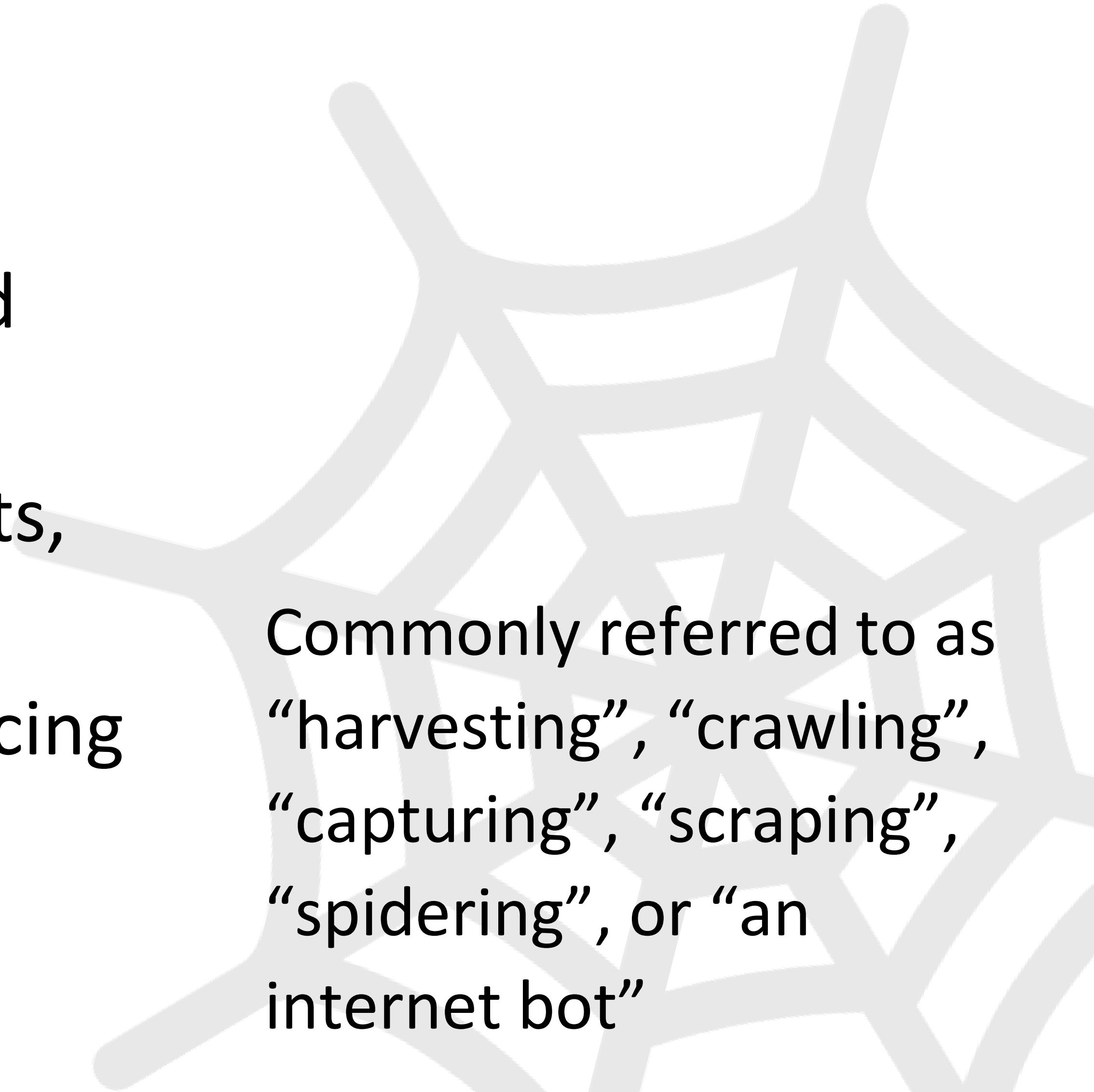
Code & files needed to reproduce original website

Playback Tool
(like Wayback Machine)



Basic Crawl

- A tool ('crawler') systematically browses the web
- Uses a set of parameters, or defined scope (e.g. from a seed list)
- Downloads code, images, documents, and other files
  - Whatever is essential to reproducing the web content as similarly to original form as possible

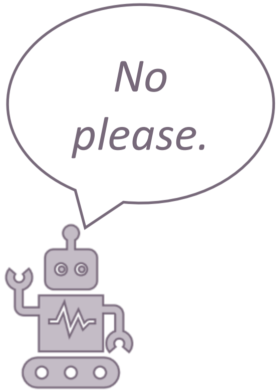


Commonly referred to as "harvesting", "crawling", "capturing", "scraping", "spidering", or "an internet bot"

Crawling: Parameters

- **Seed URLs** or **URIs**: starting point(s) for web crawler; the crawler follows links out from this initial URL or set of URLs

- **Robots.txt**: a file included in web content that instructs a crawler not to capture that content or to capture only parts of it



- **Crawl Depth** or "**Hops**": number of links away from the seed URL/URI the crawler will capture

- **Crawl Frequency**: how often the crawler will capture the same URL(s)

Other Capture Methods

Dynamic Capture

- Tools built to capture interactive or complex content
  - Ex. videos & other media
  - Ex. social media and other platform-based web
  - Ex. complex JavaScript
- Tools like Webrecorder/Conifer, Browserstric, Brozzler

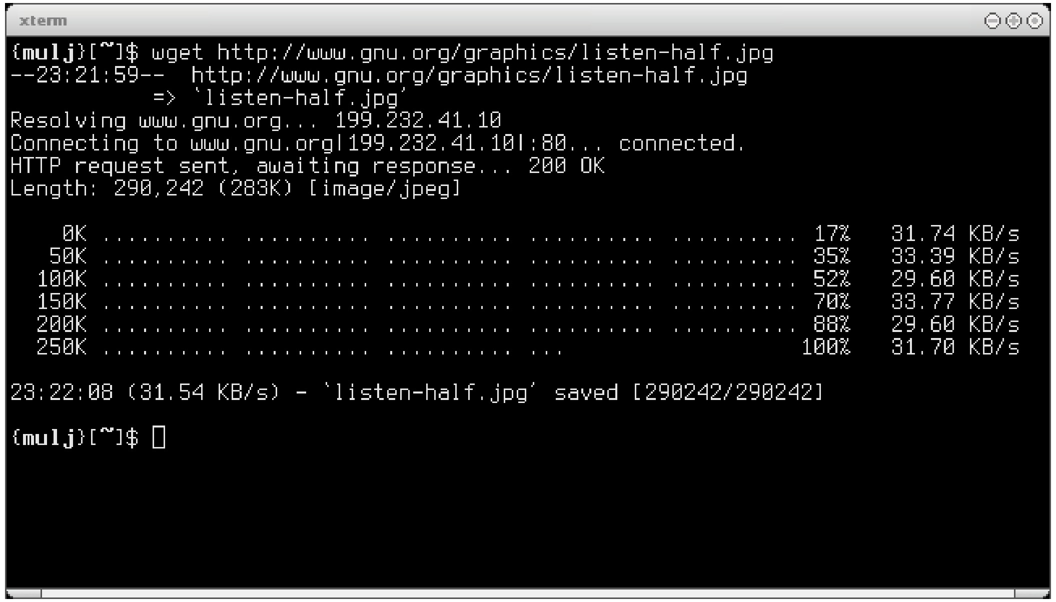
API Harvesting

- Only available for web resources that provide an API
- An API allows authenticated users to extract data directly from the platform through the web
- Works for the modern “platformized” web
- Tools for using APIs: Twarc, Social Feed Manager, others

