Going with the Flow

Digital Archiving Workflows

ACA 2018

Presenters

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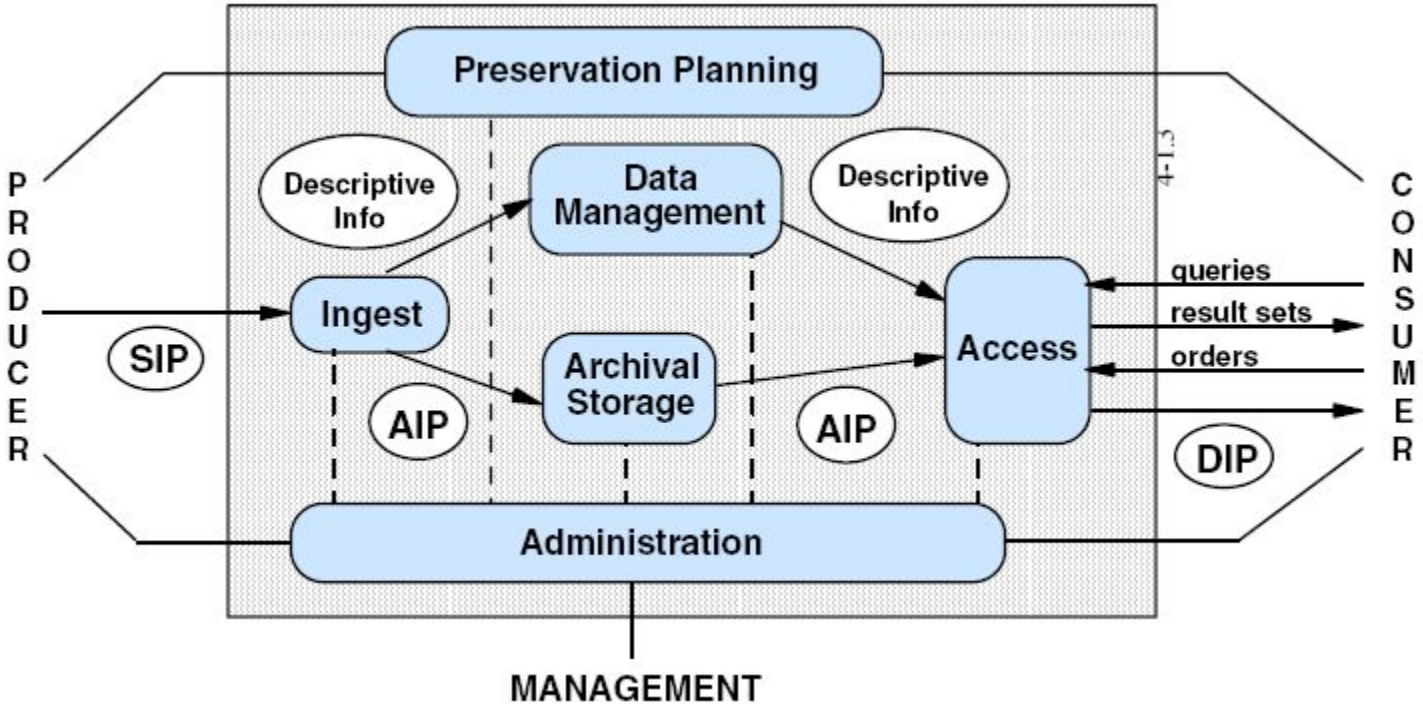
Outline

- Open Archival Information System (OAIS)
  - Pre, During, and Post
- Digital Archiving Needs
- Institutional Context & Scope
- Acquisition
- Metadata
- Submission Information Package (SIP) and Ingest
- Preservation
- Archival Information Package (AIP) Storage
- Dissemination Information Package (DIP) and Access

OAIS

Open Archival Information System (OAIS) model



Pre-OAIS

Acquisition

Metadata

- Accession
- Descriptive
- Rights Management

OAIS Steps:

Package SIP

Ingest

Preservation & Processing

AIP Storage

DIP Creation & Storage

Post-OAIS

Access

- Rights management
- Copyright
- Privacy & freedom of information, etc.
- Appropriate access: content vs audience

Discovery

Digital Archiving Needs

- Content Acquisition:
  - Donations of born-digital materials
  - Digitization of analog materials
- Storage
- Preservation
  - Bit level (are the 1s and 0s still there?)
  - Renderability (can you read the file? Does it look right?)
- Discovery & Access
  - Rights management
  - Copyright
  - Privacy & freedom of information, etc.

Institutional Context & Scope

University of Toronto - Context

Digital Preservation Unit (2 FTE + 3 project staff)

Digital Archivist (UTARMS, 1)

Archivists and Collection Holders from across UTL (lots)

Special Collections and Archives: born-digital materials and digitized content (not electronic records)

General Collections: licensed/published digital content (not already under consortial control)

Preservation Platform: Tivoli Storage Management (TSM) system with local and offsite storage, various contextual platforms

Intake Tools: Primarily linux-based (e.g. fiwalk, diff, rsync, local scripts). Tracking with Jira (for now).

UK Non-Print Legal Deposit - Context (slide 1 / 3)

- Legal Deposit has existed in the UK in some form since 1662
- The Legal Deposit Libraries Act 2003
  - 1 print copy of a publication sent to the British Library and any of the other libraries that claim it
- The Legal Deposit Libraries (Non-Print Works) Regulations 2013
  - Allowed the libraries to collect publications in digital formats
    - Publishers must provide a digital file that is suitable for long-term preservation

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UK Non-Print Legal Deposit - Context (slide 2 / 3)

- To ensure a national collection of non-print publications;
- To enable an efficient system in which material is archived and preserved in the legal deposit libraries;
- To govern how the deposited copies may be used, balancing the needs of libraries and researchers with the interests of publishers and right holders;
- To facilitate long-term preservation, so that the material may continue to be accessed in future; and
- To ensure long-term viability by requiring both legal deposit libraries and publishers to share the responsibility for archiving without imposing an unreasonable burden on any institution

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UK Non-Print Legal Deposit - Context (slide 3 / 3)

- Content and Metadata Processing
- Collection Metadata
- Web Archiving
- Curatorial
- Digital Preservation
- Collection Development
- Dev and test
- Application Support
- Discovery and Access
- amongst others!

Born-digital collections:

- eBooks (PDF and/or EPUB)
- eJournals (PDF)
- UK Legal Deposit Web Archive (WARC)
- Notated music (PDF)
- Geospatial datasets (many formats)

Preservation Platform: Digital Library System (DLS), a bespoke system built by the British Library

Intake Tools: Publisher Portal, FTP site, Heritrix 3 and Document Harvester (web archive)

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University of Alberta - Context

Digital Archives Strategy WG (Digital Archivist, Metadata, RM, Digital Preservation, SysAdmin, Technology Librarian & AUL)

Digital Initiatives (DAMS) & Archives

Archives: born-digital materials and digitized content. Any format & media type. Institutional & Private records.

Collaboration & Re-use:
OpenStack Swift storage
'Jupyter' repository
'Pushmi-Pullyu'
Lightweight AIP
Archivematica (TBD)

Access: AtoM (Archives & Special Collections)

Scholars Portal - Context

Service Provider for members of the Ontario Council of University Libraries (OCUL)

Develops and maintains content-based and member support services

Digital Preservation Librarian + systems & client support staff

Preserves digital licensed materials on behalf of members (journals, books, data)

Develops and sustains **digital preservation services and infrastructure** for the preservation of member-created and managed assets

TDR for journal content runs on MarkLogic + custom preservation processing pipeline

Ontario Library Research Cloud (OLRC) for member storage needs

Permafrost hosted preservation service for processing

Scholars Portal - Permafrost

- Divides responsibility for implementation of OAIS
  - “OAIS Archive” is the subscriber
  - Functional implementation of *aspects* of OAIS: service provider

Scholars Portal:

- Installs and maintains tools, systems and hardware;
- Provides training, consultation, technical support and other resources and guides;
- Provides fixity/reporting data;
- Performs preservation actions over time;
- Implements access requests and assists with integrations

Subscriber:

- Determines content to be preserved,
- Sets policies and procedures,
- Resources the use of the service,
- Validates outputs,
- Dictates preservation actions over time
- Manages access to AIPs & DIPs

McMaster University - Context

Digital Archivist (Archives & Research Collections, 1)

Support Librarians (Repository, Technology, 2 [with lots of other commitments])

Other Archivists (3)

Archives & Research Collections

Born-digital materials. Any format and media type.

