Update at CNI, April 14, 2015

Chip German, APTrust
Andrew Diamond, APTrust
Nathan Tallman, University of Cincinnati
Linda Newman, University of Cincinnati
Jamie Little, University of Miami

APTrust Web Site: aptrust.org
Sustaining Members:

Columbia University
Indiana University
Johns Hopkins University
North Carolina State University
Penn State
Syracuse University
University of Chicago
University of Cincinnati
University of Connecticut
University of Maryland
University of Miami
University of Michigan
University of North Carolina
University of Notre Dame
University of Virginia
Virginia Tech
Quick description of APTrust: The Academic Preservation Trust (APTrust) is a consortium of higher education institutions committed to providing both a preservation repository for digital content and collaboratively developed services related to that content. The APTrust repository accepts digital materials in all formats from member institutions, and provides redundant storage in the cloud. It is managed and operated by the University of Virginia and is both a deposit location and a replicating node for the Digital Preservation Network (DPN).

39 of the registrants for CNI in Seattle are from APTrust sustaining-member institutions
APTrust

How it works

Andrew Diamond
Senior Preservation & Systems Engineer
Behind the Scenes, Step by Step
Your Files → S3 Receiving (VA)
What You See, Step by Step
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<th>Action</th>
<th>Stage</th>
<th>Status</th>
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Effect of Computer Animation Instruction on Spatial Visualization Performance

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Bag Name: ncsu.1840.16-1028
Last Modified: 2015-04-02T12:58:25.273Z

Aggregate Data About Preserved Files
- Files Preserved: 4
- Total File Size: 344 KB
  - text/plain: 1
  - application/xml: 2
  - application/pdf: 1
List of Files

Files for Effect of Computer Animation Instruction on Spatial Visualization Performance

Object Identifier: test.edu/ncsu.1840.16-1028

1 - 4 of 4

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   - Mime Type: application/xml
   - File size: 128 Bytes

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   - Institution: Test University
   - Mime Type: application/pdf
   - File size: 339 KB

3. test.edu/ncsu.1840.16-1028/data/object.properties
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   - Mime Type: application/octet-stream
   - File size: 828 Bytes
File Detail

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test.edu/ncsu.1840.16-1028/data/ORIGINAL/1-metadata.xml

Institution: Test University (test)

Intellectual Object: Effect of Computer Animation Instruction on Spatial Visualization Performance (consortia)

Identifier: test.edu/ncsu.1840.16-1028/data/ORIGINAL/1-metadata.xml

URL to File: https://s3.amazonaws.com/aptrust.test.preservation/059db6bd-1645-46d6-7df7-32ea8d1f70bc

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Filesize: 128 Bytes

Created: 2014-04-25T13:51:10-04:00 (11 months)

Modified: 2014-04-25T13:51:10-04:00 (11 months)

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- sha256: 60eca5faef45a627d0c1e916026ed6cf91ffe911b5f9b136a3dcc7d99e291519 generated about 7 hours ago

View Events | Delete
Events

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   Event Type: ingest
   DateTime: 2015-01-27T16:21:55.9866658362Z
   Detail: Ingested to replication storage and assigned replication URL identifier
   Outcome: Success
   Outcome Details: https://s3.amazonaws.com/aptrust.test.preservation.oregon/c1ee56f2-4897-4a1a-601a-eeff204b94d0
   Object: Go uuid library + goarmz GS library
   Agent: http://github.com/nu7hatch/gouuid

2. test.edu/ncsu.1840.16-1013/data/ORIGINAL/1
   Event Identifier: be7181ef-4560-42c1-447d-55c4e3fbd7d9
   Event Type: fixity_generation
   Detail: Calculated new fixity value
   Outcome: Success
   Outcome Details: sha256:5cbf7f3fd8461ff0319249821ad5fd0b378303302611c5264d18b88a3250e18a
   Object: Go language crypto/sha256
   Agent: http://golang.org/pkg/crypto/sha256/
3. test.edu/ncsu.1840.16-1013/data/ORIGINAL/1