Tools to Support Capture of Web Archives

Tools: GNU wget

- Command line tool that downloads files from the web
- Runs on Unix and Mac OS, but also has a Windows version
- Supports HTTP, HTTPS, and FTP
- Operates continuously in the background
- Usable on slow or unstable networks
- Allows scoping & configuration
- Supports writing to a WARC file
- Free and open source under GNU General Public License
- https://www.gnu.org/software/wget/



```
{mulj}[~]$ wget http://www.gnu.org/graphics/listen-half.jpg
--23:21:59--  http://www.gnu.org/graphics/listen-half.jpg
           => `listen-half.jpg'
Resolving www.gnu.org... 199.232.41.10
Connecting to www.gnu.org|199.232.41.10|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 290,242 (283K) [image/jpeg]

    0K .......... .......... .......... .......... ..........  17%   31.74 KB/s
   50K .......... .......... .......... .......... ..........  35%   33.39 KB/s
  100K .......... .......... .......... .......... ..........  52%   29.60 KB/s
  150K .......... .......... .......... .......... ..........  70%   33.77 KB/s
  200K .......... .......... .......... .......... ..........  88%   29.60 KB/s
  250K .......... .......... .......... ...                   100%   31.70 KB/s

23:22:08 (31.54 KB/s) - `listen-half.jpg' saved [290242/290242]

{mulj}[~]$ 
```

Tools: Heritrix (+ Umbra)

Heritrix

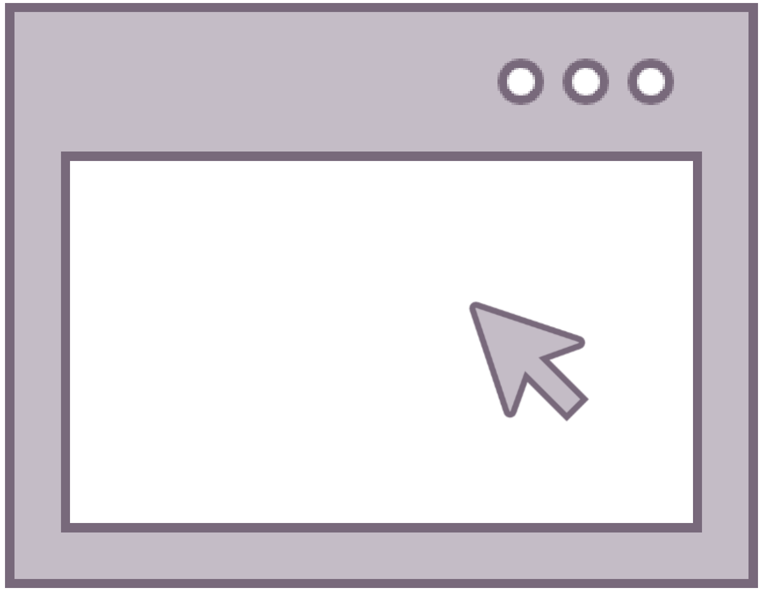
- From the Internet Archive
- Web crawler that downloads websites and embedded media
- Suitable for large collections
- Available for Windows and Unix-like environments
- Supports configurable scoping and deduplication
- Supports writing to a WARC file
- Less effective at triggering and capturing client side script

Heritrix + Umbra

- Browser automation tool that runs alongside Heritrix
- Mimics the way a browser would access a page
- Executes client side scripts so previously undetectable URLs can be accessed
- Supports the capture of JavaScript
- Allows for dynamic scrolling

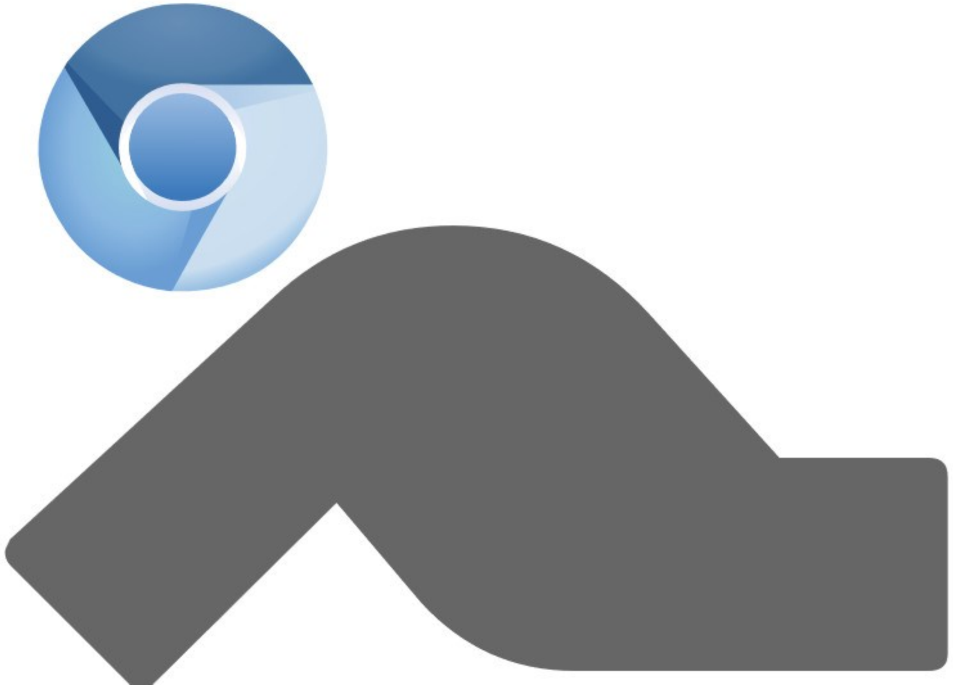
Tools: Heritrix-Based Curator Tools

- Examples:
  - Archive-It
  - Web Curator Tool
  - NetArchive Suite
- Run Heritrix with user interfaces that make it easier to manage collections
- Many used by IIPC members
- Some curator tools are subscription-based



Tools: Brozzler

- Internet Archive Tool
- “Browser” + “Crawler” = “Brozzler”
- Captures HTTP traffic as it loads
- Uses a real browser to fetch pages and embedded URLs, and to extract links
- Implements a tool called youtube-dl to improve media capture
- Improves capture of ‘difficult’ content such as social media



Tools: Webrecorder/Conifer

Conifer
by RHIZOME.org
http://conifer.rhizome.org

- User-driven capture rather than automated crawler
- Focus on dynamic web content (embedded video and JavaScript)
- Simple to use interface
- Captures page by page – can be labour intensive!
- Can be structured by Collection and capture session
- Captures can be downloaded as WARC files

Conifer = Hosted Service from Rhizome

- Up to 5GB of free storage
- Some use-cases and integrations may require additional support or storage that requires a fee

Webrecorder = Desktop App

- Same functionality as Conifer but on local desktop
- Slower, but only limited by local storage…

