

# GETTING BITS OFF DISKS

---

## Using Open Source Tools to Prepare Born-Digital Materials for Long-Term Preservation and Access

To connect to the audio portion of the conference,  
dial **1-605-475-6150**, then enter conference code **5915426#** at the prompt.  
Please **mute** your phone.



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative

COUNCIL OF STATE ARCHIVISTS

# ACKNOWLEDGEMENTS

---

- This project made possible by a grant from the U.S. Institute of Museum and Library Services



# GETTING BITS OFF DISKS

---

## Using Open Source Tools to Prepare Born-Digital Materials for Long-Term Preservation and Access

Sam Meister  
Digital Archivist and Assistant Professor  
University of Montana



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative  
COUNCIL OF STATE ARCHIVISTS

# INSTITUTIONAL CONTEXT

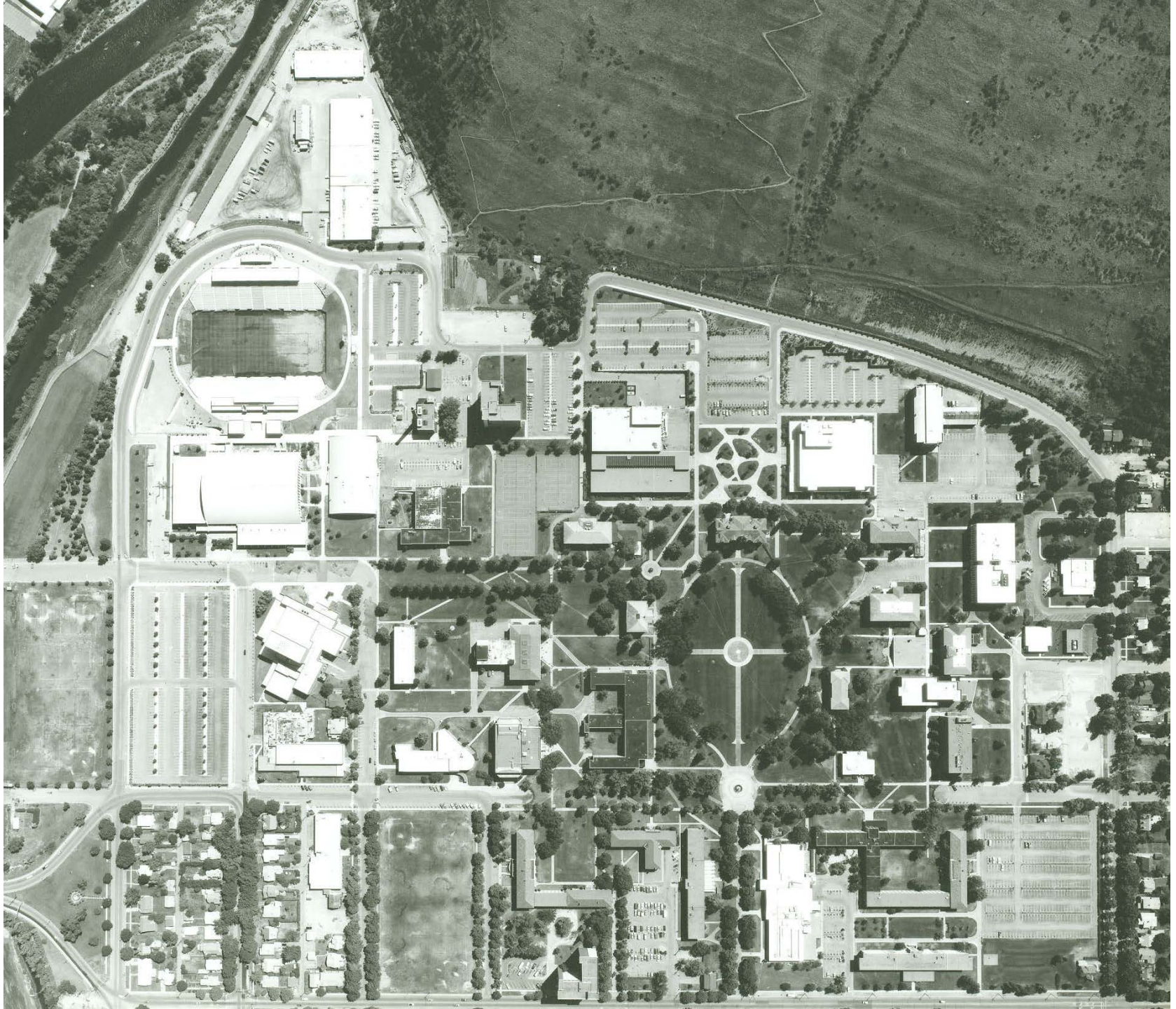


INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative  
COUNCIL OF STATE ARCHIVISTS









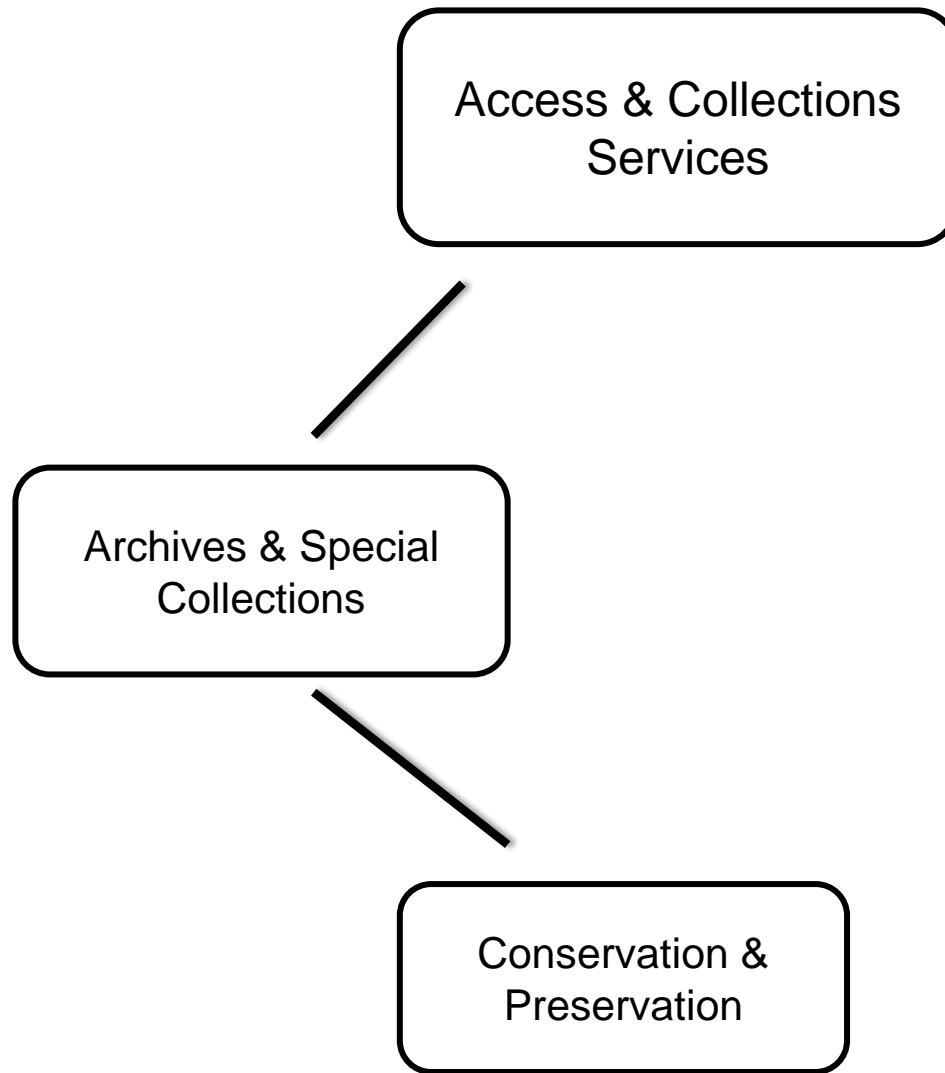
**Maureen and Mike  
Mansfield Library**  
Dedicated 1975