Mostly personal records, but some institutional material.

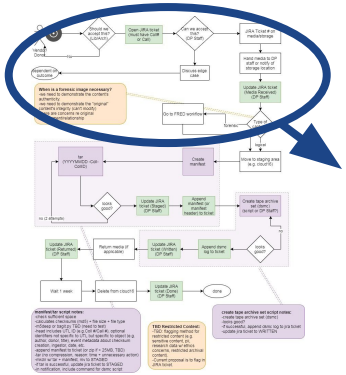
Intake/Validity/Ingest.: BitCurator (and others), Archivematica

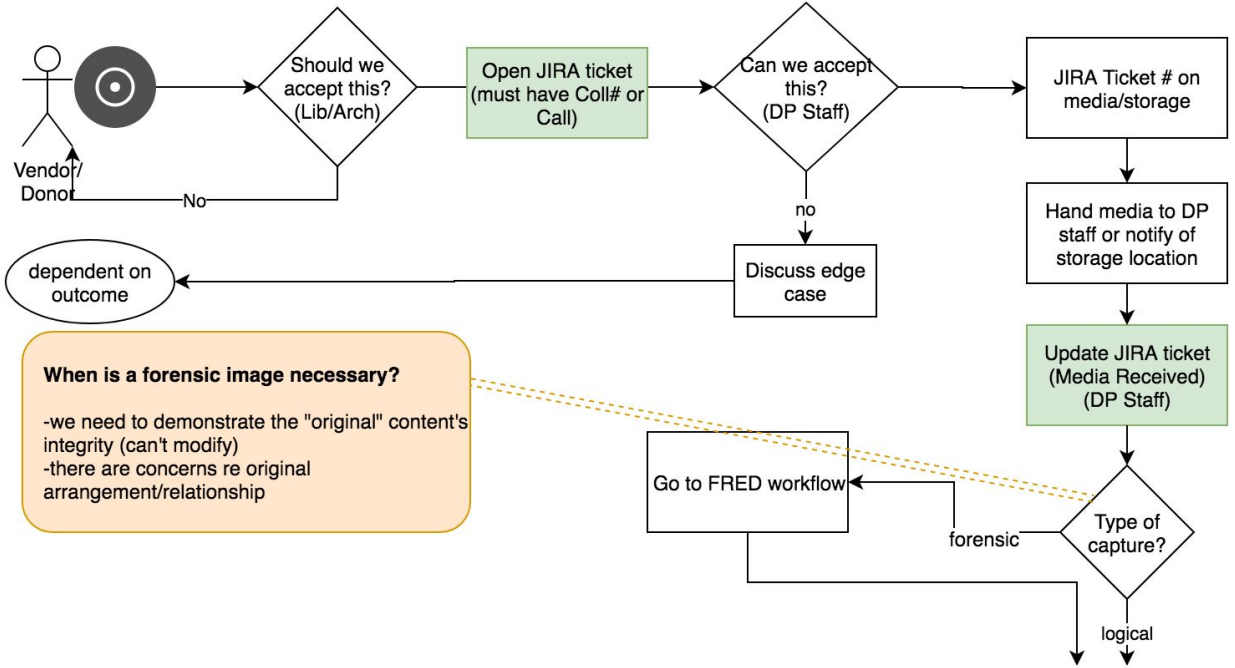
Preservation: Islandora

Access: Some combination of AtoM, Islandora, ePadd, others

Acquisition

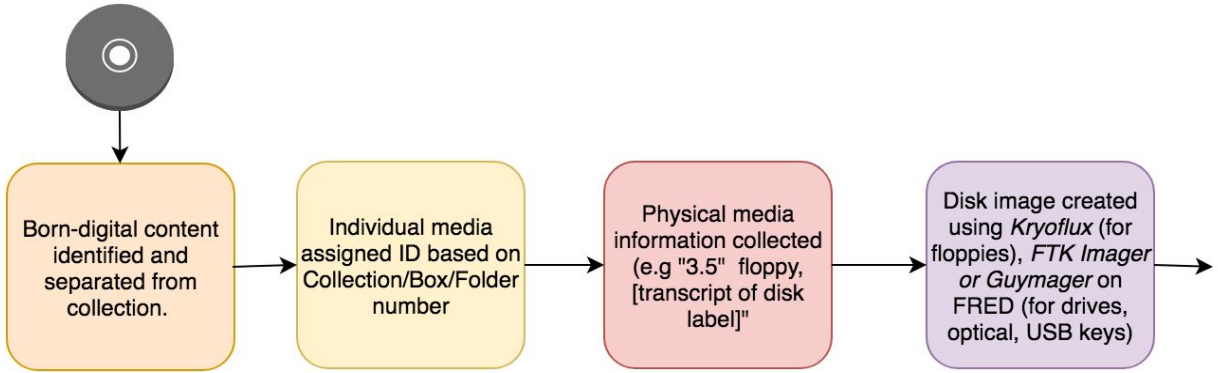
University of Toronto - Acquisition (General)





http://uoft.me/gen-workflow

University of Toronto - Acquisition (Media)



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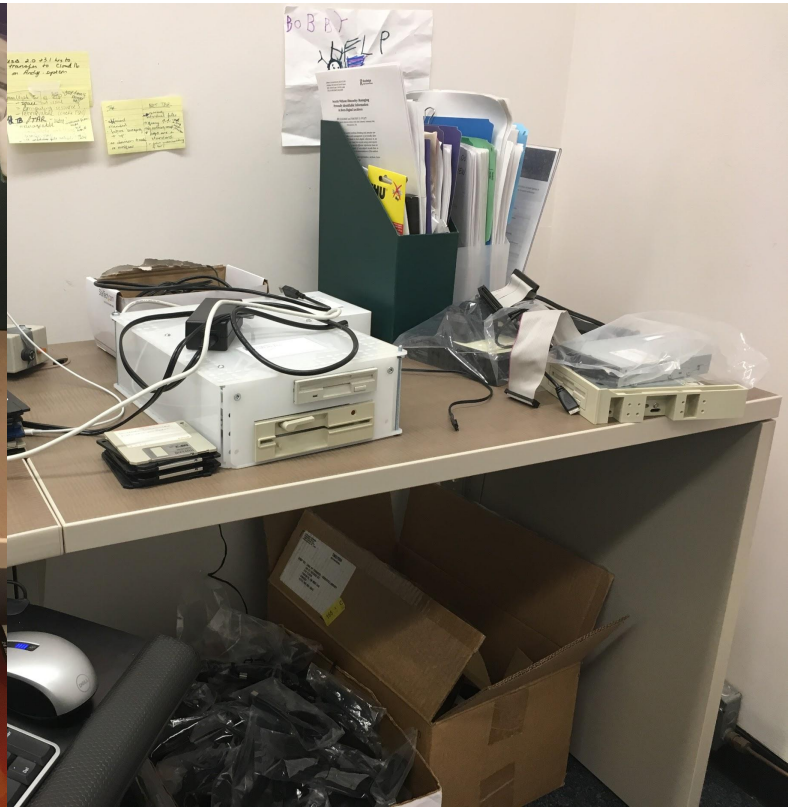
University of Toronto - Acquisition (Reality)