Tools: ArchiveWeb.page & Browsertrix Crawler

ArchiveWeb.page

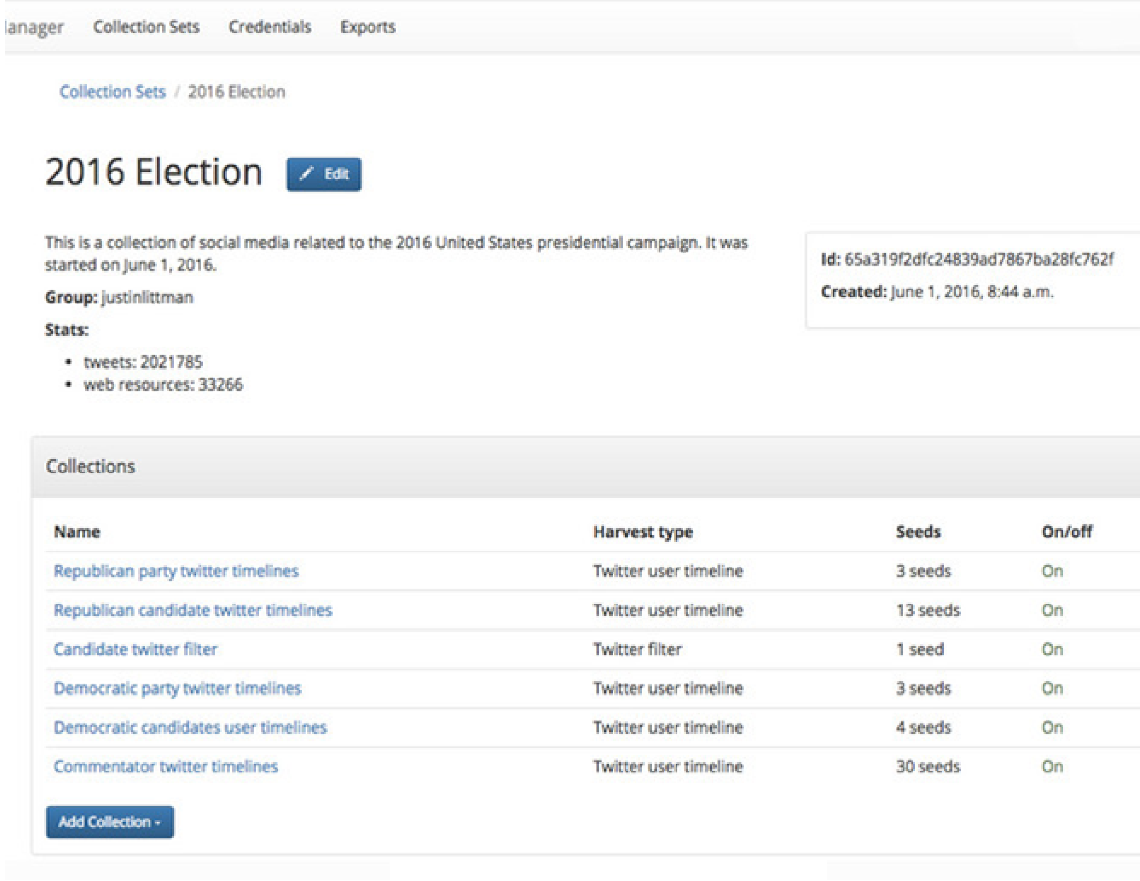
- JavaScript based system for high-fidelity web archiving directly in the browser
- Extension for Chrome/Chromium based browsers or a stand-alone app
- Simple to use, quick to get started
- Good for capturing dynamic content
- Data is stored locally
- Files can be downloaded as WARC or WACZ

Browsertrix Crawler

- Automated browser based crawling
- Aims to make it easy to run a browser based crawl on the command line
- Supports automatically running customized in-browser behaviors
- Automated, so suitable for larger sites.
- Can use seed lists
- Needs technical know-how to set up and use

Tools: Social Feed Manager

- Open source tool created by George Washington University Libraries
- Harvests data from Twitter, Flickr, Sina Weibo, and Tumblr
- Captures data through platform APIs
- Captures linked URLs and embedded media
- Supports the curation and management of archived collections



2016 Election

This is a collection of social media related to the 2016 United States presidential campaign. It was started on June 1, 2016.

Group: justinlittman

Stats:

- tweets: 2021785
- web resources: 33266

Id: 65a319f2dfc24839ad7867ba28fc762f

Created: June 1, 2016, 8:44 a.m.

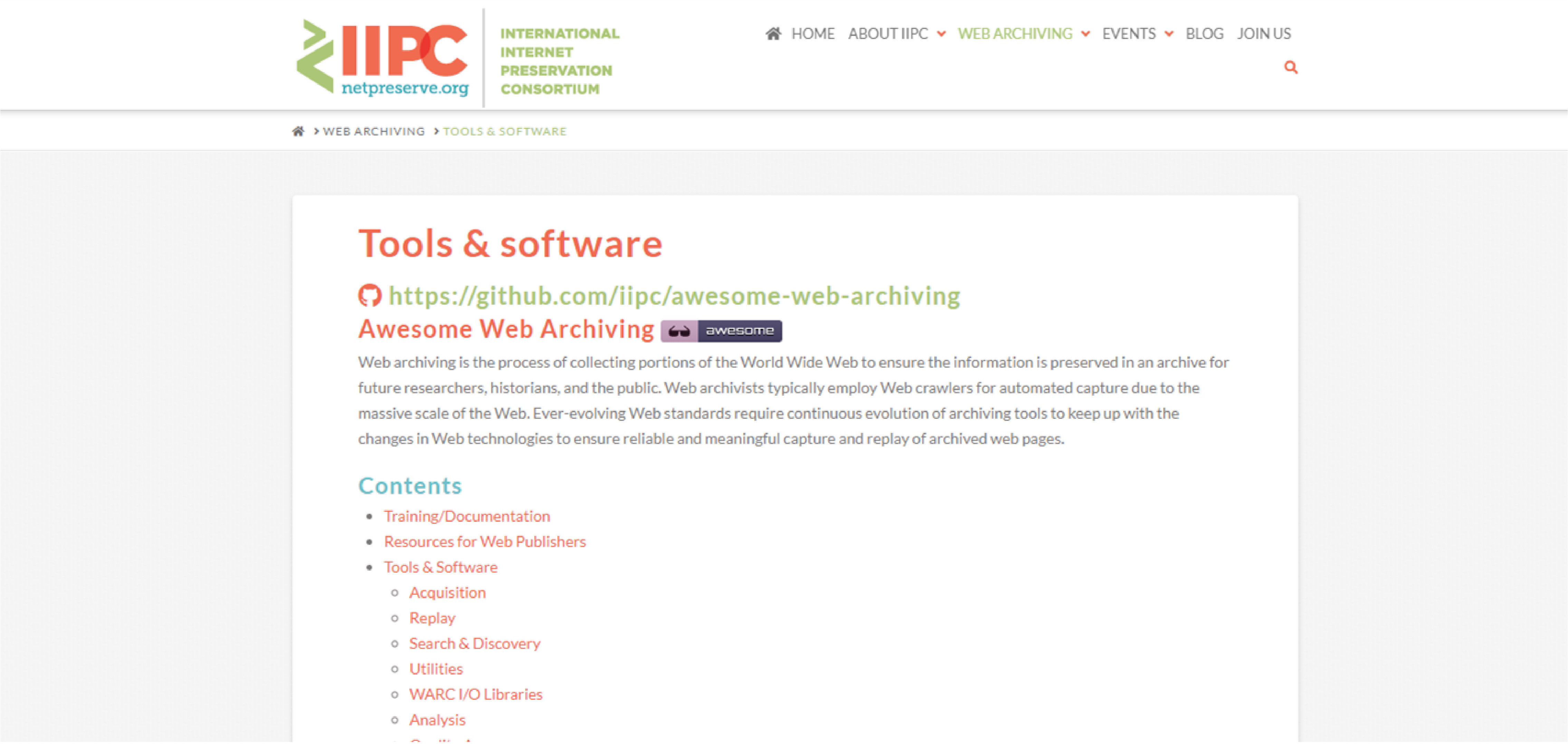
Collections

Name	Harvest type	Seeds	On/off
Republican party twitter timelines	Twitter user timeline	3 seeds	On
Republican candidate twitter timelines	Twitter user timeline	13 seeds	On
Candidate twitter filter	Twitter filter	1 seed	On
Democratic party twitter timelines	Twitter user timeline	3 seeds	On
Democratic candidates user timelines	Twitter user timeline	4 seeds	On
Commentator twitter timelines	Twitter user timeline	30 seeds	On

Tools: Social Media Download

- Available for Twitter, Facebook (limited), Google, and others
- Function in Settings
- Only permitted for the account owner
- Good practice for institutions with one or more public-facing social media accounts
- Good practice for personal digital archiving

Capture: MORE TOOLS!