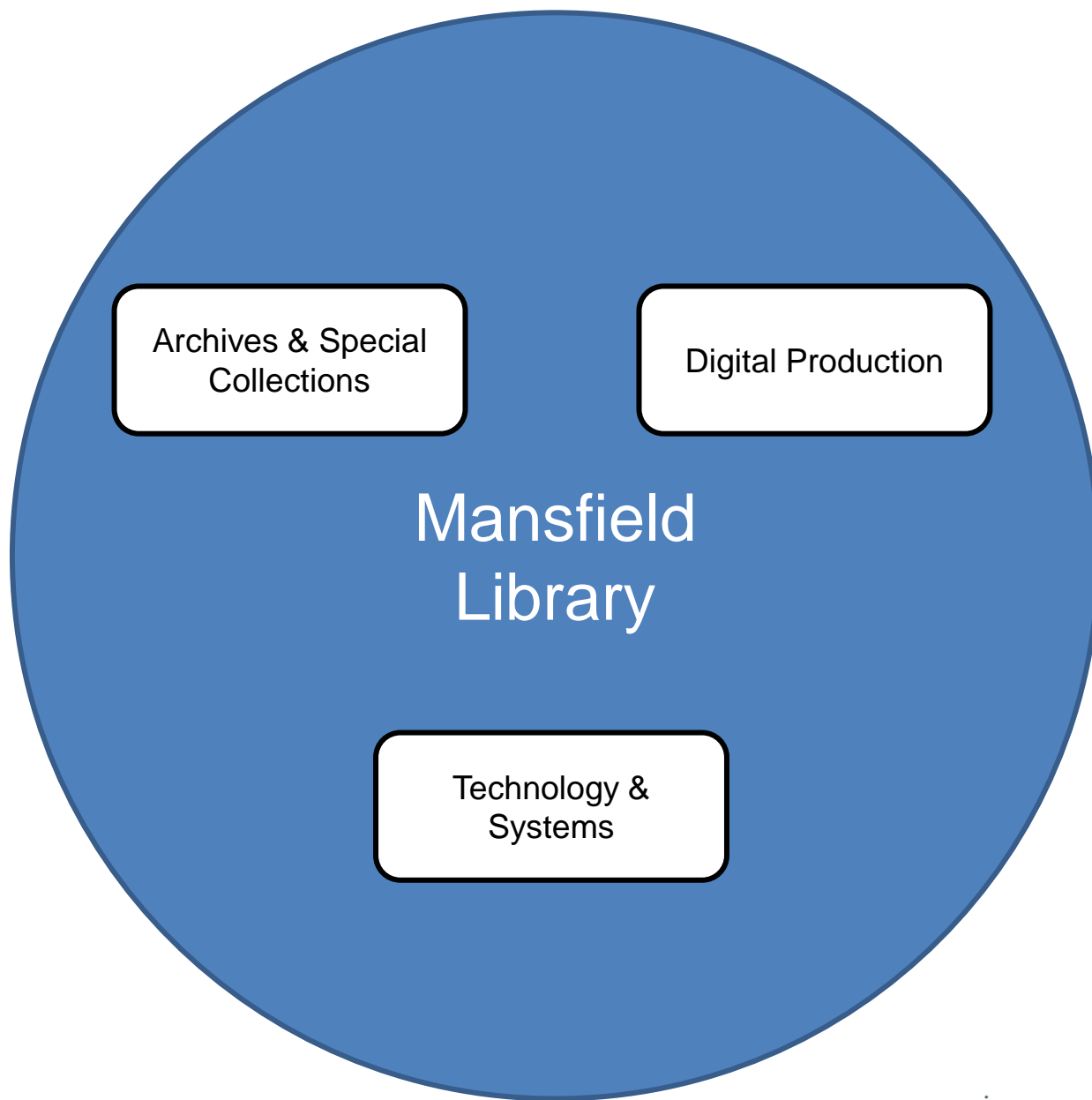
Library Services  
Maureen and Mike  
Mansfield Center  
Public Programs  
Special Collections  
Community Outreach  
Mansfield Foundation



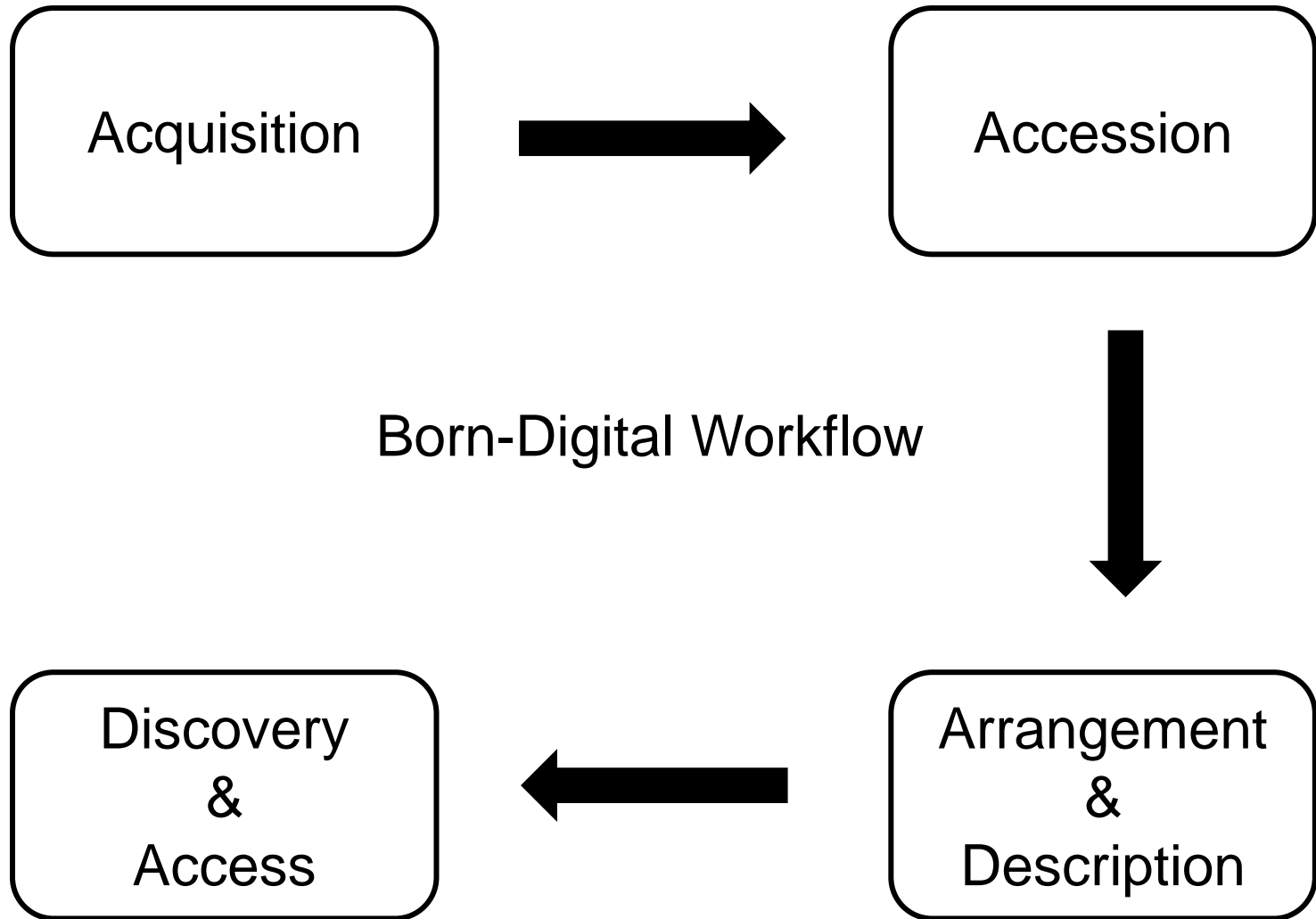


ARCHIVES









INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative

COUNCIL OF STATE ARCHIVISTS

Acquisition



Accession



Arrangement  
&  
Description



Discovery  
&  
Access

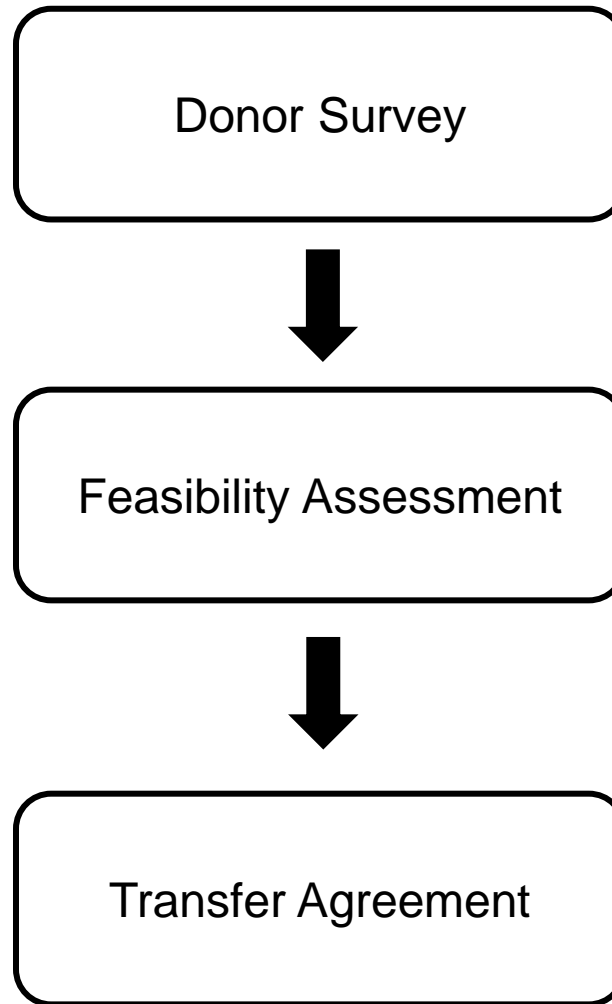


INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative

# Acquisition Process





# Donor Survey

Creation

Context

Organization

Privacy & Security

Storage

Technical

Transfer Options



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative  
COUNCIL OF STATE ARCHIVISTS

# Current

**Donor Survey**  
**Sam Meister**  
**08/16/12**

---

**Date: 09/07/12**  
**Donor Name: Joe Crabtree – Art & Architecture Studio**  
**Location: Donor's Residence – Missoula, MT**  
**Accession #: 2012-061**

## **Creation**

Are you the only creator of your digital files? (e.g. does your collection contain email, documents, or other materials produced by others?)