UK NPLD Legal Deposit - Acquisition

- If content is published in the UK, it's in-scope to acquire
  - File format(s) determine if a publisher can be onboarded
- Phase 1 of NPLD addressed short tail of publishers (e.g. large trade publishers, aggregators) as well as long tail of publishers and other content creators
- Phase 2 addressed specialised content (e.g. geospatial datasets and notated music);
- Phase 3 is addressing complex formats not current collected (e.g eBooks created as mobile apps)
- Publishers prioritisation determined by Collection Development and Acquisitions Subgroup (eBooks and eJournals), Legal Deposit Libraries Web Archiving Subgroup, and curators (for maps and music)

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UK NPLD Legal Deposit - Acquisition

- For eBooks, eJournals, and notated music, content is deposited directly by publishers or aggregators onto FTP site
- Small eBook publishers (< 1,000 publications per year) deposit using Publisher Portal that was built on SharePoint
- Geospatial datasets are sent to a third party supplier that ‘bags’ the content using the BagIt standard
- Heritrix 3, an open source, scalable crawler developed by the Internet Archive, is used for yearly UK domain crawl

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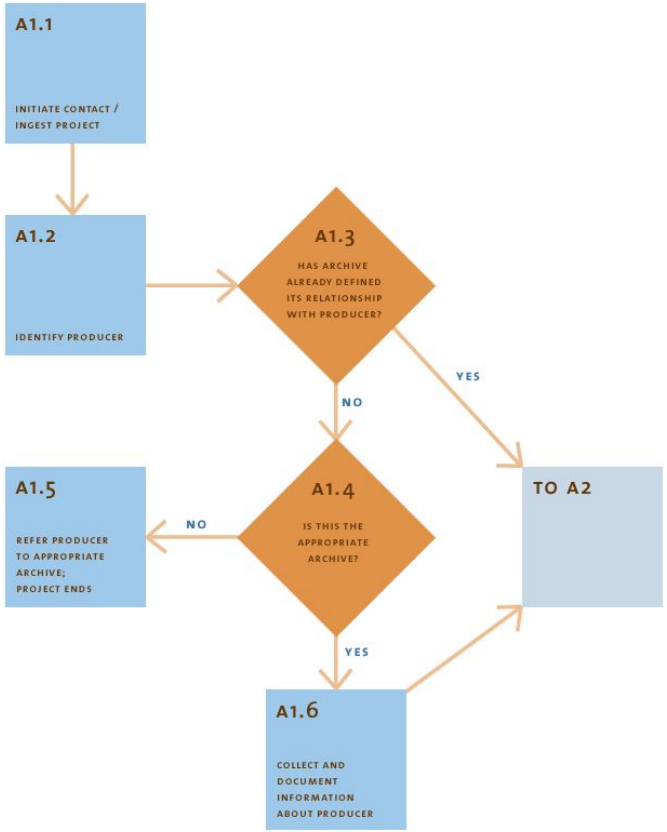
University of Alberta - Acquisition



TUFTS University Ingest Guide

- ISO 20652 Producer-archive interface - Methodology abstract standard (PAIMAS)

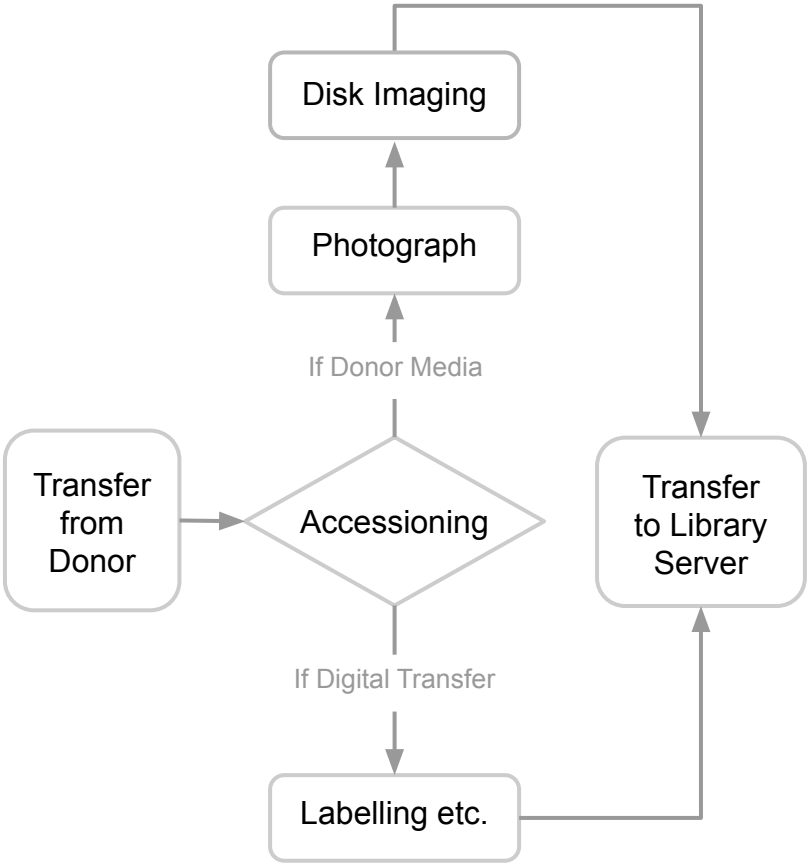
Decision-making and considerations based; not tied to a specific technology

See: https://dca.lib.tufts.edu/features/nhprc/reports/ingest/index.html

McMaster - Acquisition

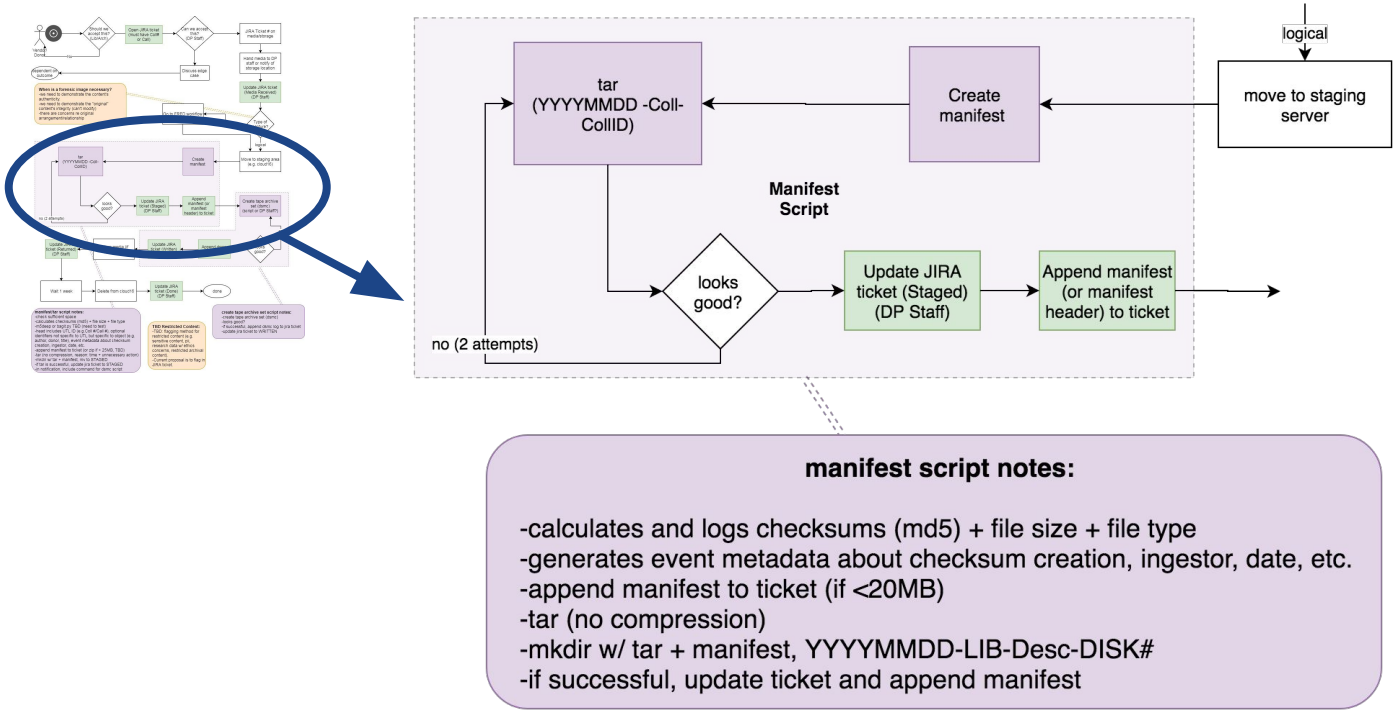
- Acquisition considerations same criteria for other archives