Tools & software

https://github.com/iipc/awesome-web-archiving

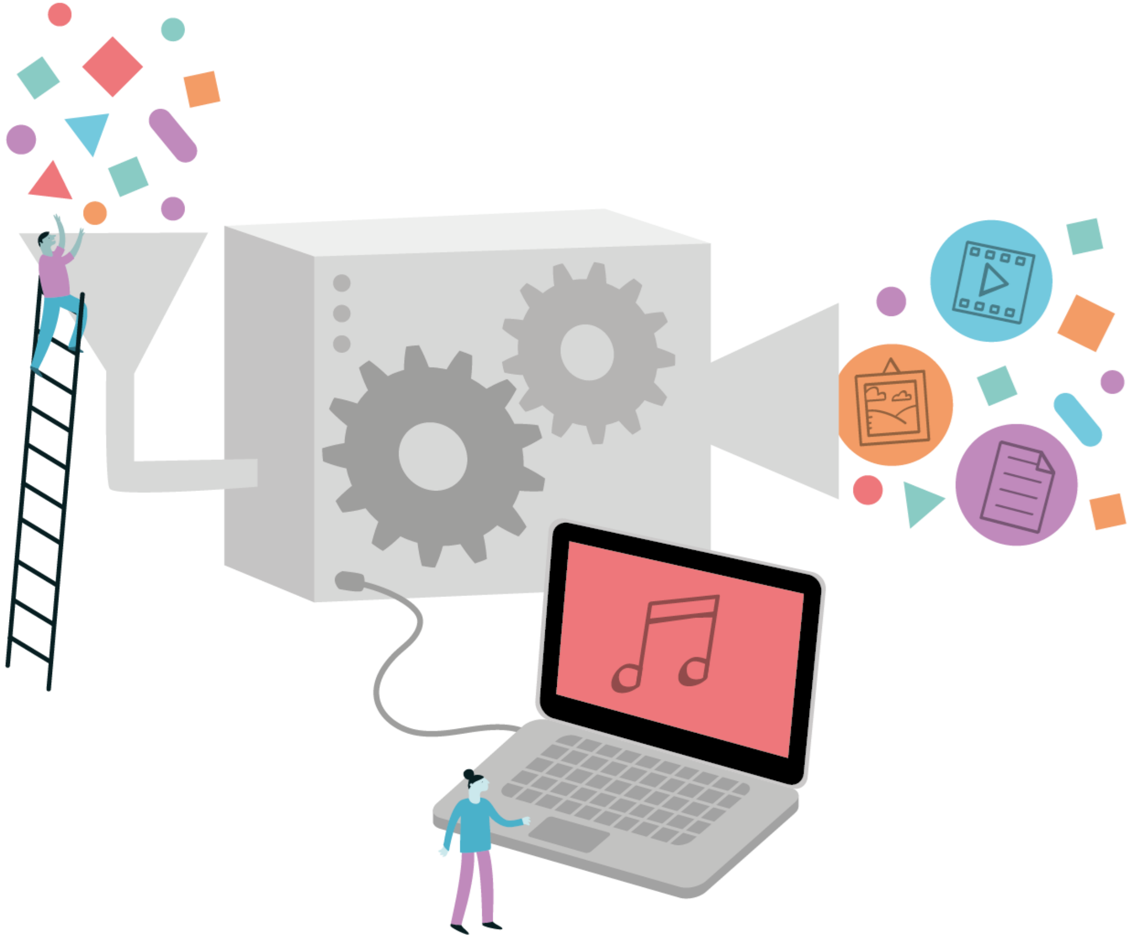
Awesome Web Archiving

Web archiving is the process of collecting portions of the World Wide Web to ensure the information is preserved in an archive for future researchers, historians, and the public. Web archivists typically employ Web crawlers for automated capture due to the massive scale of the Web. Ever-evolving Web standards require continuous evolution of archiving tools to keep up with the changes in Web technologies to ensure reliable and meaningful capture and replay of archived web pages.

Contents

https://netpreserve.org/web-archiving/tools-and-software/

Preserve:
What Happens to Captured Content?



Capture to Preservation

Captured Content

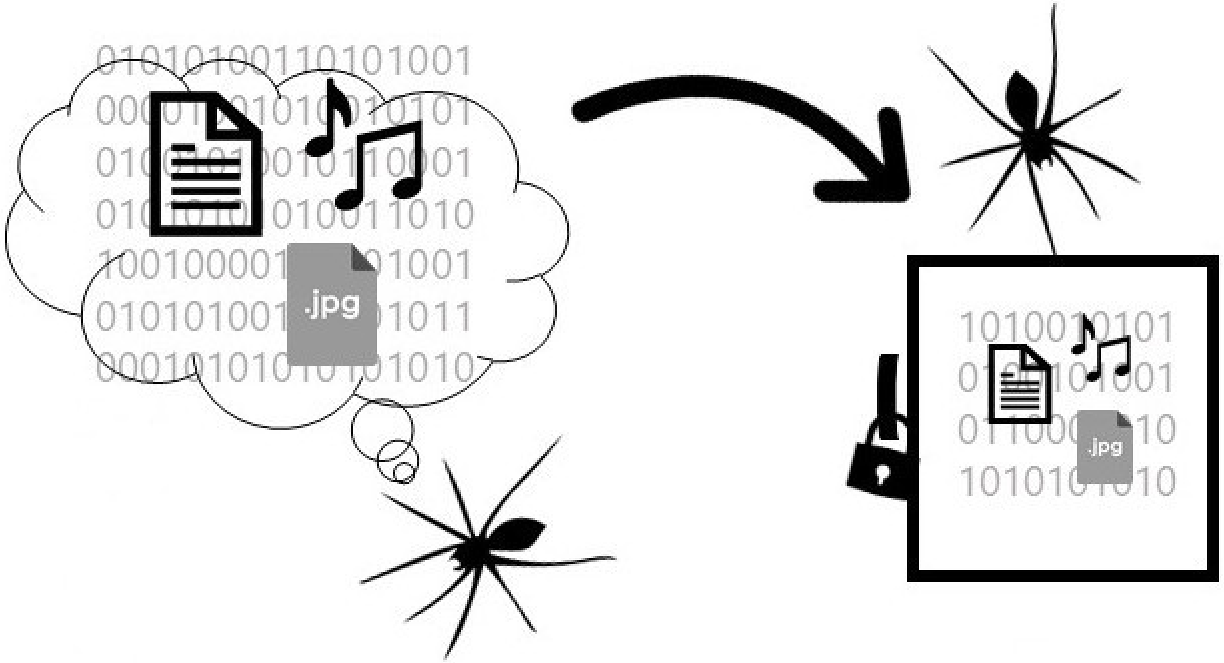
or

“The Crawl”