Crabtree ~~Leigland~~ Arch. / Art & Architecture Studio / Crabtree Architecture

If not, who else is involved and what are their roles?

What are the earliest dates of file creation?

1996

What are the latest dates of file creation?

2011



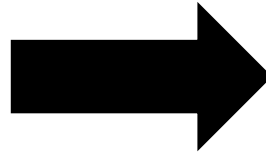
INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative  
COUNCIL OF STATE ARCHIVISTS

# Future

Drupal  
Web Form



XML / CSV

# Feasibility Assessment

Do we have resources to feasibly acquire, preserve, and provide access to the digital materials?



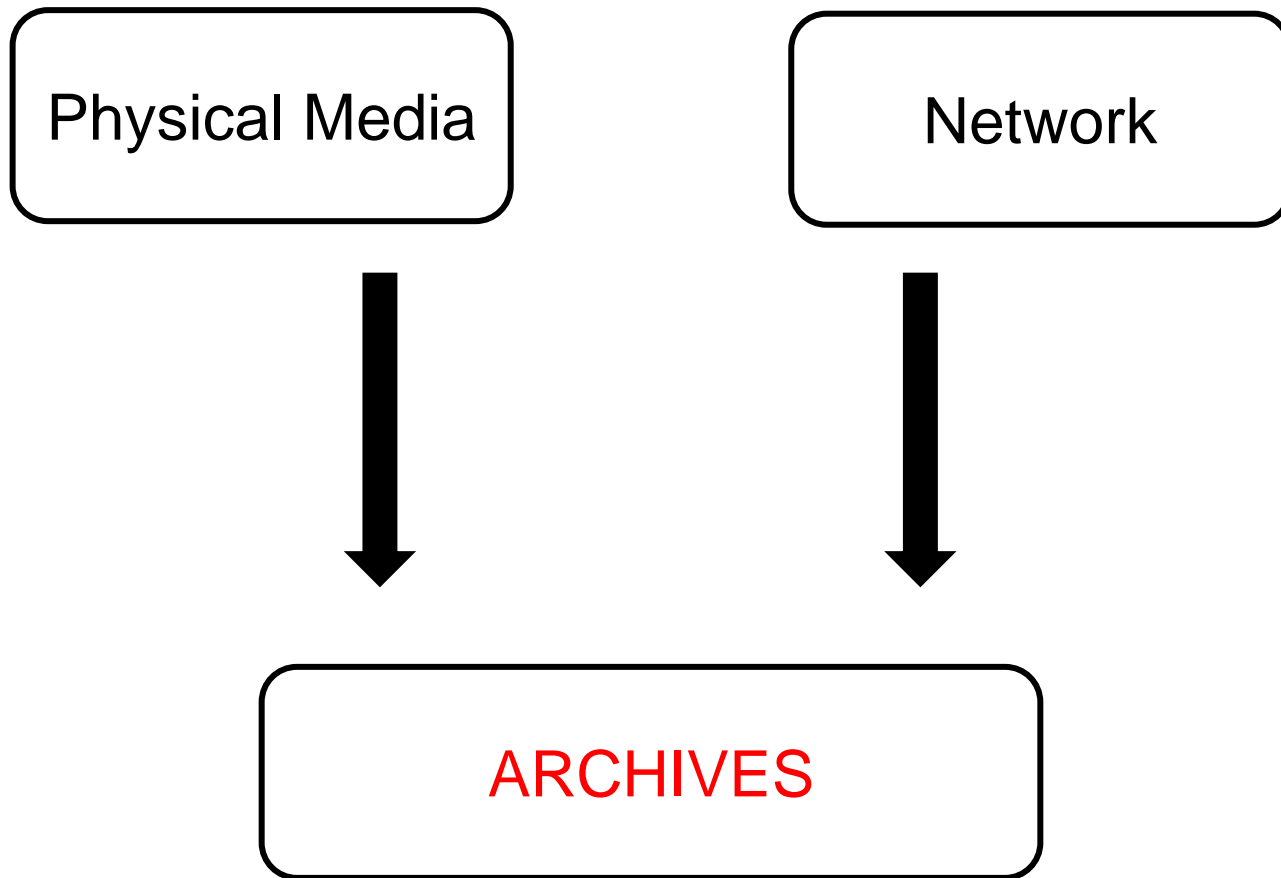
INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative

COUNCIL OF STATE ARCHIVISTS

# Transfer



# Current

## Digital Materials Transfer

Date of Transfer:	2012-11-08
Transferred from:	Joe Crabtree
Transferred to:	Archives and Special Collections
Transferred by:	Sam Meister
Accession number:	2013-030

### Information

#### **Content**

The digital materials include the following types of content:

Vector drawing files (AutoCAD)

3.5 inch floppy disks

CD Roms

#### **Technical**

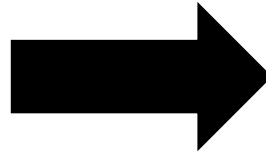
The technical environment used in the creation and management of digital materials includes:

*Describe details of technical infrastructure including hardware, software, operating systems, etc*