Event Identifier: 115105f7-94de-4441-4528-6b5d3e8da2ef
Event Type: identifier_assignment
Detail: Assigned new institution.bag/path identifier
Outcome: Success
Outcome Details: test.edu/ncsu.1840.16-1013/data/ORIGINAL/1
Object: APTrust bag processor
Agent: https://github.com/APTrust/bagman

4. test.edu/ncsu.1840.16-1013/data/ORIGINAL/1

Event Identifier: 4d863ca9-8100-4da5-6d21-cd3cedc887ae
Event Type: identifier_assignment
Detail: Assigned new storage URL identifier
Outcome: Success
Outcome Details: https://s3.amazonaws.com/aptrust.test.preservation/c1ee56f2-4897-4a1a-601a-eeff204b94d0
Object: Go uuid library + goamz S3 library
Agent: http://github.com/nu7hatch/gouuid
Multicasting in a Partially Tunable Broadcast WDM Network

Your item has been queued for restoration.
# Pending Tasks: Restore & Delete

<table>
<thead>
<tr>
<th>Name</th>
<th>Etag</th>
<th>Institution</th>
<th>Processed</th>
<th>Action</th>
<th>Stage</th>
<th>Status</th>
<th>Reviewed?</th>
</tr>
</thead>
<tbody>
<tr>
<td>ncsu.1840.16-1013.tar</td>
<td>1f0c214d33c30dba20c98ee852991600</td>
<td>test.edu</td>
<td>1 minute</td>
<td>Restore</td>
<td>Requested</td>
<td>Pending</td>
<td>False</td>
</tr>
<tr>
<td>virginia.edu.uva-lib_2278801.tar</td>
<td>da04d76f9dca11455297827426db35f2</td>
<td>test.edu</td>
<td>2 minutes</td>
<td>Delete</td>
<td>Requested</td>
<td>Pending</td>
<td>False</td>
</tr>
<tr>
<td>virginia.edu.uva-lib_2278801.tar</td>
<td>da04d76f9dca11455297827426db35f2</td>
<td>test.edu</td>
<td>2 minutes</td>
<td>Delete</td>
<td>Requested</td>
<td>Pending</td>
<td>False</td>
</tr>
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<td>virginia.edu.uva-lib_2278801.tar</td>
<td>da04d76f9dca11455297827426db35f2</td>
<td>test.edu</td>
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<td>Pending</td>
<td>False</td>
</tr>
<tr>
<td>virginia.edu.uva-lib_2278801.tar</td>
<td>da04d76f9dca11455297827426db35f2</td>
<td>test.edu</td>
<td>2 minutes</td>
<td>Delete</td>
<td>Requested</td>
<td>Pending</td>
<td>False</td>
</tr>
<tr>
<td>virginia.edu.uva-lib_2278801.tar</td>
<td>da04d76f9dca11455297827426db35f2</td>
<td>test.edu</td>
<td>4 minutes</td>
<td>Ingest</td>
<td>Record</td>
<td>Success</td>
<td>False</td>
</tr>
<tr>
<td>ncsu.1840.16-1013.tar</td>
<td>1f0c214d33c30dba20c98ee852991600</td>
<td>test.edu</td>
<td>4 minutes</td>
<td>Ingest</td>
<td>Record</td>
<td>Success</td>
<td>False</td>
</tr>
</tbody>
</table>
### Completed Tasks: Restore & Delete