Web Archive

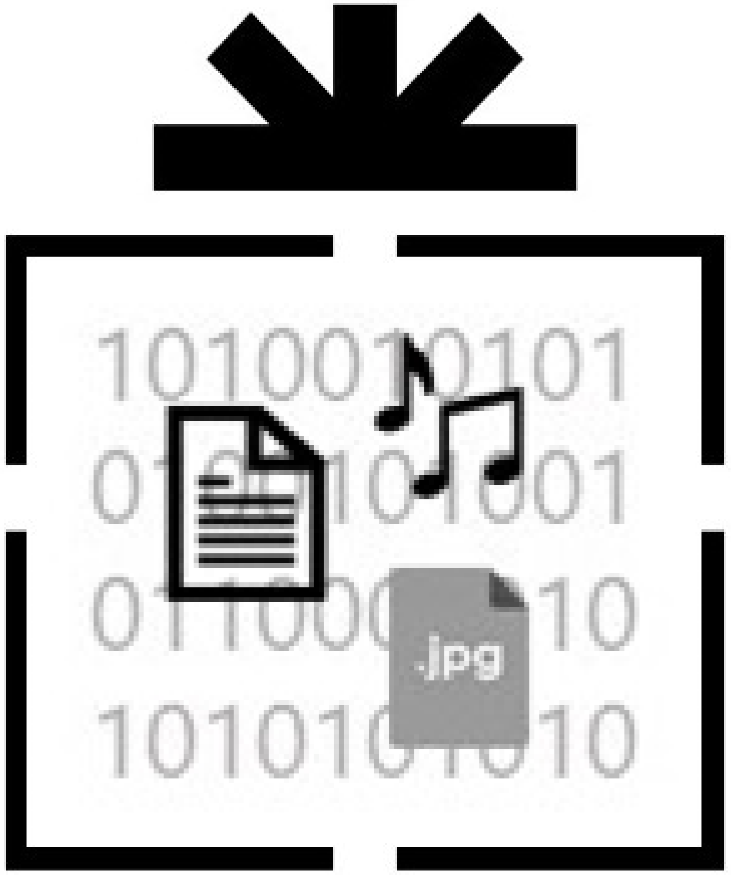
Preserved in Safe

Storage



Introduction to WARC

- WARC (Web ARChive)
- WARC is a wrapper for archived web objects developed by the IIPC
- Tools that write to WARC create files with the extension .warc
- A WARC file can be ingested into a digital preservation system
- WARC was preceded by the ARC (.arc) format



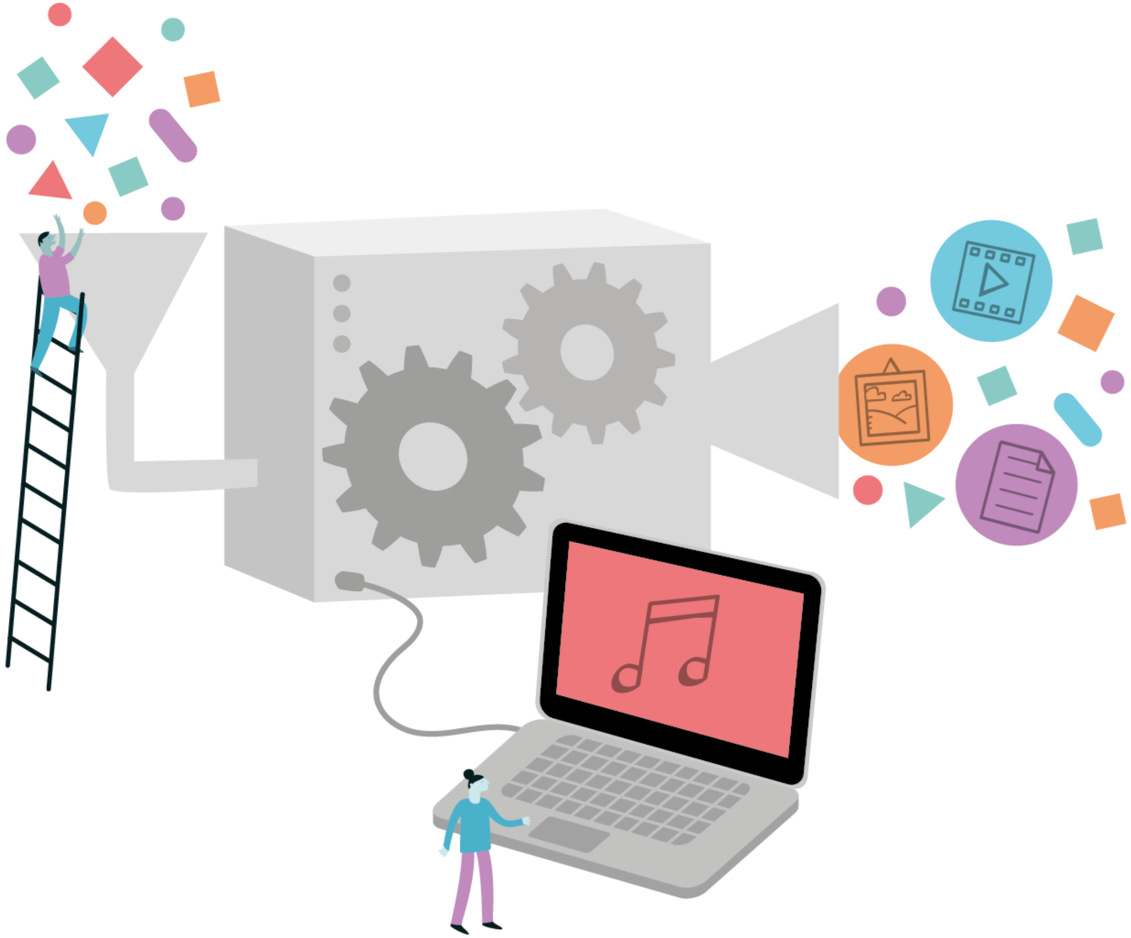
WARC Standard

- File format standard
- ISO 28500:2017 (formerly ISO 28500:2009)
- Packages together multiple files of different types from a web crawl or capture
- Maintains and describes relationships between web pages or related content
- Accommodates different forms of metadata
- Requires special access tools or viewers