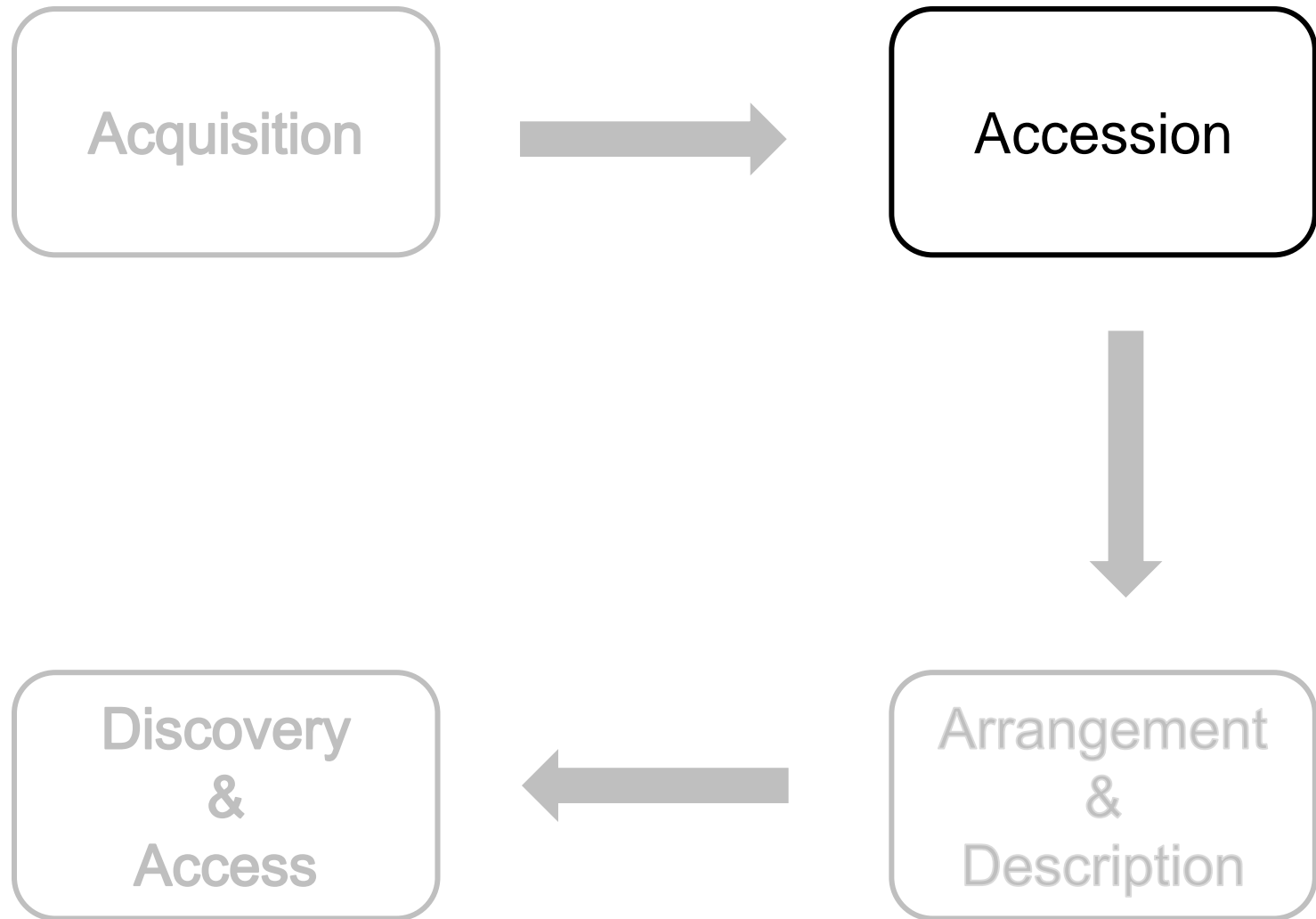
Windows XP Desktop computer

# Future

Drupal  
Web Form

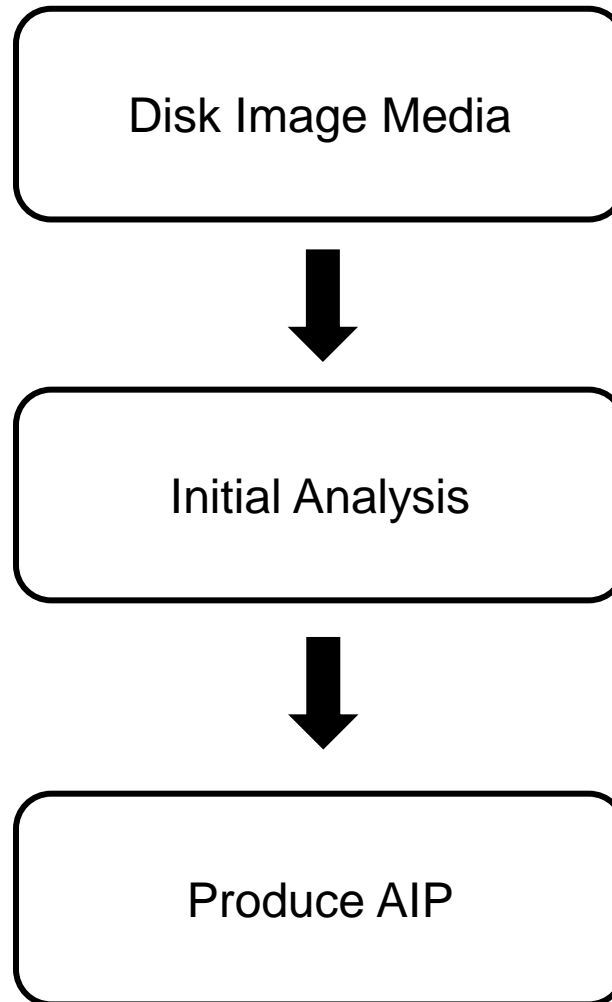


XML / CSV





# Accession Process



# Data Transfer

## Hardware

3.5 Floppy Drive  
5.25. Floppy Drive  
Zip Drive  
CD / DVD Drive  
USB Write-Blocker  
SATA / IDE Write-Blocker

## Software

FTK Imager  
Guymager  
FC5205



# Disk Imaging

“A single file or storage device containing the complete contents and structure representing a data storage medium or device, such as a hard drive, tape drive, floppy disk, CD/DVD/BD, or USB flash drive”



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative

COUNCIL OF STATE ARCHIVISTS

# Disk Imaging

## Born Digital Workstation 1.0



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative  
COUNCIL OF STATE ARCHIVISTS