- What we are given does determine initial steps after accessioning



Metadata

University of Toronto - Metadata (General)



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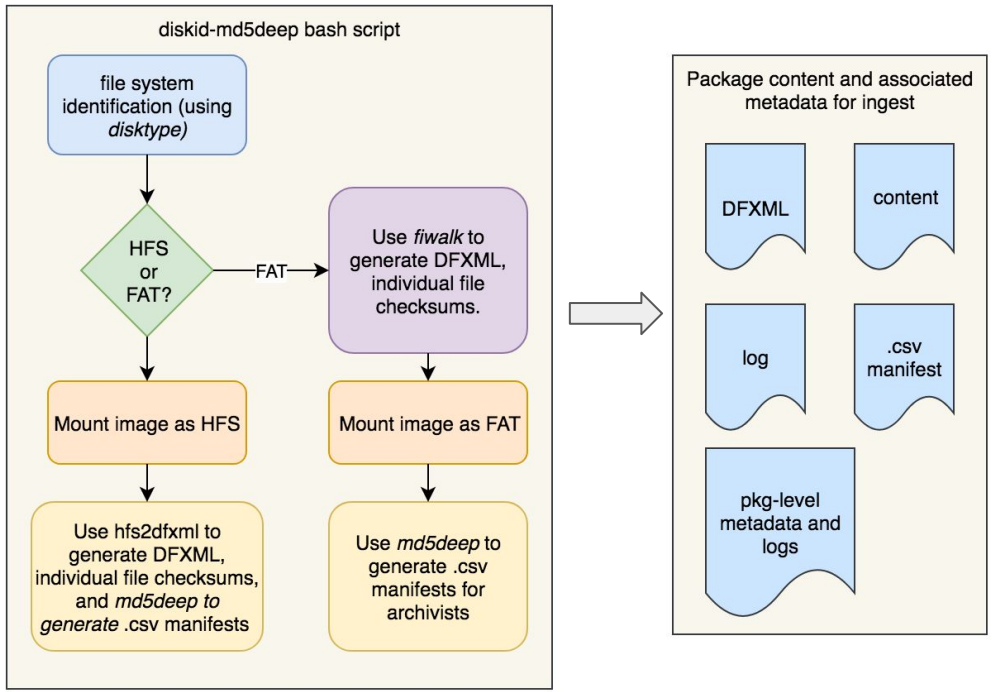
University of Toronto - Metadata (Media)



Note: if disk images are not being kept, manifests are simply created from extracted content rather than disk images.

http://uoft.me/media-workflow

UK Non-Print Legal Deposit - Metadata

- Quality and type of descriptive metadata depends on what the publishers create and provide as well as standards used
- Descriptive records created in BL's Aleph catalogue (eBooks, eJournals, notated music, and geospatial datasets)
- UK Legal Deposit Web Archive do not have individual Aleph records
- Metadata for all items ingested held in METS file for an item package as well as in Metadata Extension Repository (MER) and the Metadata Database (MDDB)
- Records harvested by the LDLs via OAI-PMH or FTP (for older workflows)

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University of Alberta - Metadata

Hybrid analog-digital system for descriptive & administrative metadata:

- In-house accession reg; RAD for full finding aid
- Database record of accessions
- Hardcopy accession file with donation information
- Digital and hard copy donations go through same accession registration process
- Digital files, like physical file folders, labelled with accession & file number

University of Alberta - Metadata

Donor required to:

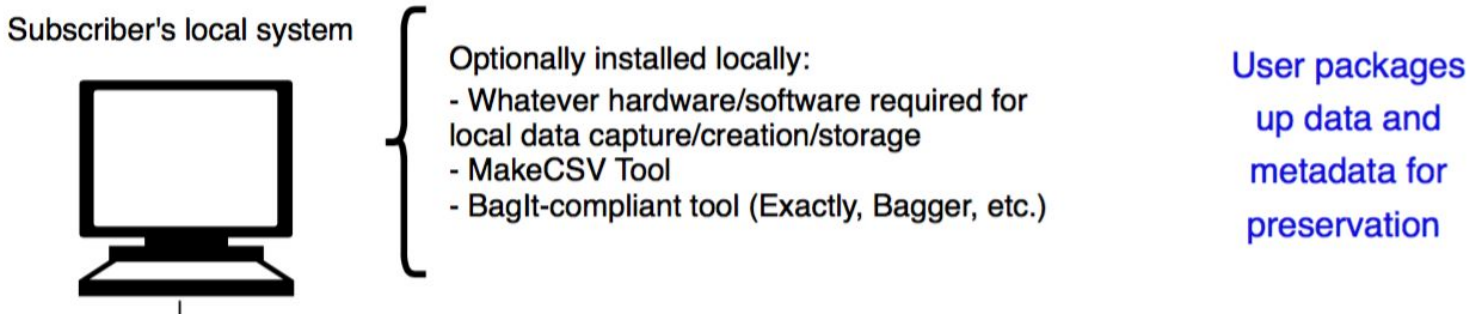
- Confirm & finalized file listing (PAIMAS requirement)
- List known rights issues (copyright, privacy, restrictions, etc.)

SIP/AIP/DIP division

- By accession
- Separate Open vs. Restricted package for accession

Permafrost - Metadata

- Subscribers encouraged to map descriptive metadata to simple DublinCore for ingest to Archivematica
  - Transfer-level metadata can be added through interface; item-level metadata is imported via CSV
  - MakeCSV tool can be used to create CSV template with file name listings for easier import
- Use of PREMIS rights metadata entry/import also encouraged