Preserve: Actions

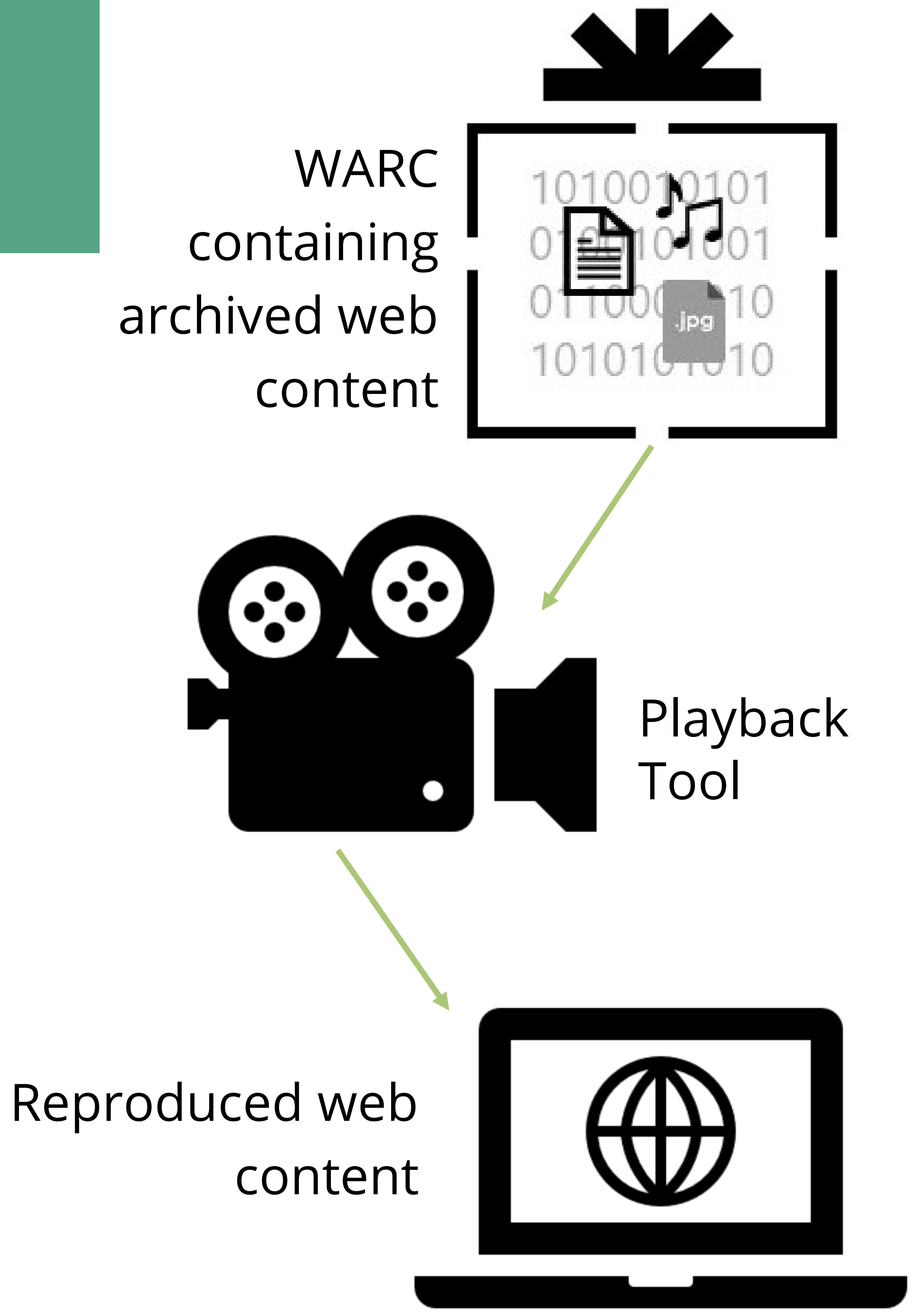
- Quality assurance
  - Successfully completed capture?
  - Capture content complete?
  - Sensitive data review
- “Patching” any issues
- Generating metadata
- Transfer to archival storage

Playback: Providing Access to Archived Web Content



How Do We Provide Access?

- Playback Tools required
- Designed to render archived web content
- Read and display WARC files
- Examples:
  - Wayback Machine
  - ReplayWeb.page (dynamic, interactive)
  - Third-party service platforms



WARC containing archived web content

Playback Tool

Reproduced web content

Playback: Facilitating Use

Indexing and Search

Indexing

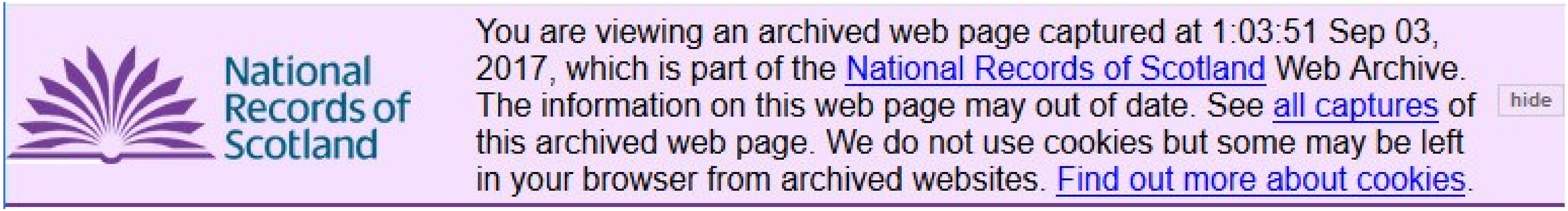
- Allows the search and retrieval of archived web content
- Enables search based on metadata fields, including keywords
- Required to enable access & re-use of web content

Full-text Search Index

- Indexed to allow end users to search broader range of keywords or phrases
- Enhances digital preservation planning
  - UK Web Archive uses full-text search capability to search tags to track the birth and death of specific features like HTML elements

Banner or User Notice

- To designate the viewed content as archived to avoid confusion with the live web