<table>
<thead>
<tr>
<th>Name</th>
<th>Etag</th>
<th>Institution</th>
<th>Processed</th>
<th>Action</th>
<th>Stage</th>
<th>Status</th>
<th>Reviewed?</th>
</tr>
</thead>
<tbody>
<tr>
<td>ncsu.1840.16-1013.tar</td>
<td>1f0c214d33c30dba20c98ee852991600</td>
<td>test.edu</td>
<td>3 minutes</td>
<td>Restore</td>
<td>Resolve</td>
<td>Success</td>
<td>False</td>
</tr>
<tr>
<td>virginia.edu.uvalib_2278801.tar</td>
<td>da04d76f9dca11455297827426db35f2</td>
<td>test.edu</td>
<td>4 minutes</td>
<td>Delete</td>
<td>Resolve</td>
<td>Success</td>
<td>False</td>
</tr>
<tr>
<td>virginia.edu.uvalib_2278801.tar</td>
<td>da04d76f9dca11455297827426db35f2</td>
<td>test.edu</td>
<td>4 minutes</td>
<td>Delete</td>
<td>Resolve</td>
<td>Success</td>
<td>False</td>
</tr>
<tr>
<td>virginia.edu.uvalib_2278801.tar</td>
<td>da04d76f9dca11455297827426db35f2</td>
<td>test.edu</td>
<td>4 minutes</td>
<td>Delete</td>
<td>Resolve</td>
<td>Success</td>
<td>False</td>
</tr>
<tr>
<td>virginia.edu.uvalib_2278801.tar</td>
<td>da04d76f9dca11455297827426db35f2</td>
<td>test.edu</td>
<td>4 minutes</td>
<td>Delete</td>
<td>Resolve</td>
<td>Success</td>
<td>False</td>
</tr>
<tr>
<td>virginia.edu.uvalib_2278801.tar</td>
<td>da04d76f9dca11455297827426db35f2</td>
<td>test.edu</td>
<td>5 minutes</td>
<td>Ingest</td>
<td>Record</td>
<td>Success</td>
<td>False</td>
</tr>
<tr>
<td>ncsu.1840.16-1013.tar</td>
<td>1f0c214d33c30dba20c98ee852991600</td>
<td>test.edu</td>
<td>6 minutes</td>
<td>Ingest</td>
<td>Record</td>
<td>Success</td>
<td>False</td>
</tr>
</tbody>
</table>
**Detail of Completed Restore**

<table>
<thead>
<tr>
<th>Name</th>
<th>ncsu.1840.16-1013.tar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution</td>
<td>test.edu</td>
</tr>
<tr>
<td>Bucket</td>
<td>aptrust.receiving.test.test.edu</td>
</tr>
<tr>
<td>Etag</td>
<td>1f0c214d33c30dba20c98ee852991600</td>
</tr>
<tr>
<td>Object Identifier</td>
<td>test.edu/ncsu.1840.16-1013</td>
</tr>
<tr>
<td>Bag Date</td>
<td>2015-01-27 15:30:44 UTC</td>
</tr>
<tr>
<td>Date Processed</td>
<td>2015-01-27 16:24:51 UTC</td>
</tr>
<tr>
<td>Action</td>
<td>Restore</td>
</tr>
<tr>
<td>Stage</td>
<td>Resolve</td>
</tr>
<tr>
<td>Status</td>
<td>Success</td>
</tr>
</tbody>
</table>

**Note / Error**

Object restored to https://s3.amazonaws.com/aptrust.test.restore/ncsu.1840.16-1013.tar
<table>
<thead>
<tr>
<th>Name</th>
<th>virginia.edu.uva-lib_2278801.tar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution</td>
<td>test.edu</td>
</tr>
<tr>
<td>Bucket</td>
<td>aptrust.receiving.test.test.edu</td>
</tr>
<tr>
<td>Etag</td>
<td>da04d76f9dca11455297827426db35f2</td>
</tr>
<tr>
<td>Object Identifier</td>
<td>test.edu/virginia.edu.uva-lib_2278801</td>
</tr>
<tr>
<td>Generic File Identifier</td>
<td>test.edu/virginia.edu.uva-lib_2278801/data/datastream-descMetadata</td>
</tr>
<tr>
<td>Bag Date</td>
<td>2015-01-27 15:30:45 UTC</td>
</tr>
<tr>
<td>Date Processed</td>
<td>2015-01-27 16:23:35 UTC</td>
</tr>
<tr>
<td>Action</td>
<td>Delete</td>
</tr>
<tr>
<td>Stage</td>
<td>Resolve</td>
</tr>
<tr>
<td>Status</td>
<td>Success</td>
</tr>
</tbody>
</table>