# Disk Imaging

## Born Digital Workstation 2.0



INSTITUTE of  
Museum and Library  
SERVICES

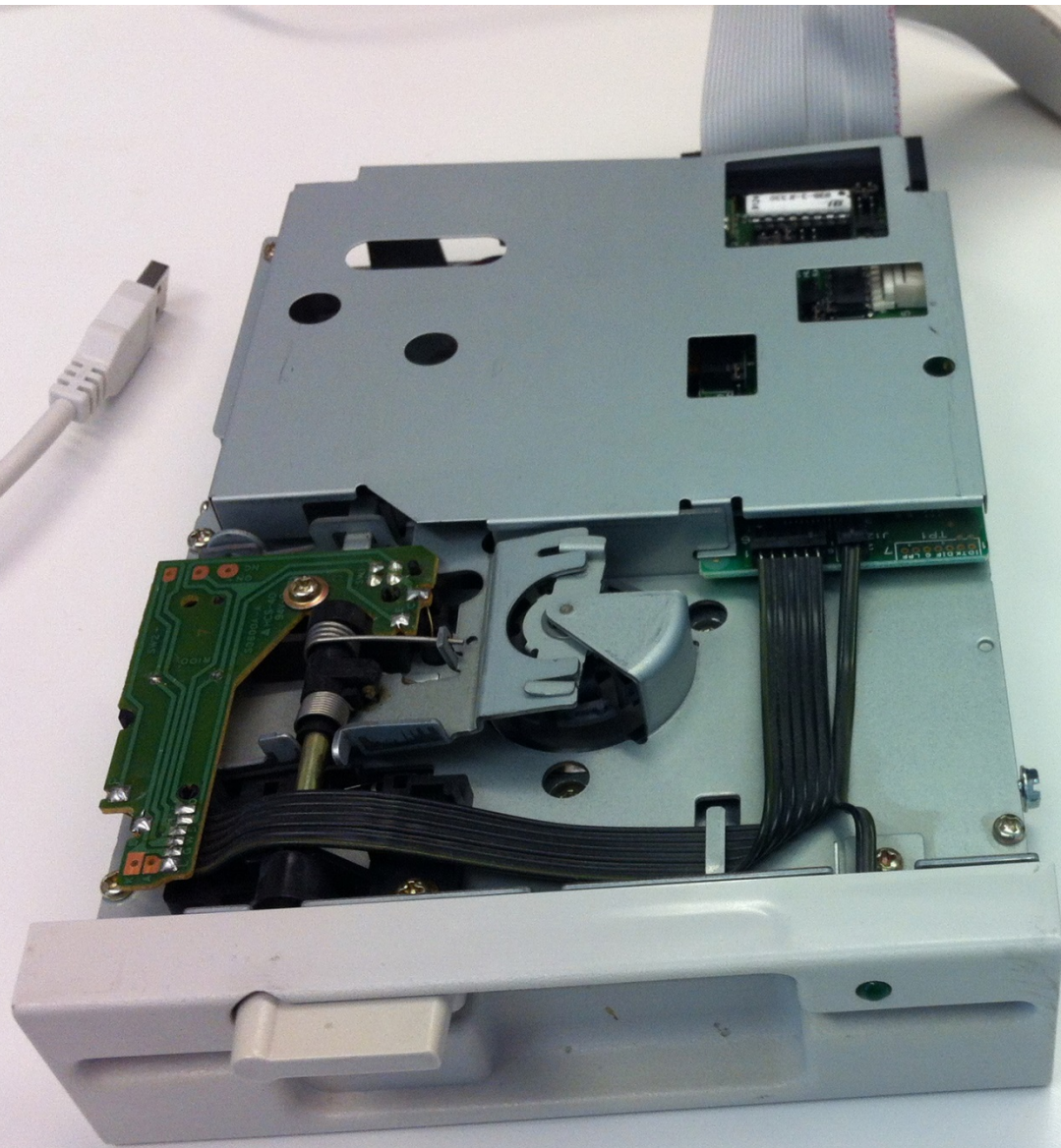


**SERI**  
State Electronic  
Records Initiative  
COUNCIL OF STATE ARCHIVISTS





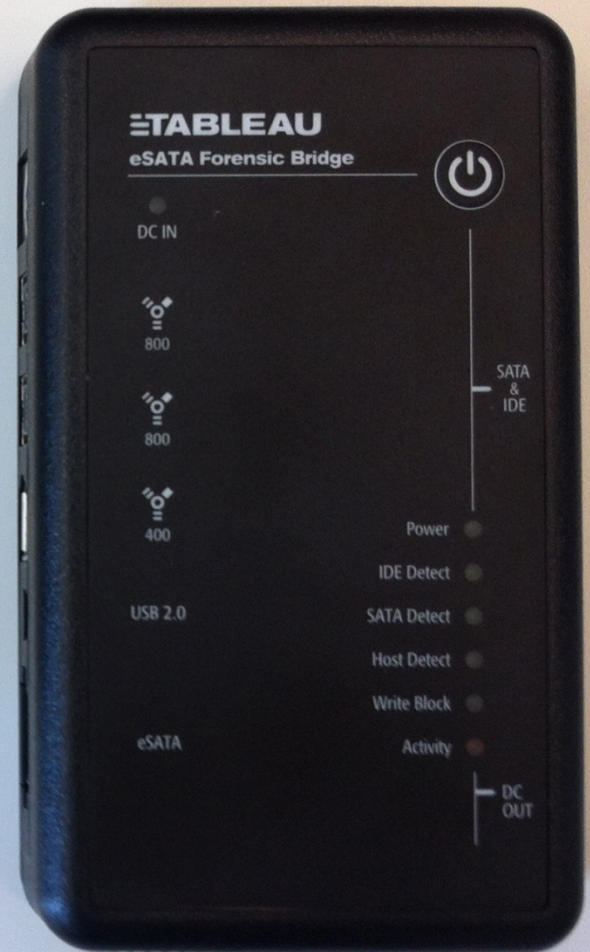




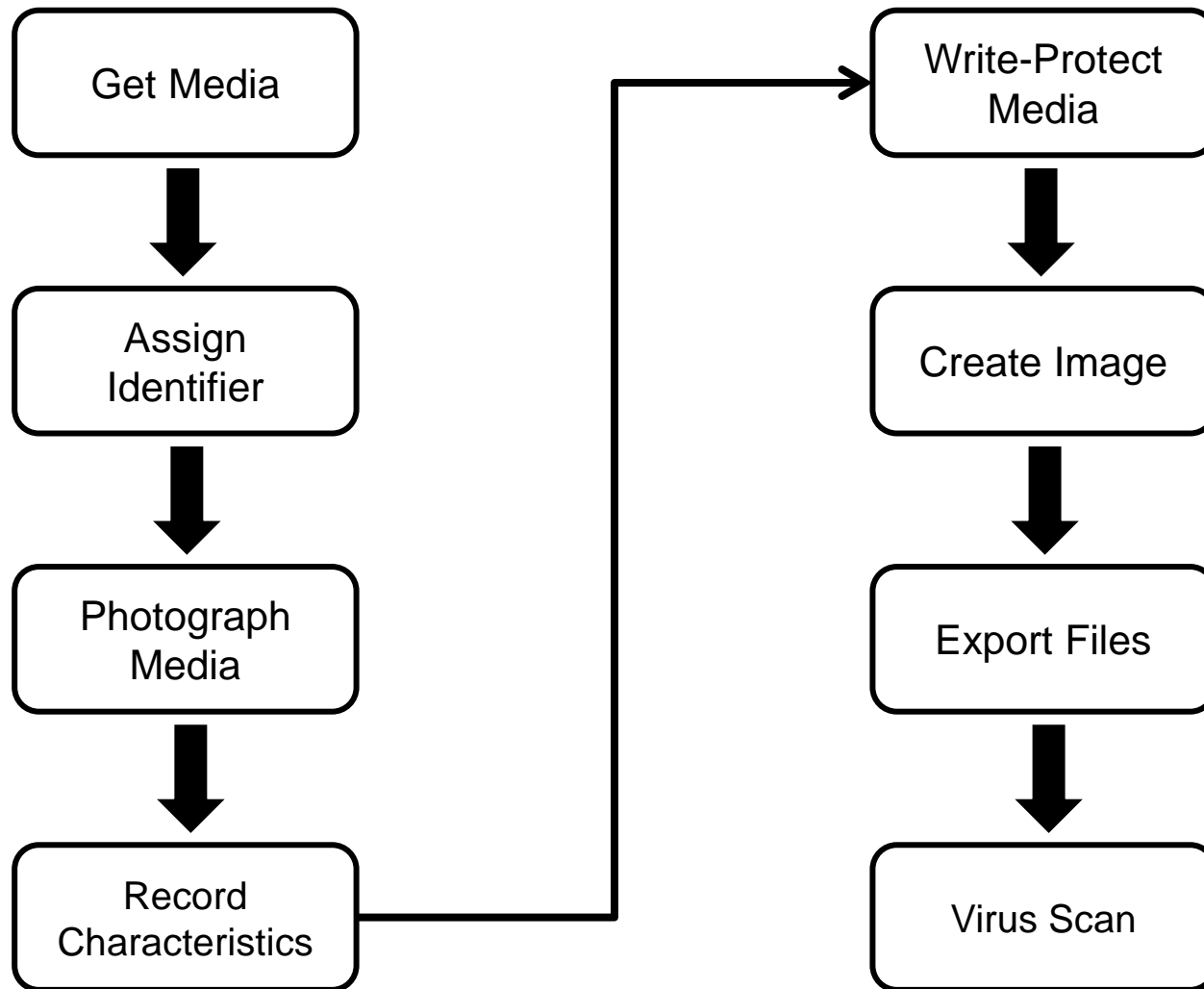








# Disk Imaging



## Born Digital - Detail

Identifier 2013\_030\_079

Date Acquired 11/8/2012

Accession Number 2013\_030

Received From Joe Crabtree

Transfer Type Physical Media

Received By Sam Meister

## Physical Media

## Produce AIP

Media Storage Location Electronic Media Storage

Virus Scan? Yes

Media Format Magnetic

Metadata Extracted?

Media Sub Type Floppy 3.5 in.

AIP Created?

Manufacturer Imation

AIP Transferred?

Model High Density IBM Format

Age 16

Date Transfer Storage

Condition Good

Network Storage Location

Media Label Text 9812 90812A-1 9812A-2

Media Photographed? No

Transfer Notes

Disk Image Created? Yes

Disk Image Date 4/19/2013

Disk Image Filename 2013\_030\_079.aff

Disk Image Software FTK Imager





Accession No.	Identifier
<b>2013-030</b>	<b>079</b>
Aspec	From      everse      Side / Case