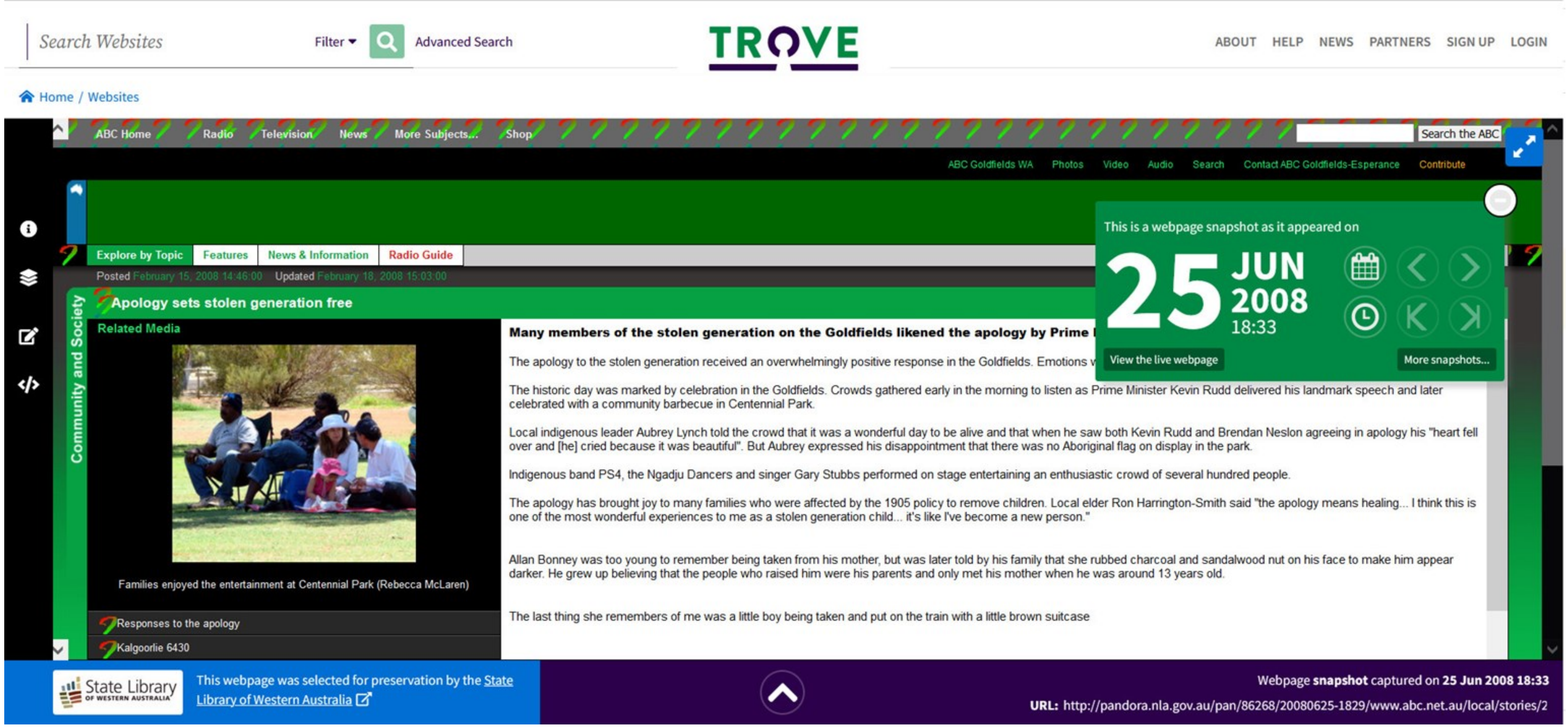


You are viewing an archived web page captured at 1:03:51 Sep 03, 2017, which is part of the National Records of Scotland Web Archive. The information on this web page may out of date. See all captures of this archived web page. We do not use cookies but some may be left in your browser from archived websites. Find out more about cookies.

https://webarchive.nrscotland.gov.uk/#!/

Date and Time of Capture

- To compare with concurrent information, such as major events or other publications



This is a webpage snapshot as it appeared on

25 JUN 2008 18:33

Posted February 15, 2008 14:46:00 Updated February 18, 2008 15:03:00

Apology sets stolen generation free

Families enjoyed the entertainment at Centennial Park (Rebecca McLaren)

Responses to the apology

Kalgoorlie 6430

Many members of the stolen generation on the Goldfields likened the apology by Prime

The apology to the stolen generation received an overwhelmingly positive response in the Goldfields. Emotions v

The historic day was marked by celebration in the Goldfields. Crowds gathered early in the morning to listen as Prime Minister Kevin Rudd delivered his landmark speech and later celebrated with a community barbecue in Centennial Park.

Local indigenous leader Aubrey Lynch told the crowd that it was a wonderful day to be alive and that when he saw both Kevin Rudd and Brendan Neslon agreeing in apology his "heart fell over and [he] cried because it was beautiful". But Aubrey expressed his disappointment that there was no Aboriginal flag on display in the park.

Indigenous band PS4, the Ngadju Dancers and singer Gary Stubbs performed on stage entertaining an enthusiastic crowd of several hundred people.

The apology has brought joy to many families who were affected by the 1905 policy to remove children. Local elder Ron Harrington-Smith said "the apology means healing... I think this is one of the most wonderful experiences to me as a stolen generation child... it's like I've become a new person."

Allan Bonney was too young to remember being taken from his mother, but was later told by his family that she rubbed charcoal and sandalwood nut on his face to make him appear darker. He grew up believing that the people who raised him were his parents and only met his mother when he was around 13 years old.

The last thing she remembers of me was a little boy being taken and put on the train with a little brown suitcase

This webpage was selected for preservation by the State Library of Western Australia

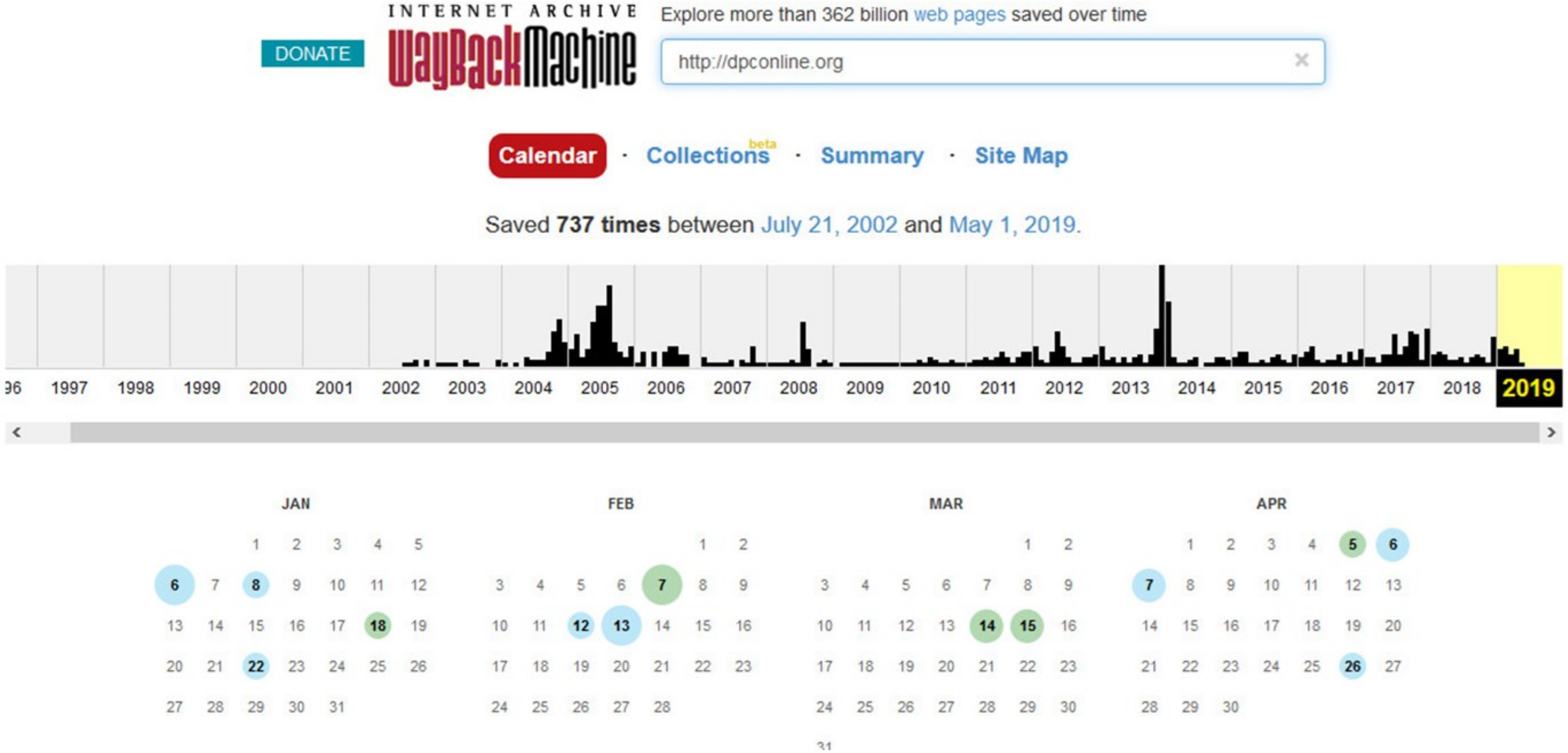
Webpage **snapshot** captured on **25 Jun 2008 18:33**

URL: http://pandora.nla.gov.au/pan/86268/20080625-1829/www.abc.net.au/local/stories/2

https://webarchive.nla.gov.au/awa/20080625083334/http://pandora.nla.gov.au/pan/86268/20080625-1829/www.abc.net.au/local/stories/2008/02/15/2164173bb59.html

Timeline Navigation

- To show the timeline of captures for collections of web content



INTERNET ARCHIVE WaybackMachine

Explore more than 362 billion web pages saved over time

http://dpconline.org

Saved **737 times** between July 21, 2002 and May 1, 2019.