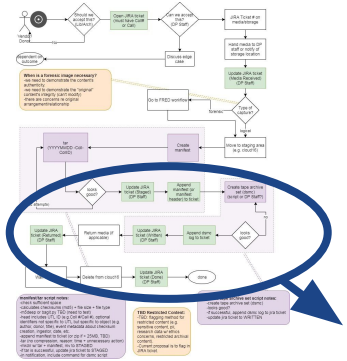
McMaster - Metadata

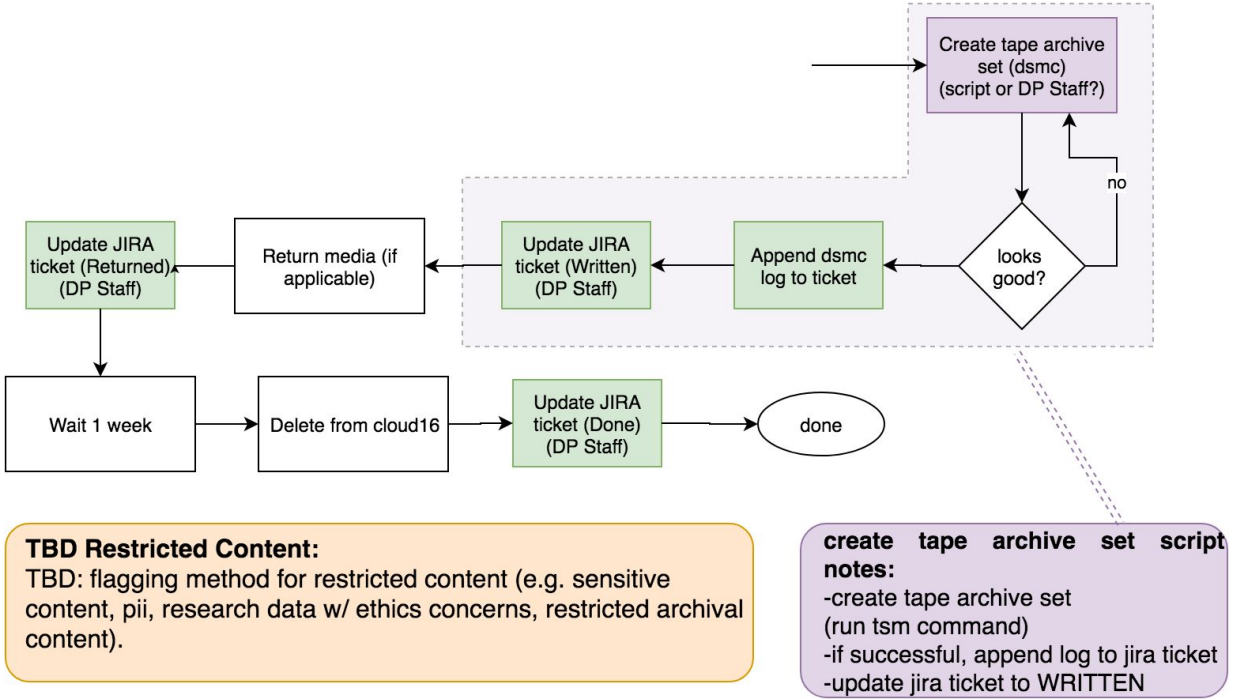
Combination of RAD finding aid and repository metadata needs

- All digital files linked to accession number to pair with physical records
- Descriptive metadata from file names, media labels, accession records etc.
- PREMIS rights metadata
- Written in .CSV mapped to DublinCore

SIP Ingest

University of Toronto - Ingest (General)





http://uoft.me/gen-workflow

UK NPLD Legal Deposit - SIP Ingest

Pre-Ingest

- Steps depend on content type and source
- Content virus checked
- Content packaged if not received this way from publisher (e.g. for eBooks, a metadata file, content file, and often .jpg of cover)
- Metadata transformation
- Creation of METS file
- Persistent identifier assigned to each object (Archival Resource Key / ARK)

Strategic Ingest (common ingest workflow)

- METS data added to Metadata Extension Repository (MER)
- Record created in Aleph
- Metadata from Aleph and MER combined to create an aggregated record for each item
    - Added to Data Warehouse for management information purposes
    - Published to OAI-PMH so records can be harvested by other Legal Deposit Libraries
    - Published to Primo to enable discovery at the BL
- DOMID (internal identifer) assigned to each object

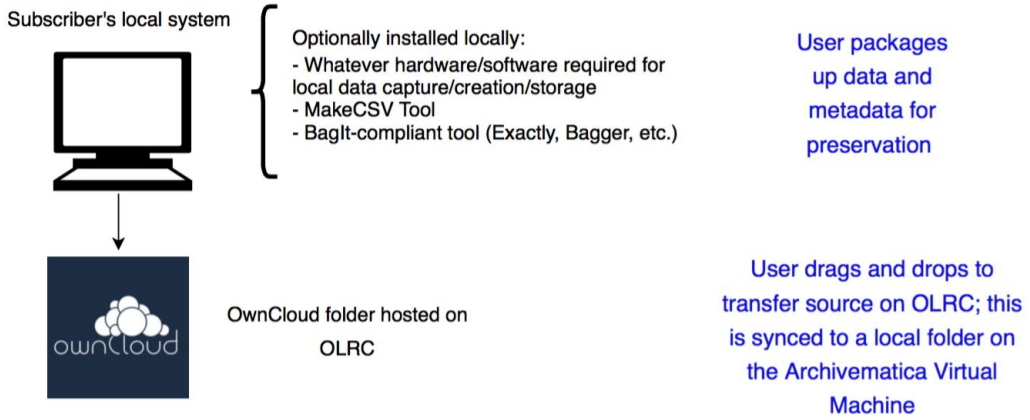
University of Alberta - SIP

Records first go into a staging area for Archivist intervention (relabelling, metadata, etc.)

Divided by accession & subdivided by open vs restricted

Original files & metadata in SIPs, as appropriate

Permafrost - SIP



- User packages transfers on local systems containing
  - Original materials to be preserved
  - Descriptive metadata (if imported)
  - Rights metadata (if imported)
  - Contextual documentation (if available)

- Transfers are (optionally) bagged and dragged and dropped to OLRC transfer point staging area
  - This staging area will (likely) use OwnCloud - a Dropbox-like application hosted on the OLRC (currently in testing!)
  - The OwnCloud folder is synced to a local folder on the Archivematica VM to reduce bottleneck at transfer point

McMaster - SIP

SIP to contain:

- Original files
- Rights information
- Photographs of donor media (when present)
- Metadata

Grouped by accession, rights, and archival hierarchy (sometimes)

Preservation

UK Non-Print Legal Deposit - Preservation

As part of either pre-ingest or ingest workflow:

- Checksum creation and/or validation
- File format identification, characterisation, and validation (JHOVE for PDFs and EpubCheck for EPUBs; METS validated against BL METS profile)
- Digital signatures created for every object
  - Later validated with Object Authenticity Checker (OAC) tool
- All objects (individual digital files) ingested and created during ingest (e.g. METS file) preserved within store and replicated four times

UK Non-Print Legal Deposit - Preservation

What else helps ensure immediate and long-term preservation?

- Undertaking an audit/assessment of technical infrastructure, staffing, and governance for preservation
- Preservation policy and implementation plan
- Preservation planning (How are changes that could impact the preservation of and access to content monitored? What information informs preservation actions?)
- Collection profiles (e.g. high-level information on why content is being preserved and main preservation requirements)
- Providing access to collections and listening to user feedback

University of Alberta - Preservation

SIPs are bagged along with technical & structural metadata

- Currently, custom made “lightweight AIP” process, looking to move to “full AIP”

2-tiered preservation:

1. Bit level
    - Guaranteed for all deposits
    - “Preservation storage”

University of Alberta - Preservation

2. Full preservation

- For records that are legally required to be maintained
- Renderable on an ongoing basis
- Combination of normalization (file format registry based on LOC registry), migration, and emulation as necessary based on content & format type
- Will try our best for as much as possible. Higher likelihood for common formats

University of Alberta - Preservation

AIP contains:

- Original files
- Normalized and/or migrated records, as applicable
- Metadata
  - Descriptive
  - Administrative
  - Technical
  - Structural

Permafrost - Preservation

- Preservers process package through “transfer” stage workflow in Archivematica to create SIP
  - Various functions performed: file identification, characterization, validation
  - Processing configuration can be adapted as needed; automated if desired

- Preservers optionally normalize files
  - Work with individuals to assess normalization options
  - Not all ‘out of the box’ Archivematica normalization rules are good for everyone

Dedicated Virtual Machine running Archivematica

User processes materials through Archivematica workflow

McMaster - Preservation

AIP created in Archivematica always has:

- Original files
- Metadata

Likely contains:

- Normalized files (if needed/available)
- Photographs of original media (planned, not yet active)

AIP Storage

UK NPLD Legal Deposit - AIP storage

- NPLD objects ingested at BL Boston Spa
- Ingested objects replicated to four geographically separate nodes: British Library Boston Spa and St Pancras, National Library of Scotland, National Library of Wales
- Integrity checking carried out on each of the nodes using OAC
- Self-healing from another node when an object is not found or is corrupt
    - Corrupt objects quarantined

University of Alberta - Storage

“Preservation storage”:

- Mirrored, triplicate backup storage
- “Self healing”: ongoing integrity checking via checksums
- Physically separated secure server rooms
- Multi-layer fire walls

Currently using OpenStack Swift

Scholars Portal - Storage

- Subscriber stores AIP on designated, institution-specific account on OLRC
- Copies are replicated to at least 3 of 5 sites in Ontario: Toronto, Queens, Ottawa, York & Guelph
- Based on open source OpenStack Swift platform
- Self-healing through checksums
- Uses ORION high speed network
- Data centres housed in secure centres at universities; uses SSL encryption
- Next up: better management layer for AIPs in OLRC through project Canopus

McMaster - Storage

I do what they do.