**Note / Error**: Deleted generic file 'test.edu/virginia.edu.uva-lib_2278801/data/datastream-descMetadata' from 'https://s3.amazonaws.com/aptrust.test.preservation/bdb83294-1d02-4b76-4aad-a207e7c1fe47' at 2015-01-27T11:27:36-05:00 at the request of andrew.diamond@aptrust.org
A Note on Bag Storage & Restoration
Bag Storage

Today's Bag Format

S3    Glacier

Fedora™
Bag Restoration

Tomorrow's Bag Format

S3
Glacier

Fedora™
Where’s my data?
On multiple disks in Northern Virginia.

S3

On hard disk, tape or optical disk in Oregon.

Glacier
S3 = Simple Storage Service
S3 = Simple Storage Service

99.9999999999% Durability (9 nines)
S3 = Simple Storage Service

99.999999999% Durability (9 nines)

Each file stored on multiple devices in multiple data centers
S3 = Simple Storage Service

99.999999999% Durability (9 nines)

Each file stored on multiple devices in multiple data centers

Fixity check on transfer
S3 = Simple Storage Service

99.999999999% Durability (9 nines)

Each file stored on multiple devices in multiple data centers

Fixity check on transfer

Ongoing data integrity checks & self-healing
Glacier

Long-term storage with 99.999999999% durability (11 nines)

Not intended for frequent access

Takes five hours or so to restore a file
Chances of losing an archived object?
Chances of losing an archived object?

1 in 100,000,000,000,000

S3
Chances of losing an archived object?

- S3: 1 in 100,000,000,000,000
- Glacier: 1 in 10,000,000,000,000,000
Chances of losing an archived object?

- S3: 1 in 100,000,000,000
- Glacier: 1 in 10,000,000,000,000
- 1 in 1,000,000,000,000,000,000,000,000 chance of losing both to separate events
Chances of losing an archived object?

- **S3**: 1 in 100,000,000,000
- **Glacier**: 1 in 10,000,000,000,000

Very Slim: 1 in 1,000,000,000,000,000,000,000,000,000,000,000

chance of losing both to separate events
Protecting Against Failure During Ingest
Protecting Against Failure During Ingest

Microservices with state

Resume intelligently after failure
Protecting Against Failure After Ingest
Protecting Against Failure After Ingest

Objects & Files

Metadata & Events
AWS Availability Zones - US East (VA)

1a

1b

1c

1d

S3

S3

S3

S3
What if...
What if ingest services stop?

They restart themselves and pick up where they left off.
What if ingest server dies?

We spin up a new one in a few hours.
What if Fedora service stops?

We restart it manually.
What if Fedora server dies?

We can build a new one from the data on the hot backup in Oregon.
What if we lose all of Glacier in Oregon?

We have all files in S3 in Virginia. Ingest services and Fedora are not affected.
What if we lose the whole Virginia data center?

Fedora

Metadata and Events

Ingest Services

S3

Files and Objects
What if we lose the whole Virginia data center?

Ingest Services

We can rebuild services from code and config files in hours.
What if we lose the whole Virginia data center?

We can restore all files from Glacier in Oregon.
What if we lose the whole Virginia data center?

We can restore all metadata and events from the Fedora backup in Oregon.
Metadata stored with files