# FC5205

## Disk Image and Browse

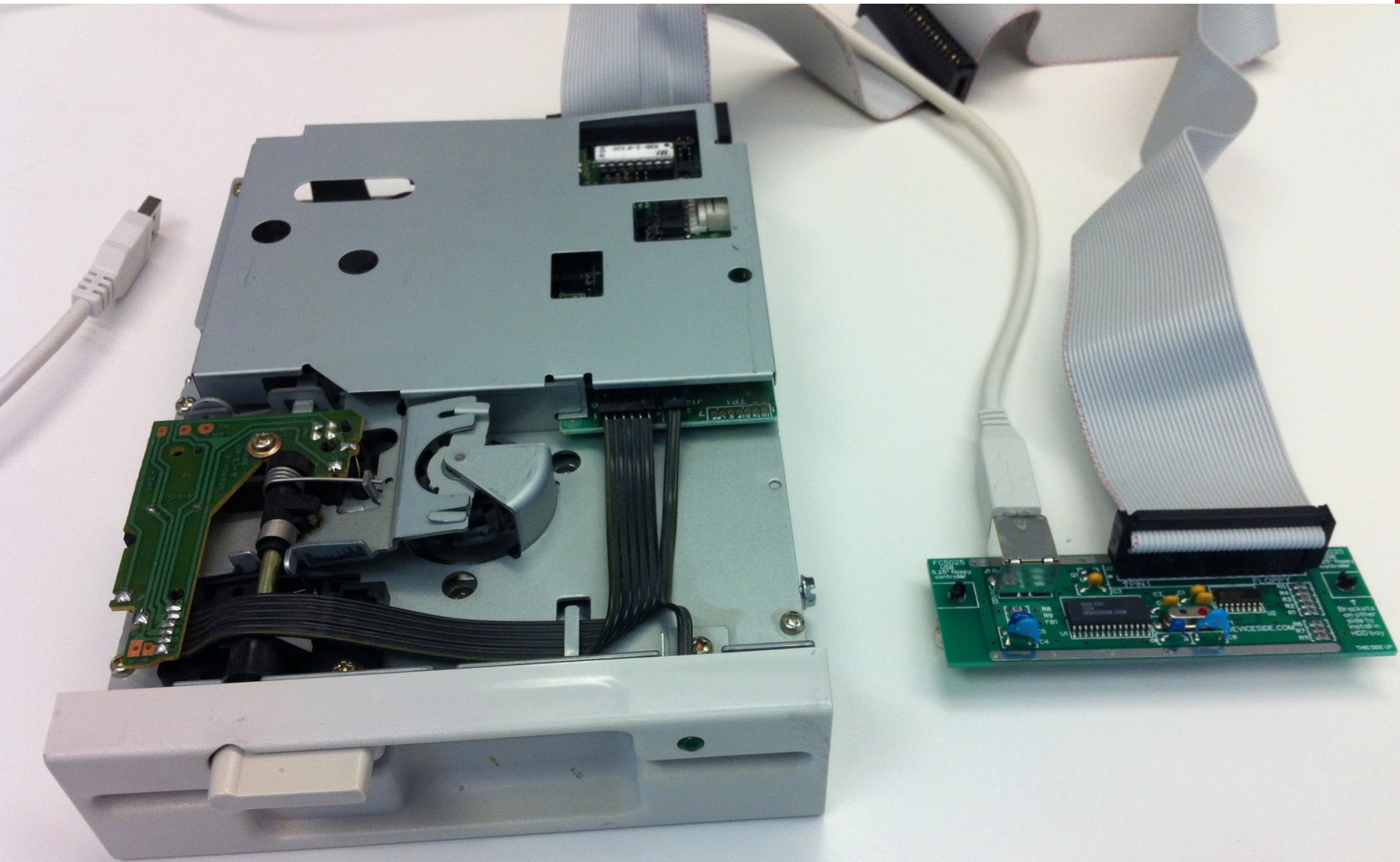


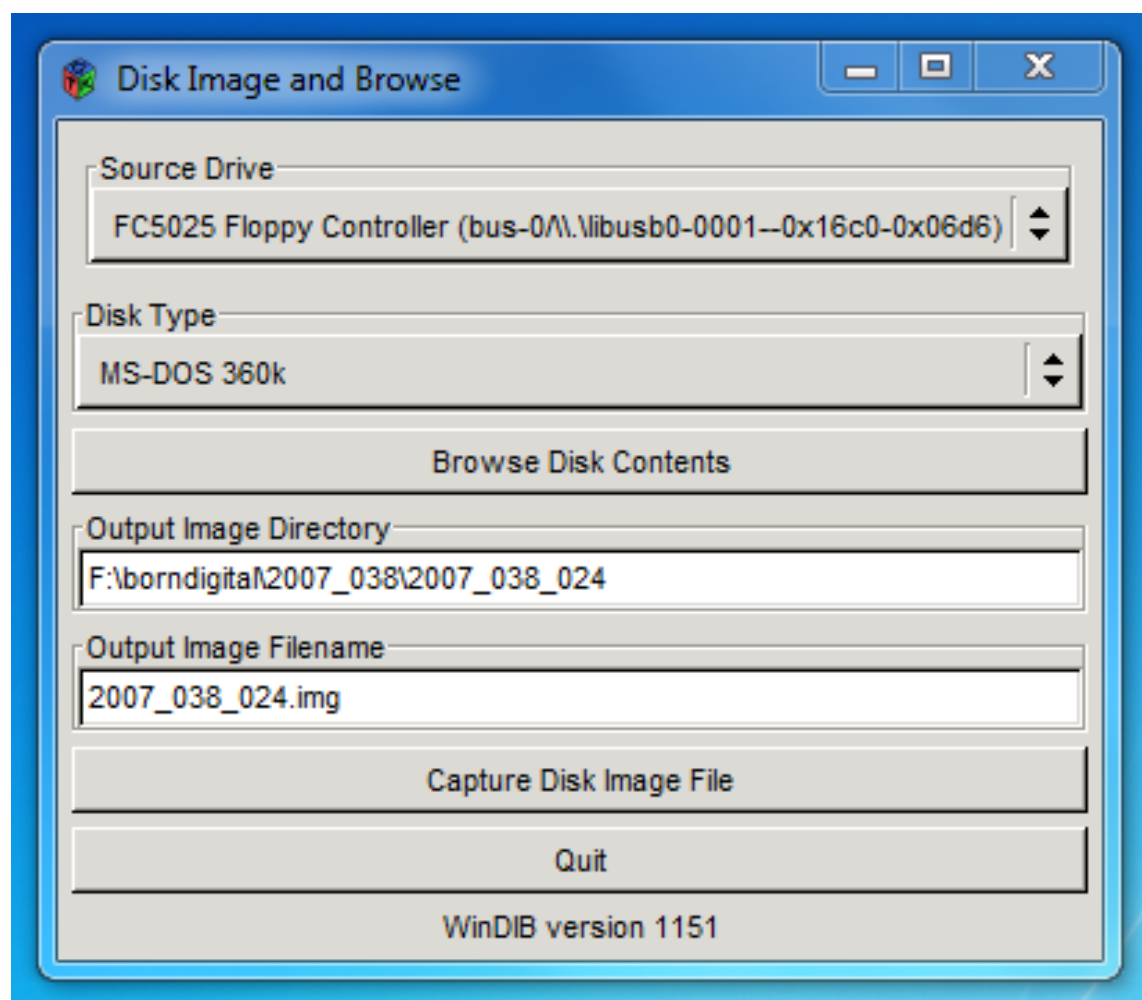
INSTITUTE of  
Museum and Library  
SERVICES

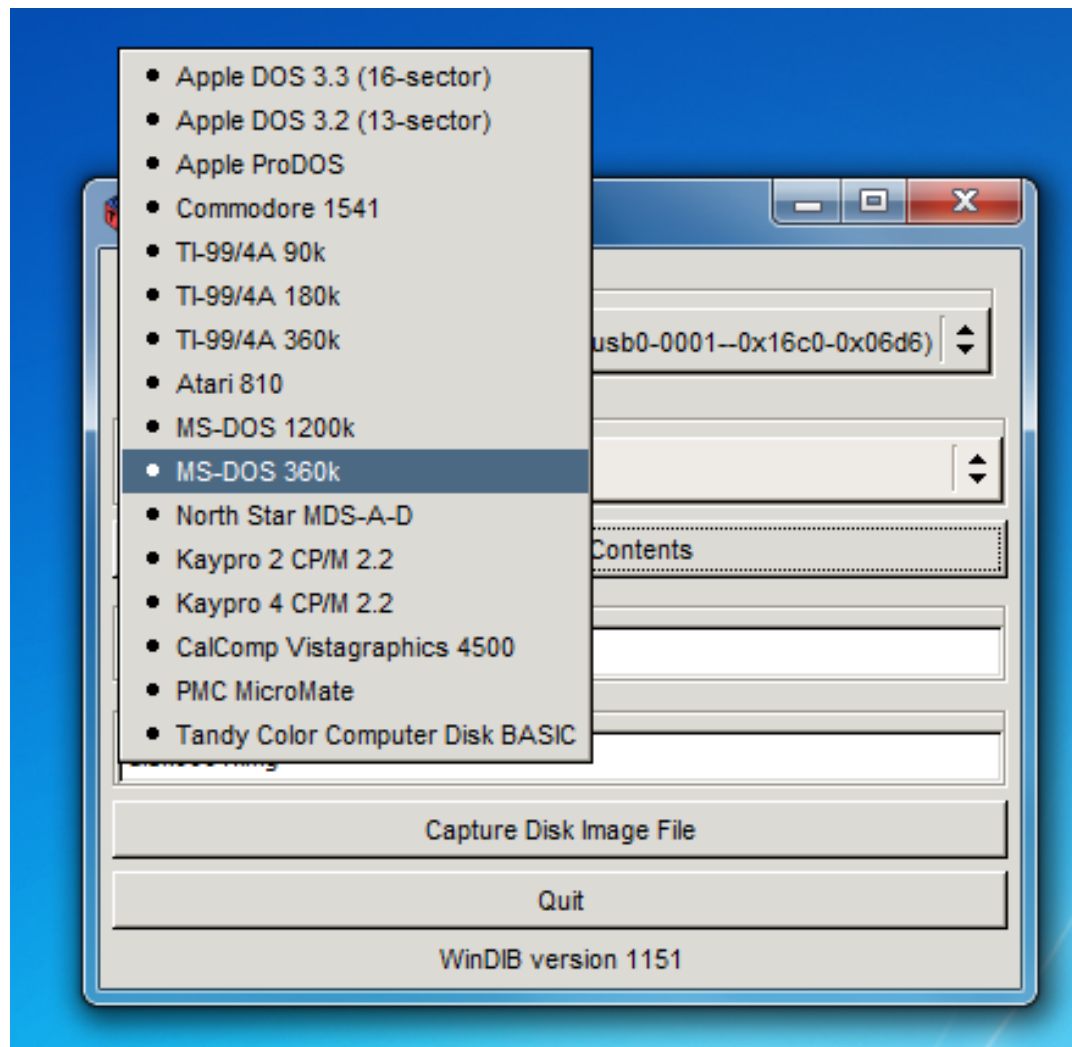


**SERI**  
State Electronic  
Records Initiative  
COUNCIL OF STATE ARCHIVISTS











**Disk Image and Browse**

Source Drive  
FC5025 Floppy Controller (bus-0A\libusb0-0001-0x16c0-0x06d6)

Disk Type  
MS-DOS 360k

Browse Disk Contents

Output Image Directory  
C:\Users\borndigital\Documents

Output Image Filename  
disk0001.img

Capture Disk Image File

Quit

WinDIB version 1151

**Browsing Disk Contents...**

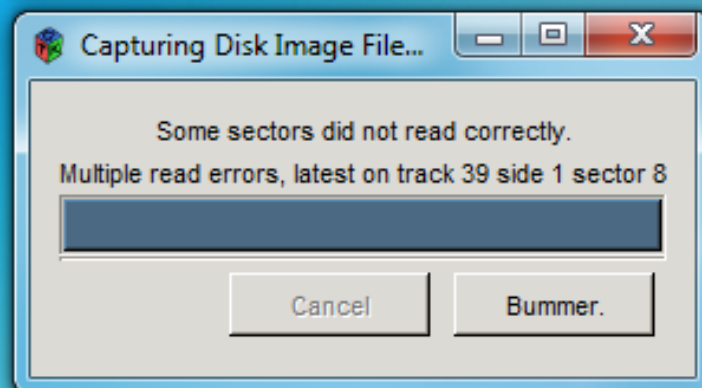
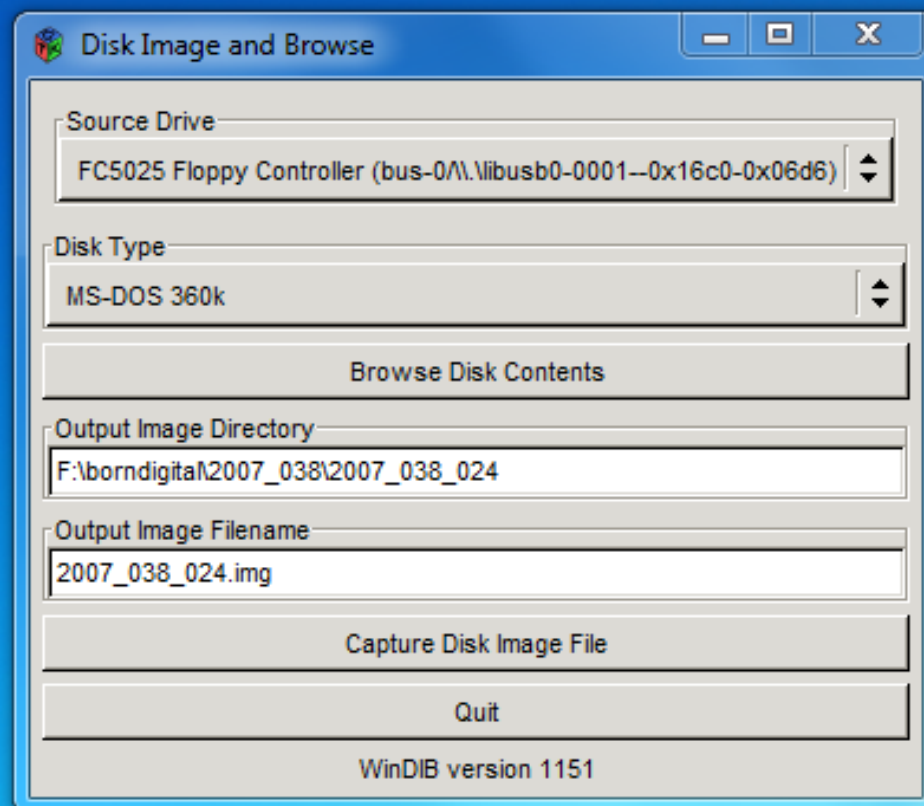
/