JAN

		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		

FEB

					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		

MAR

					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						

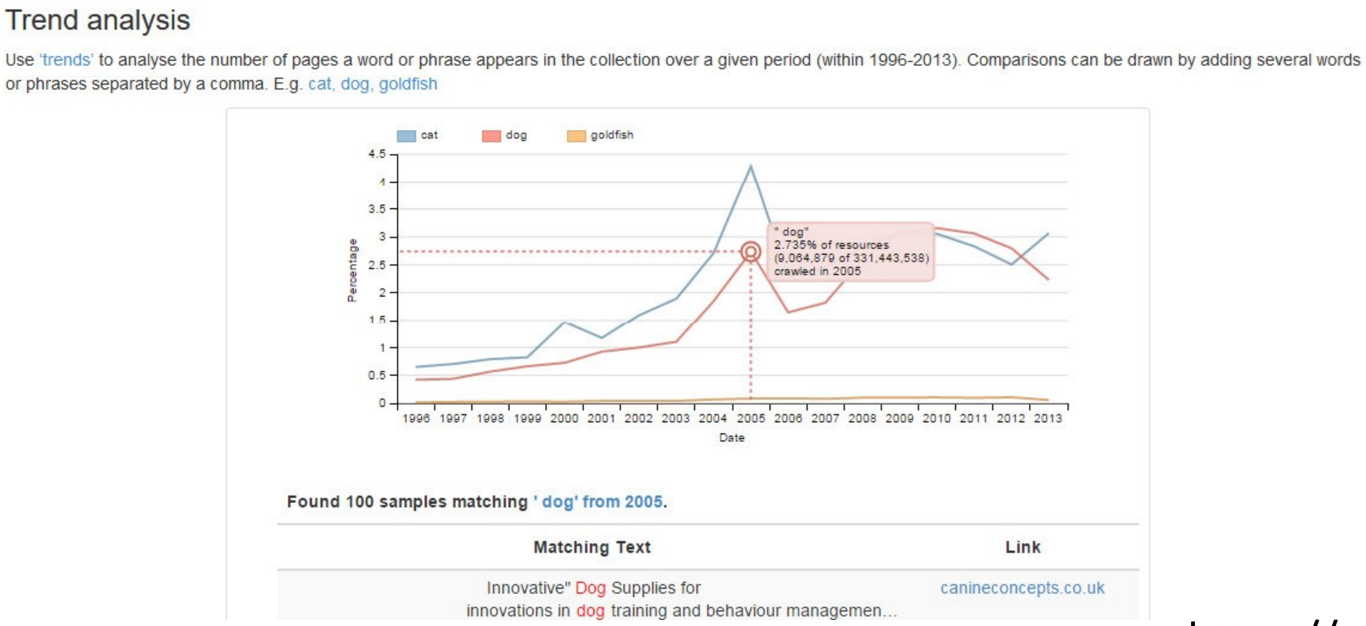
APR

	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				

https://web.archive.org/web/*/http://dpconline.org

Web Content as Data

- Users may wish to analyze web content or social media data for trends over time or across the web
- The UK Web Archive's SHINE historical search engine is a prototype web-based tool for analyzing trends in web content



Trend analysis

Use 'trends' to analyse the number of pages a word or phrase appears in the collection over a given period (within 1996-2013). Comparisons can be drawn by adding several words or phrases separated by a comma. E.g. cat, dog, goldfish

Found 100 samples matching ' dog' from 2005.

Matching Text	Link
Innovative" Dog Supplies for innovations in dog training and behaviour managemen...	canineconcepts.co.uk

https://www.webarchive.org.uk/shine

Playback:
Tools to Replay Web Archives

Wayback Machine & OpenWayback

Wayback Machine

- Developed by the Internet Archive
- Used to “play back” archived web content contained in a WARC file in an end user’s browser
- Open source software to query and access archived web content

OpenWayback

- Shared development project to address common requirements and improve testing

INTERNET ARCHIVE
WayBackMachine

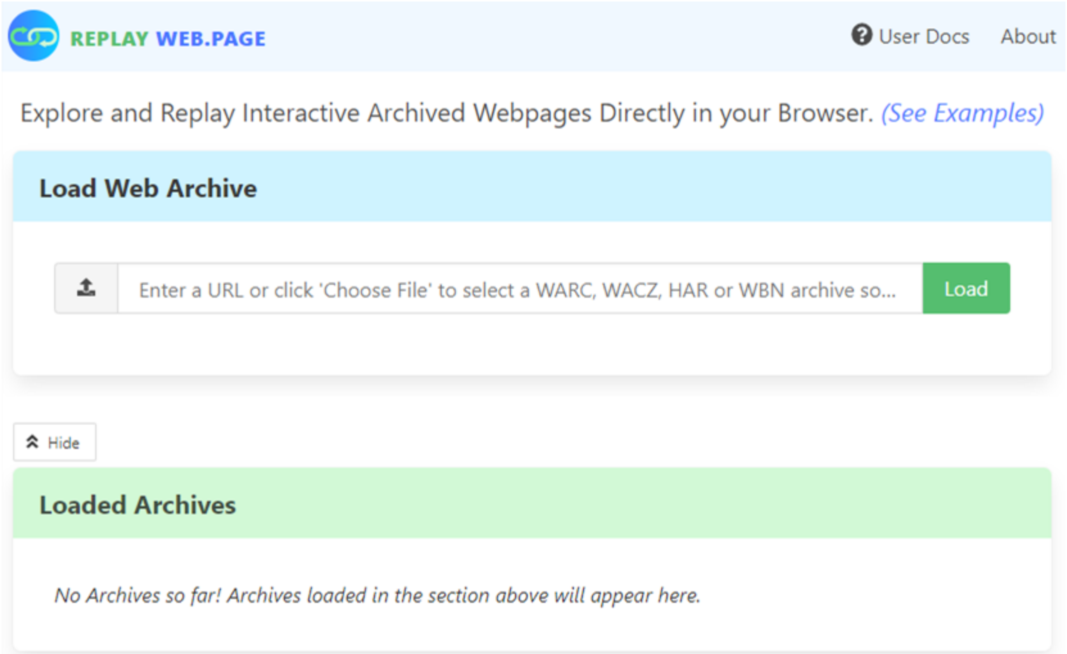
IIPC
netpreserve.org
INTERNATIONAL
INTERNET
PRESERVATION
CONSORTIUM

Python Wayback

- Replays web content as accurately as possible
- Forms the foundation of Webrecorder and other Playback tools
- Supports the creation of new web archives from the live web or other archives
- Support for Memento
- Significantly improved ability to handle most modern web sites

ReplayWeb.page

- Developed by the Webrecorder project and complements Conifer and Webrecorder
- Available as a browser-based replay tool or an downloadable app
- Browser-based replay tool can be used offline once it is loaded
- Supports WARC file types (.warc, .warc.gz)



Explore and Replay Interactive Archived Webpages Directly in your Browser. *(See Examples)*

Load Web Archive

Enter a URL or click 'Choose File' to select a WARC, WACZ, HAR or WBN archive so...

Loaded Archives

No Archives so far! Archives loaded in the section above will appear here.

https://replayweb.page/

Other Tools and Services

- When working with archived web content as data:
  - ArchiveSpark
  - Archives Unleashed Toolkit
- Third-Party Services
  - Archive-It
  - MirrorWeb
  - Hanzo
- For creating Collaborative Collections
  - Memento
  - COBWEB
  - UNT Nomination Tool

Group Discussion

Questions to discuss:

1. Do you currently have web archiving process in place?
2. What tools do you use/have you tested?
3. What would you like to add to your web archiving programme?