<table>
<thead>
<tr>
<th>Name</th>
<th>Storage Class</th>
<th>Size</th>
<th>Last Modified</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001592e-a8c5-4cbe-46f8-a6124..</td>
<td>Standard</td>
<td>2.9 KB</td>
<td>Fri Feb 20 16:45:54</td>
</tr>
<tr>
<td>0001d2f3-9c73-4b87-7c3a-0a6824..</td>
<td>Standard</td>
<td>249 KB</td>
<td>Fri Feb 20 00:00:03</td>
</tr>
<tr>
<td>0004f16a-03a5-4238-4bdf-28d3c8..</td>
<td>Standard</td>
<td>3 KB</td>
<td>Thu Feb 26 05:59:46</td>
</tr>
<tr>
<td>000286cc-9017-497b-67bf-dce34e..</td>
<td>Standard</td>
<td>187.3 KB</td>
<td>Fri Feb 25 06:41:33</td>
</tr>
<tr>
<td>0003ee14-cca0-46fb-756f-04686f..</td>
<td>Standard</td>
<td>16.9 MB</td>
<td>Sat Feb 21 17:33:30</td>
</tr>
<tr>
<td>000449be-8eac-7c0b-d9637..</td>
<td>Standard</td>
<td>3.4 KB</td>
<td>Thu Feb 25 22:59:06</td>
</tr>
<tr>
<td>00049f9a-f0ce-6a04-c483-724d2..</td>
<td>Standard</td>
<td>2.8 KB</td>
<td>Sat Feb 21 08:20:20</td>
</tr>
<tr>
<td>00053c26-586c-4a52-44b4-dae3d..</td>
<td>Standard</td>
<td>2.8 KB</td>
<td>Sat Feb 21 17:11:51</td>
</tr>
<tr>
<td>00053343-e649-4b26-60a4-60033..</td>
<td>Standard</td>
<td>548 bytes</td>
<td>Fri Feb 25 14:56:00</td>
</tr>
<tr>
<td>00055030-53eb-4292-56ac-f1437c..</td>
<td>Standard</td>
<td>3.6 KB</td>
<td>Sat Feb 21 11:47:48</td>
</tr>
<tr>
<td>0005b5ca-a810-485e-52c2-5528e38..</td>
<td>Standard</td>
<td>3.8 KB</td>
<td>Wed Feb 25 10:16:31</td>
</tr>
<tr>
<td>00064b4f-0bb2-49da-630e-e6657..</td>
<td>Standard</td>
<td>8.8 MB</td>
<td>Wed Feb 25 10:09:09</td>
</tr>
<tr>
<td>0006b23a-f120-4b49-7083-06fcd7..</td>
<td>Standard</td>
<td>15 bytes</td>
<td>Sun Feb 22 13:03:54</td>
</tr>
<tr>
<td>00077126-3e1d-4daf-686f-d9fd41..</td>
<td>Standard</td>
<td>383.7 KB</td>
<td>Tue Feb 24 15:12:04</td>
</tr>
<tr>
<td>00077136-dff5-44b0-43bb-a3266..</td>
<td>Standard</td>
<td>269 bytes</td>
<td>Tue Feb 24 06:33:57</td>
</tr>
<tr>
<td>0009e08d-9ef9-4db7-697f-6cb2b6..</td>
<td>Standard</td>
<td>3.1 KB</td>
<td>Fri Feb 20 11:47:45</td>
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<tr>
<td>0010ba37-f33f-4b24-6993-468d2..</td>
<td>Standard</td>
<td>17.2 MB</td>
<td>Mon Feb 23 07:27:53</td>
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<tr>
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<td>Standard</td>
<td>3.1 KB</td>
<td>Fri Feb 20 13:33:25</td>
</tr>
<tr>
<td>001254f4-fbca-4c97-75eb-1b81cc..</td>
<td>Standard</td>
<td>282.8 KB</td>
<td>Fri Feb 20 17:45:40</td>
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<tr>
<td>0012dc8f-0f6e-4eef-67c9-2e3728..</td>
<td>Standard</td>
<td>285.8 KB</td>
<td>Fri Feb 20 11:47:45</td>
</tr>
<tr>
<td>00185b32-eb40-4601-7016-d653e..</td>
<td>Standard</td>
<td>231.8 KB</td>
<td>Fri Feb 22 11:18:28</td>
</tr>
<tr>
<td>00185d7f-ff7c-4a04-4a0b-ab327b..</td>
<td>Standard</td>
<td>10.6 MB</td>
<td>Thu Feb 24 23:07:24</td>
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<tr>
<td>001e92ad-2e40-4601-7016-d653e..</td>
<td>Standard</td>
<td>29.3 MB</td>
<td>Thu Feb 22 11:42:12</td>
</tr>
<tr>
<td>00150ed9-1776-413a-5c76-65027..</td>
<td>Standard</td>
<td>3.5 KB</td>
<td>Sat Feb 21 14:26:07</td>
</tr>
<tr>
<td>00150ed9-1776-413a-5c76-65027..</td>
<td>Standard</td>
<td>29.3 MB</td>
<td>Thu Feb 22 11:42:12</td>
</tr>
</tbody>
</table>