DIP & Access

UK NPLD Legal Deposit - DIP and Access

- Preservation and access files the same for eBooks (EPUB), eJournals (PDF), and notated music (PDF)
  - Calibre viewer used for EPUBs and Sumatra PDF for PDFs
- Access to preserved websites provided via UK Web Archive
- Access to geospatial datasets provided via theMapCloud platform
- Ex Libris Primo used for Discovery at BL
- Records harvested by other LDLs via OAI-PMH
  - Records added to catalogues at each LDL to enable search, discovery, and access

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UK NPLD Legal Deposit - DIP and Access

- Single concurrent access per item per Library
- Users can only access content on library terminals
- No digital copies can be removed from the reading room
- Printing allowed in accordance with Copyright Regulations
- No digital sharing or screen shots
- No interlibrary loan unless it is between one legal deposit library and another
- Cannot text data mine

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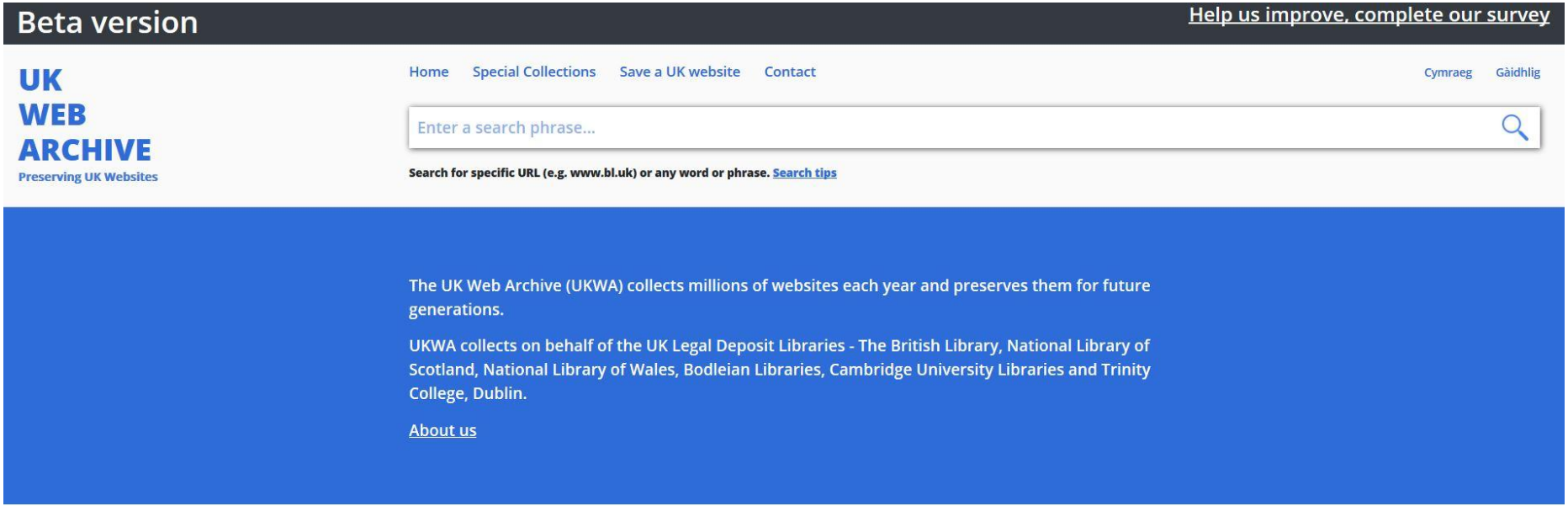
Beta version
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UK
WEB
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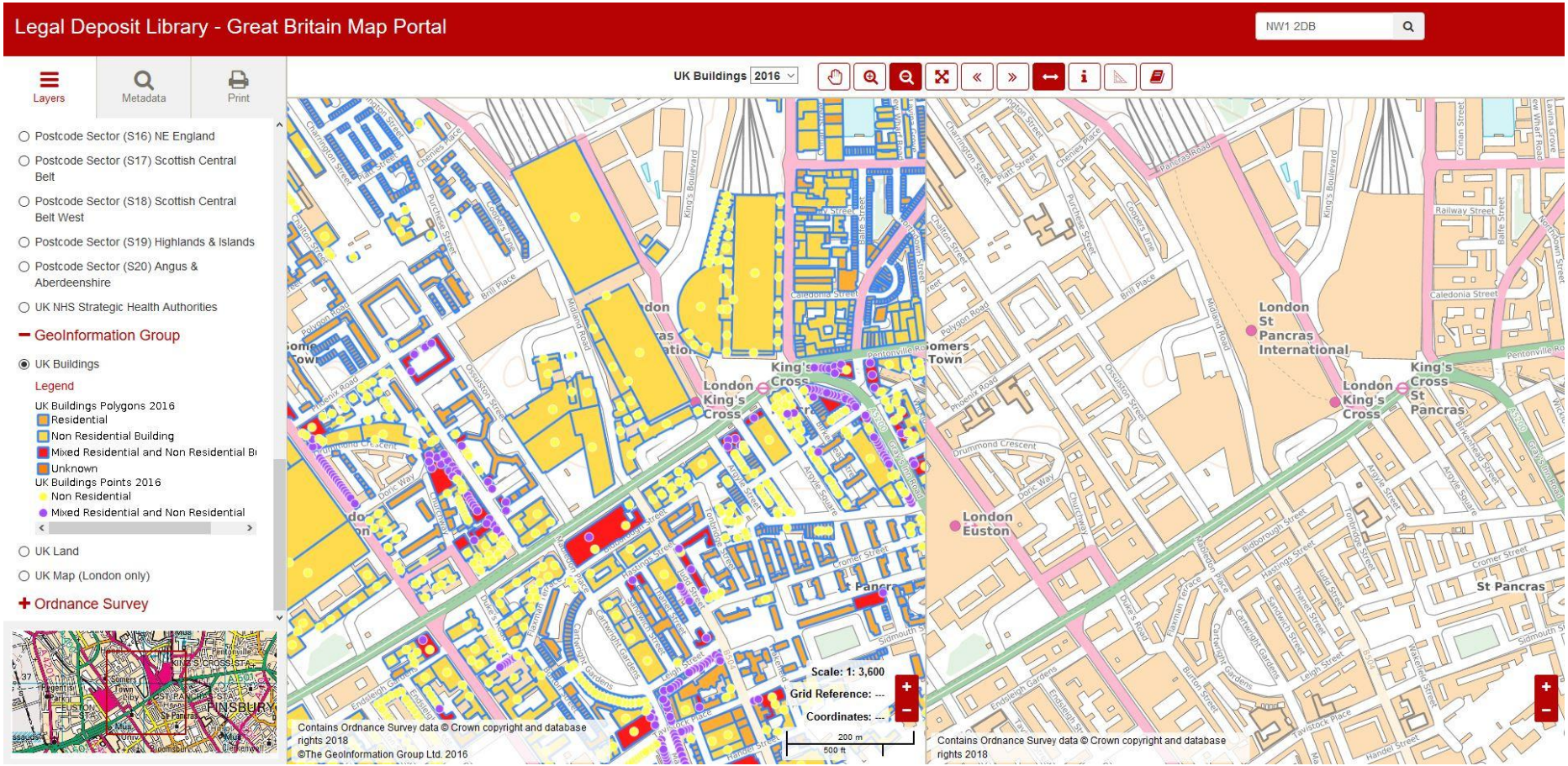
Enter a search phrase...
Search for specific URL (e.g. www.bl.uk) or any word or phrase. Search tips
The UK Web Archive (UKWA) collects millions of websites each year and preserves them for future generations.
UKWA collects on behalf of the UK Legal Deposit Libraries - The British Library, National Library of Scotland, National Library of Wales, Bodleian Libraries, Cambridge University Libraries and Trinity College, Dublin.
About us
Highlights from the Special Collections
Special Collections are groups of websites brought together on a particular theme by librarians, curators and other specialists, often working in collaboration with key organisations in the field.
View all special collections