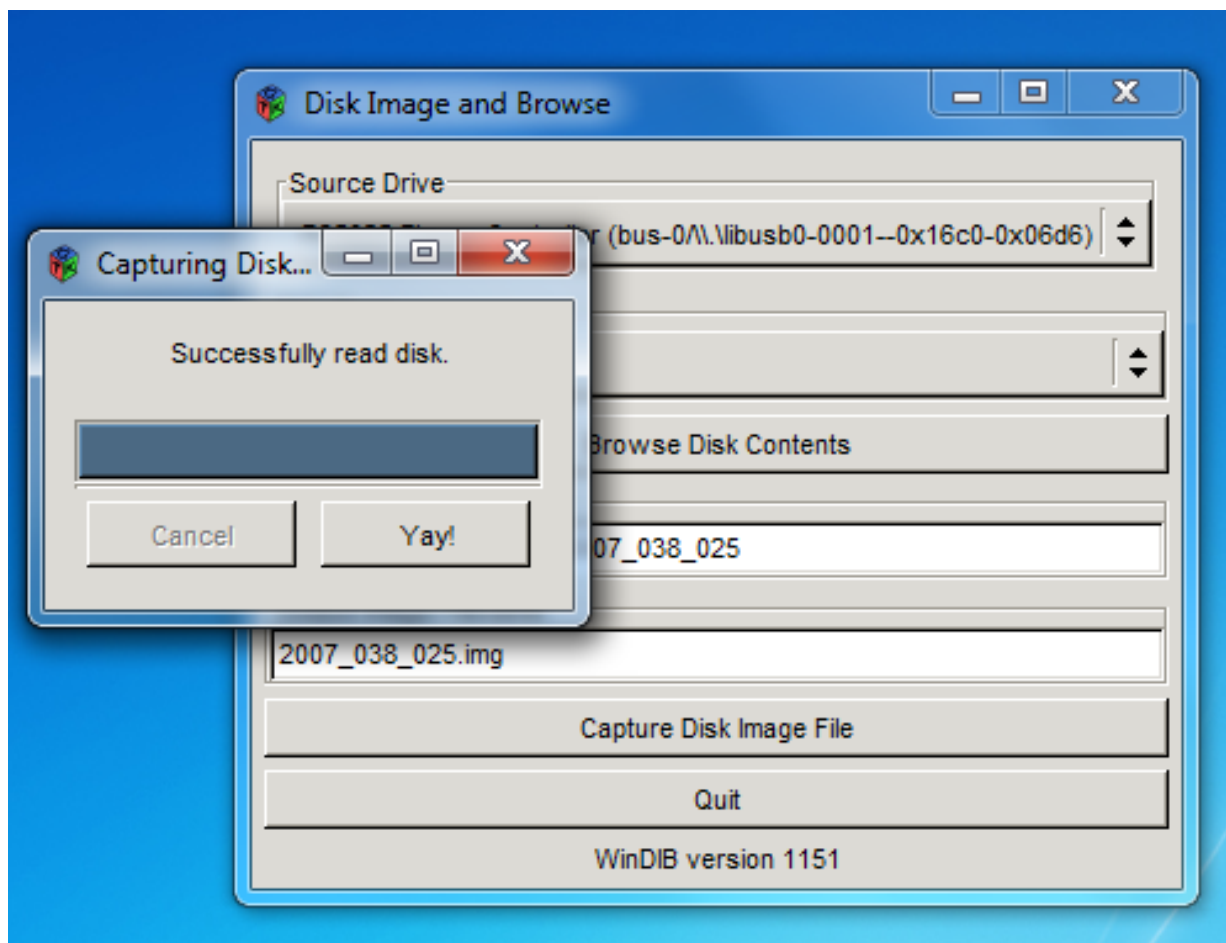
-rw	23808	1996-08-08 15:55	MKWD96L
-rw	20992	1991-12-17 12:44	MILKPRCR
-rw	6784	1997-07-29 15:57	MKWDSTA
-rw	9856	1993-12-01 16:37	PGCHRON
-rw	1280	1996-09-24 16:48	FECTMTSM
-rw	6272	1994-12-14 16:39	NONCE.BAK
-rw	44672	1991-06-27 10:08	NTEBKS.BAK
-rw	31488	1996-04-04 12:40	MOORCRFT
-rw	4992	1997-06-12 17:47	BELOIT
-rw	2176	1996-05-03 16:10	CAPA
-rw	9088	1995-04-02 11:15	DEE
-rw	1920	1995-09-11 10:13	HASS
-rw	2304	1996-05-28 14:40	HDSN96
-rw	6400	1996-05-11 17:18	HDSN934
-rw	3584	1996-06-27 12:27	HEDIN
-rw	3712	1995-03-30 08:39	FENZA
-rw	32512	1996-08-29 12:10	FRIED
-rw	6528	1996-08-29 12:41	FRIED96
-rw	3584	1995-04-05 12:37	GIB945
-rw	1792	1995-07-21 14:53	HAMG
-rw	1024	1995-07-21 17:17	HAMILL

Leave Directory

Copy File

Done





# FTK Imager



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative

COUNCIL OF STATE ARCHIVISTS

Name	Size	Type	Date Modified
------	------	------	---------------

## Select Drive

## Source Drive Selection

Please select from the following available drives:

A:\ - [FAT]  
A:\ - [FAT]  
C:\ - [NTFS]  
D:\  
E:\ - System Reserved [NTFS]  
F:\ - New Volume [NTFS]