Object: 00055ca-a810-485e-52c2-5528e38...

- **Bucket:** aptrust.preservation.storage
- **Name:** 00055ca-a810-485e-52c2-5528e38bc38
- **Link:** https://s3.amazonaws.com/aptrust.preservation.storage/00055ca-a810-485e-52c2-5528e38bc38
- **Size:** 9935 bytes
- **Last Modified:** Wed Feb 25 10:16:31 GMT-05:00
- **Owner:** aws-aptrust
- **ETag:** 7079fba85a4f46315560a11628b2aa29f
- **Expiration Rule:** None

**Metadata**

- **Key:** x-amz-meta-sha256 | **Value:** 5b4e8687ca13393d9c1606e68197
- **Key:** x-amz-meta-institution | **Value:** uc.edu
- **Key:** x-amz-meta-md5 | **Value:** 7079fbba85a4f46315560a11628b2aa29f
- **Key:** x-amz-meta-bagpath | **Value:** data/1431/dublin_core.xml
- **Key:** x-amz-meta-bag | **Value:** cin.702760
- **Key:** Content-Type | **Value:** application/xml

- **Add more metadata**
Attached metadata for last-ditch recovery

<table>
<thead>
<tr>
<th>Key</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>x-amz-meta-sha256</td>
<td>5b4e8687ca13393d9c160e68197</td>
</tr>
<tr>
<td>x-amz-meta-institution</td>
<td>uc.edu</td>
</tr>
<tr>
<td>x-amz-meta-md5</td>
<td>7079fbba85a4f46315560a11628aa29f</td>
</tr>
<tr>
<td>x-amz-meta-bagpath</td>
<td>data/1431/dublin_core.xml</td>
</tr>
<tr>
<td>x-amz-meta-bag</td>
<td>cin.702760</td>
</tr>
<tr>
<td>Content-Type</td>
<td>application/xml</td>
</tr>
</tbody>
</table>
To lose everything...
To lose everything...

A major catastrophic event in Virginia and Oregon, or...
To lose everything...

A major catastrophic event in Virginia and Oregon, or...

Don’t pay the AWS bill
Partner Tools
Partner Tools

Bag Management

Upload
Download
List
Delete
Partner Tools

Bag Management

Upload
Download
List
Delete

...or use open-source AWS libraries for Java, Python, Ruby, etc.
Partner Tools

Bag Management
Partner Tools

Bag Validation

Validate a bag before you upload it.

Get specific details about what to fix.
Partner Tools

Bag Validation

The full APTrust bagit specification is available at https://sites.google.com/a/aptrust.org/aptrust-wiki/technical-documentation/processing-ingest/aptrust-bagit-profile
Partner Tools

Bag Management & Validation

Download from the APTrust wiki

https://sites.google.com/a/aptrust.org/aptrust-wiki/home/partner-tools
Learning to Run

University of Cincinnati Libraries path to contributing content to APTrust
Digital Collection Environment

● 3 digital repositories
  ○ DSpace -- UC Digital Resource Commons
  ○ LUNA -- UC Libraries Image and Media Collections
  ○ Hydra -- Scholar@UC Institutional Repository

● 1 website

● 1 Storage Area Network file system
Workflow Considerations

● Preservation vs. Recovery
  ○ platform-specific bags or platform-agnostic bags?
  ○ derivative files

● Bagging level
  ○ record level or collection level?
UC Libraries Workflow Choices