Legal Deposit Library - Great Britain Map Portal
NW1 2DB
Layers
Metadata
Print
UK Buildings 2016
Postcode Sector (S16) NE England
Postcode Sector (S17) Scottish Central Belt
Postcode Sector (S18) Scottish Central Belt West
Postcode Sector (S19) Highlands & Islands
Postcode Sector (S20) Angus & Aberdeenshire
UK NHS Strategic Health Authorities
GeoInformation Group
UK Buildings
Legend
UK Buildings Polygons 2016
Residential
Non Residential Building
Mixed Residential and Non Residential Bu
Unknown
UK Buildings Points 2016
Non Residential
Mixed Residential and Non Residential
UK Land
UK Map (London only)
Ordnance Survey
King's Cross
London King's Cross
London St Pancras International
London Euston
St Pancras
Scale: 1: 3,600
Grid Reference: ---
Coordinates: ---
200 m
500 ft
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University of Alberta - DIP & Access

Open access DIP (free of rights concerns, including privacy, restrictions, copyright):

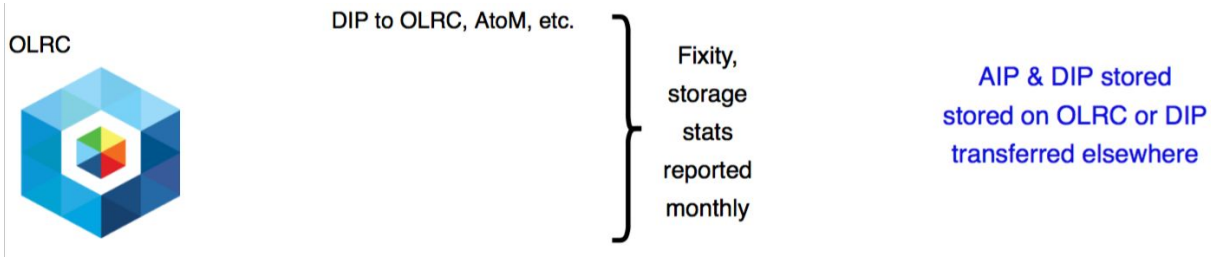
- Metadata available on Archives database (AtoM)
- DIP stored on a library server & made available through Archives database
- Routine Disclosure for university records

Restricted DIP (subject to rights concerns):

- Metadata available on Archives database (AtoM), unless otherwise restricted
- Users request access from Archivist. If granted, DIP created on demand
- Secure, timed link provided by Archivist to user

Scholars Portal - DIP & Access

- Optional to create DIP and store on OLRC
- Not currently linking to/hosting access platforms because use cases vary so much between members
  - But most are using locally-hosted AtoM instances for archival materials
  - Testing automatic AtoM DIP upload from hosted Archivematica to local AtoM
- Other in-progress workflows actually start with a DIP and work backwards to create an AIP
  - Islandora
  - Dataverse



McMaster - DIP & Access

Open DIP:

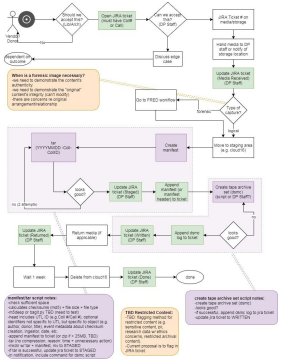
- Metadata available in online finding aid or AtoM
- DIP stored on a library server & made available through Islandora, AtoM, or (possibly) ePADD

Restricted DIP:

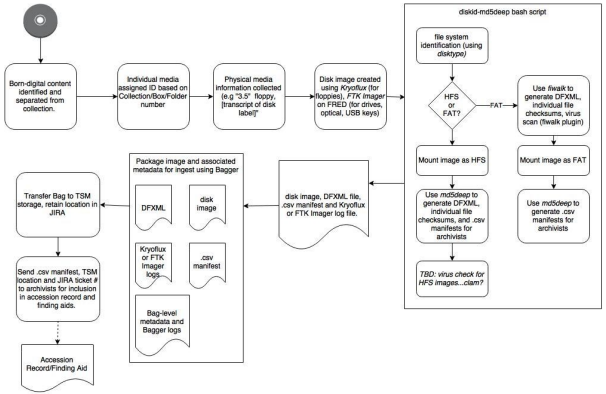
- Metadata available in online finding aid or AtoM (as appropriate)
- DIP stored on library server, accessible through separate Islandora instance on a terminal in the reading room with no internet access