- Recovery is as important as preservation
  - Include platform specific files and derivatives
- Track platform provenance
  - use bag naming convention or additional fields in bag-info.text
- Track collection membership
  - use bag naming convention or additional fields in bag-info.text
Bagging (crawling)

1st iteration

● Start with DSpace, Cincinnati Subway and Street Improvements collection

● Replication Task Suite to produce Bags
  ○ one bag per record

● Bash scripts to transform to APTrust Bags

● Bash scripts to upload to test repository

● Worked well, but…

Bagging (walking)

2nd iteration

- Same starting place
- Export collection as Simple Archive Format
  - ~ 8,800 records, ~ 375 GB
- Create bags using bagit-python
  - 250 GB is bag-size upper limit
Bagging (walking)

2nd iteration (continued)

- Collection had three series
  - two series under 250 GB
    - each series was put into a single bag
  - one series over 250 GB
    - used a multi-part bag to send to APTrust, APTrust merges split bags into one

- Bash script to upload bags to production repository
Bagging (running)

3rd iteration

- Testing of tools created by Jamie Little of University of Miami

- Jamie can tell you more but...
Long-Term Strategy (marathons)

- Bag for preservation and recovery
- For most content
  - one bag per collection
    - except for Scholar@UC
  - manual curation and bagging
    - except for Scholar@UC
- Use bag-info.txt to capture platform provenance and collection membership
UM Digital Collections Environment

- File system based long-term storage
- CONTENTdm for public access

(CONTENTdm®)
Creating a workflow

- Began at the command line working with LOC’s BagIt Java Library
- Bash scripts
- Our initial testing used technical criteria (size, structural complexity, file types)
What to put in the bag?

- CONTENTdm metadata
- FITS technical metadata
- We maintained our file system structure in the bags
Beginning APTrust Testing

- Began uploading whole collections as bags
- Early attempts at a user interface using Zenity
UM’s APTrust Automation

- Sinatra based server application
- HTML & JavaScript interface
Starting Screen

UM Libraries APTrust Automation

Let's make some bags.

You've got 3727 gigabytes of free storage.
You probably shouldn't download a collection bigger than 931.75 gigabytes.

Next
Choosing a Repository ID

UM Libraries APTrust Automation

Please choose which repository you would like to work with.

The repository component indicates which library repository the file is a part of, and serves as a top-level folder in the archive server directory structure.
Choosing Files

Click 'View Directories' to select what files you would like to send.
Viewing Download Results

The collection was downloaded. You can view the details below.

```
receiving incremental file list
0  0%  0.00kB/s  0:00:00  (xfr#0, to-chk=3/4)
0  0%  0.00kB/s  0:00:00  (xfr#0, to-chk=2/4)
0  0%  0.00kB/s  0:00:00  (xfr#0, to-chk=1/4)
0  0%  0.00kB/s  0:00:00  (xfr#0, to-chk=0/4)
```
Click OK to upload the bag to APTrust's receiving bucket.
Bagging Strategies

Moved from bag per collection strategy to bag per file

Changed interface to allow selection of individual files
APTrust Benefits for Developers

- Wide range of open source tools available
- Uploading to APTrust is no different than uploading to S3
Where to find us

github.com/UMiamiLibraries

http://merrick.library.miami.edu/
Why are we doing this again?

- Libraries’ and Archives’ historic commitment to long-term preservation is the raison d'être, a core justification, for our support of repositories. It’s why our stakeholders trust us and will place their content in our repositories.

- We expect APTrust to be our long-term preservation repository to meet our responsibilities to our stakeholders.
Why are we doing this again?

- We know from some experience, and reports from our peers, that backup procedures, while still essential, are fraught with holes.

- We expect APTrust to be our failover if any near-term restore from backup proves incomplete.
<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Email</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

UC Libraries, Digital Collections and Repositories

[http://digital.libraries.uc.edu](http://digital.libraries.uc.edu)
[https://github.com/uclibs](https://github.com/uclibs)
[https://scholar.uc.edu](https://scholar.uc.edu)