Workflow Diagrams

University of Toronto - Intake Workflow Links

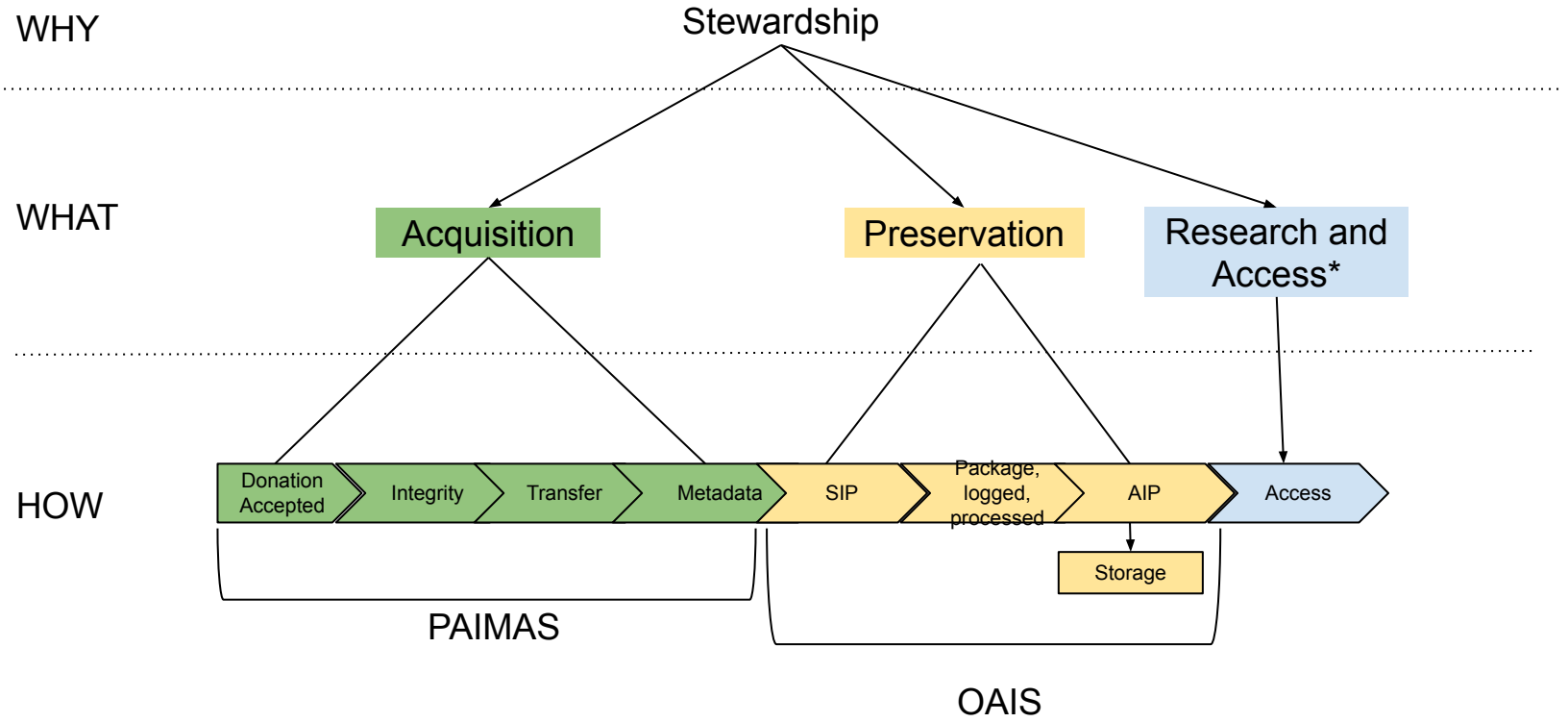


http://uoft.me/gen-workflow

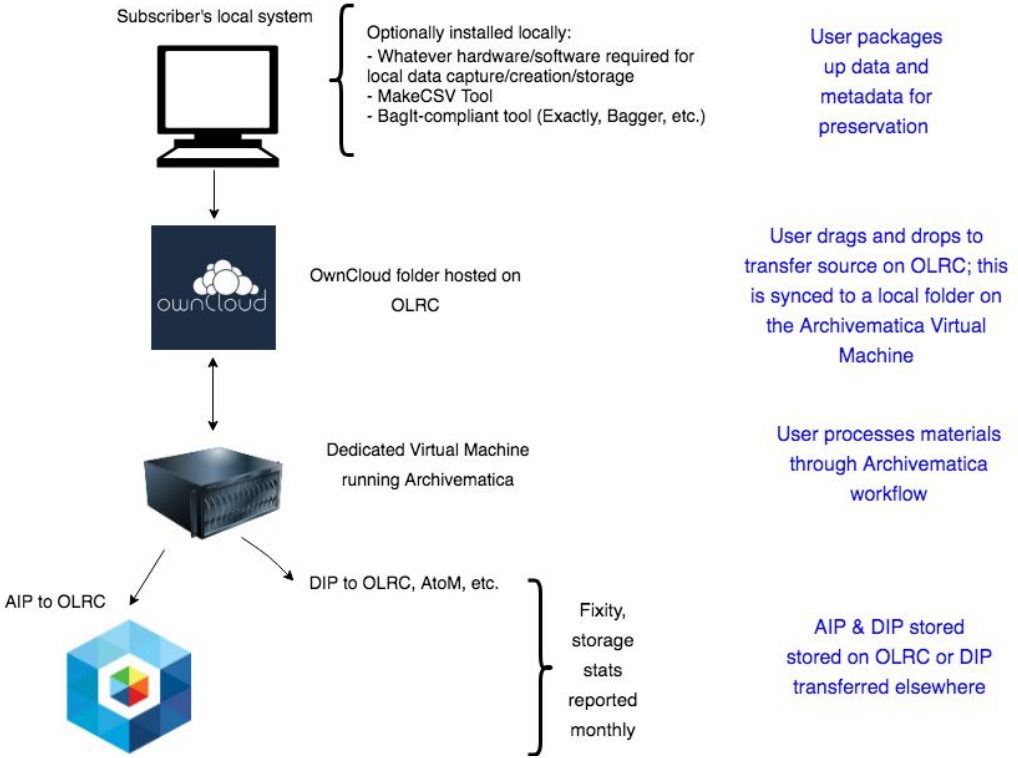


http://uoft.me/media-workflow

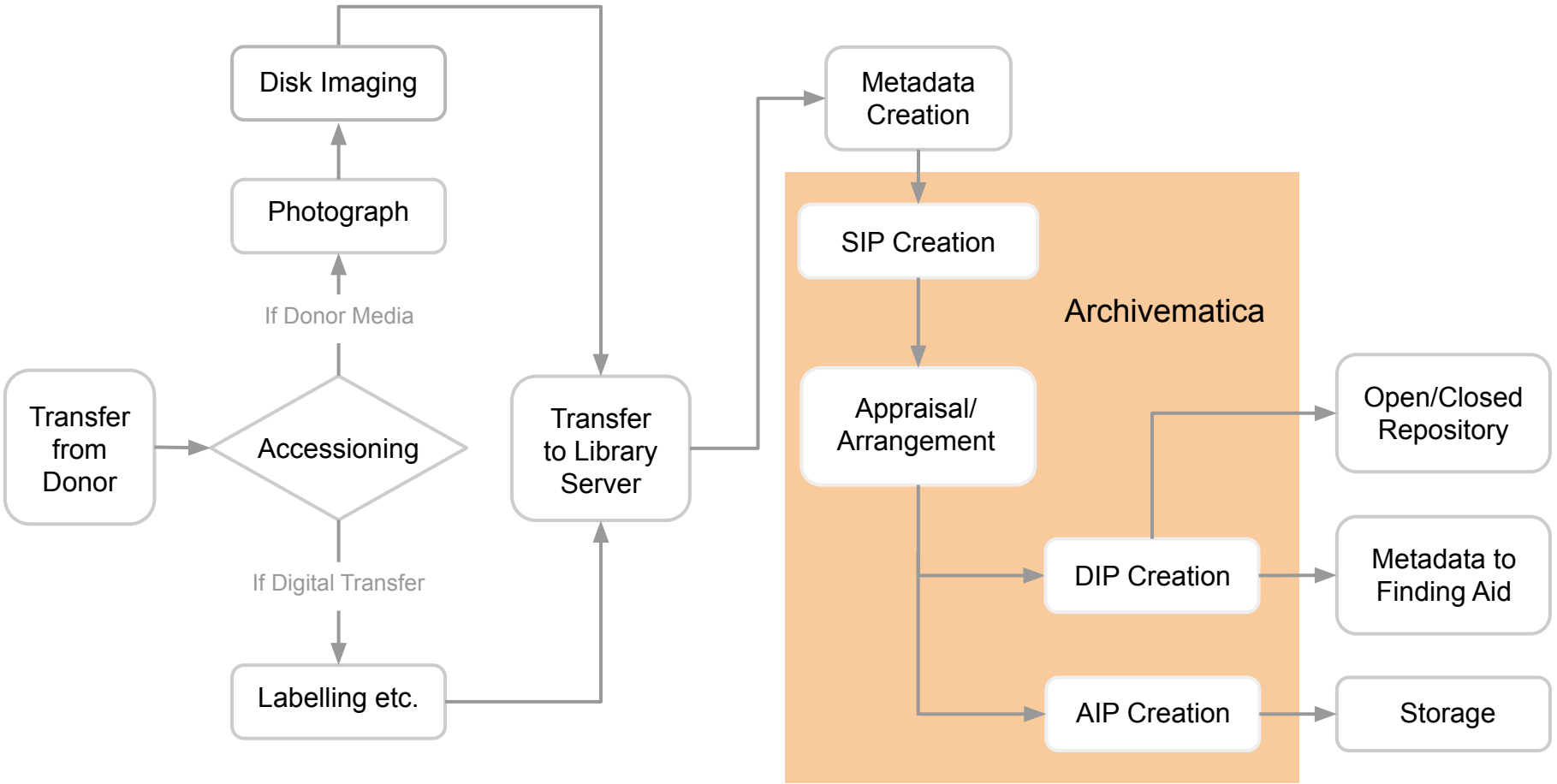
University of Alberta - Workflow



Permafrost - Workflow



McMaster - Workflow



Thank you for joining us!

Questions?

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