&lt; Back

Finish

Cancel

Help

## Custom Content Sources

Evidence:File System|Path|File

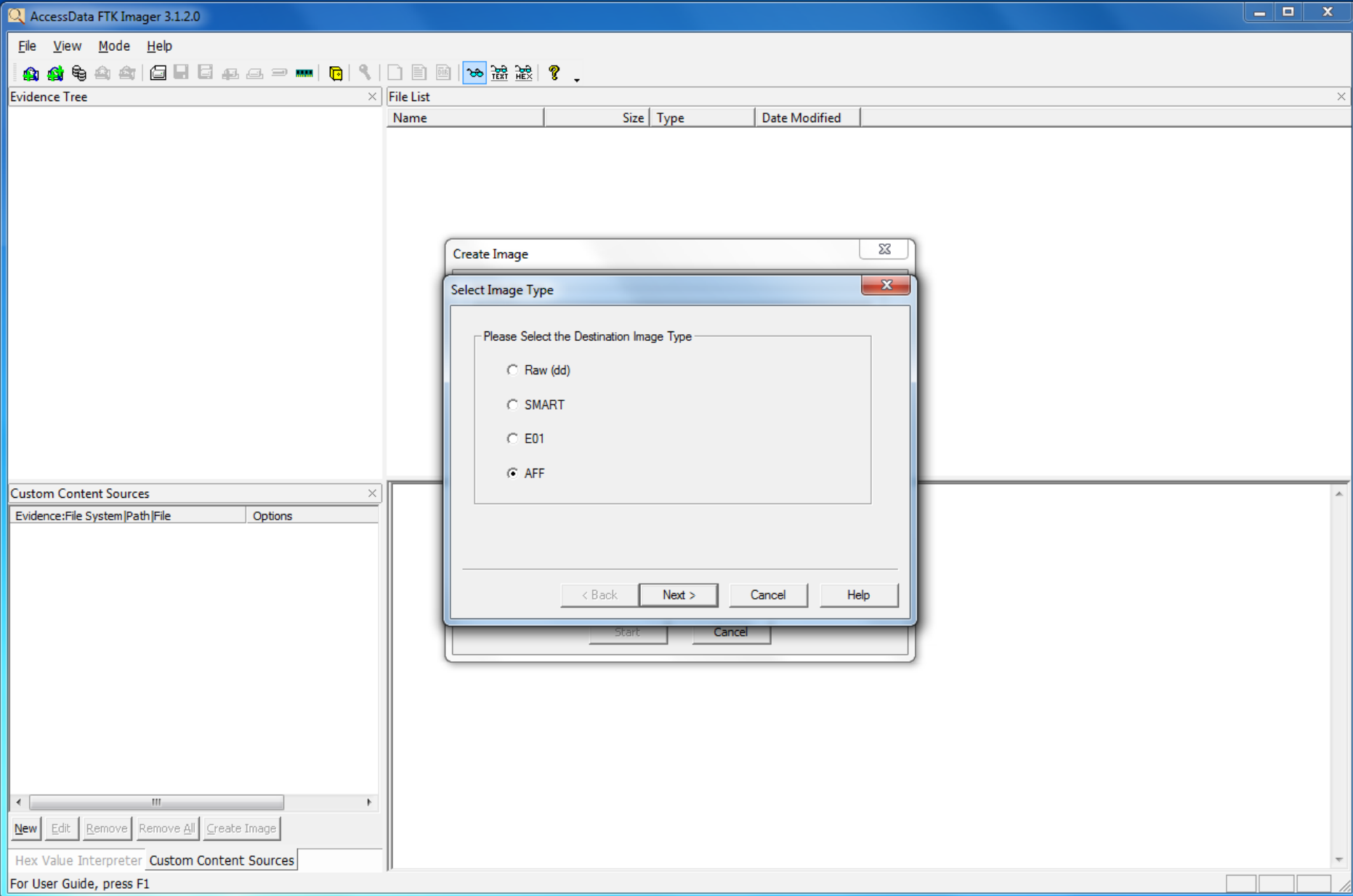
Options

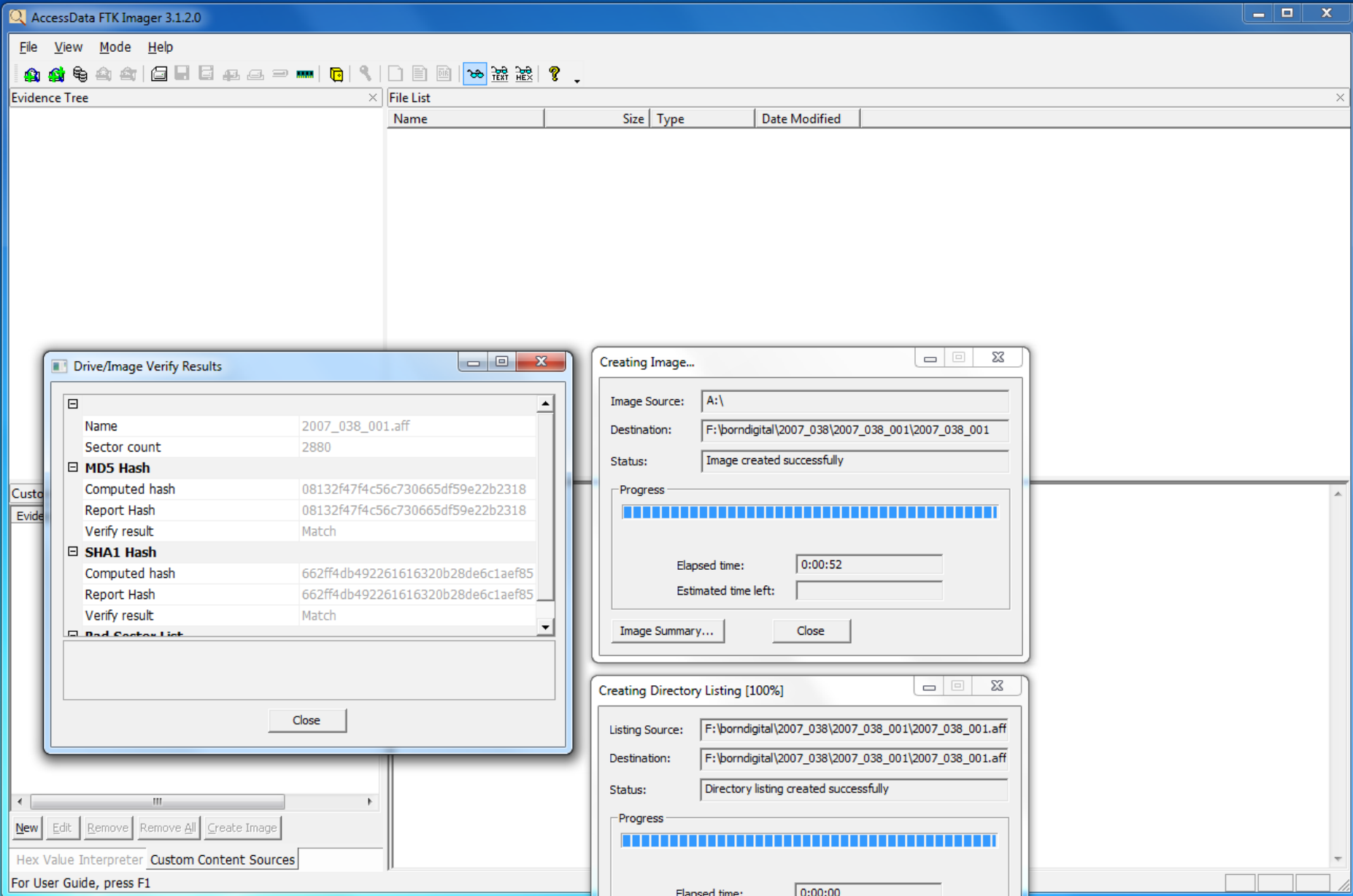
New Edit Remove Remove All Create Image

Hex Value Interpreter Custom Content Sources

For User Guide, press F1







AccessData FTK Imager 3.1.2.0

FileViewModeHelp

Evidence Tree

2007\_038\_001.aff

NONAME [FAT12]

Export Files...

Export File Hash List...

Export Logical Image (AD1)...

Add to Custom Content Image (AD1)

File List

Name	Size	Type	Date Modified
FEC971.WPD	8	Regular File	9/29/1997 1:37:...
junk holder.wpd	3	Regular File	1/30/1999 12:4...
Pgbio.wpd	14	Regular File	3/30/1998 11:4...
vita.wpd	79	Regular File	10/1/1998 5:13:...

Custom Content Sources

Evidence:File System Path File	Options

NewEditRemoveRemove AllCreate Image

Hex Value InterpreterCustom Content Sources

2007\_038\_001.aff/NONAME [FAT12]/[root]

0000	42 70 00 64 00 00 00 FF FF FF 0F 00 BB FF FF	Bp·d···ÿÿÿÿ·»ÿÿ
0010	FF FF FF FF FF FF FF FF FF 00 00 FF FF FF FF	ÿÿÿÿÿÿÿÿÿ·ÿÿÿÿ
0020	01 6A 00 75 00 6E 00 6B 00 20 00 0F 00 BB 68 00	·j·u·n·k· ···»h·
0030	6F 00 6C 00 64 00 65 00 72 00 00 00 2E 00 77 00	o·l·d·e·r····w·
0040	4A 55 4E 4B 48 4F 7E 31 57 50 44 20 00 75 34 66	JUNKHO~1WPD ·u4f
0050	3E 26 3E 26 00 00 15 66 3E 26 02 00 18 09 00 00	>s>s···f>s·····
0060	41 50 00 67 00 62 00 69 00 6F 00 0F 00 08 2E 00	AP·g·b·i·o·····
0070	77 00 70 00 64 00 00 00 FF FF FF 00 00 FF FF FF FF	w·p·d···ÿÿ·ÿÿÿÿ
0080	50 47 42 49 4F 20 20 20 20 57 50 44 20 00 A3 B6 66	PGBIO WPD ·2qf
0090	3E 26 3E 26 00 00 16 5E 7E 24 07 00 27 36 00 00	>s>s···^~s··'6·
00a0	46 45 43 39 37 31 20 20 20 57 50 44 20 00 95 DC 66	FEC971 WPD ··Üf
00b0	3E 26 3E 26 00 00 A6 6C 3D 23 23 00 1F 1F 00 00	>s>s·· l=##·····
00c0	41 76 00 69 00 74 00 61 00 2E 00 0F 00 5A 77 00	Av·i·t·a·····Zw·
00d0	70 00 64 00 00 00 FF FF FF FF 00 00 FF FF FF FF	p·d···ÿÿÿÿ·ÿÿÿÿ
00e0	56 49 54 41 20 20 20 20 20 57 50 44 20 00 8B F7 66	VITA WPD ··÷f
00f0	3E 26 3E 26 00 00 BD 89 41 25 33 00 EA 3B 01 00	>s>s···A%3·ê;·
0100	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	··········
0110	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	··········
0120	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	··········
0130	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	··········
0140	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	··········
0150	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	··········
0160	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	··········

Cursor pos = 0; log sec = 19

AccessData FTK Imager 3.1.2.0

FileViewModeHelp

Evidence Tree

2007\_038\_001.aff

NONAME [FAT12]

[root]

[unallocated space]

File List

Name	Size	Type	Date Modified
FEC971.WPD	8	Regular File	9/29/1997 1:37:...
junk holder.wpd	3	Regular File	1/30/1999 12:4:...
Pgbio.wpd	14	Regular File	3/30/1998 11:4:...
vita.wpd	79	Regular File	10/1/1998 5:13:...

Custom Content Sources

Evidence:File System Path File	Options
--------------------------------	---------

Hex View

0000	42 70 00 64 00 00 00 FF-FF	
0010	FF FF FF FF FF FF FF-FF	
0020	01 6A 00 75 00 6E 00 6B-00	
0030	6F 00 6C 00 64 00 65 00-72	
0040	4A 55 4E 4B 48 4F 7E 31-57	
0050	3E 26 3E 26 00 00 15 66-3E	
0060	41 50 00 67 00 62 00 69-00	
0070	77 00 70 00 64 00 00 FF-FF	FF FF FF FF w p d . . . y y . . y y y y
0080	50 47 42 49 4F 20 20 20-57	50 44 20 00 A3 B6 66 PGBIO WPD . . g f
0090	3E 26 3E 26 00 00 16 5E-7E	24 07 00 27 36 00 00 > s > s . . . ^ ~ s . . ' 6 . .
00a0	46 45 43 39 37 31 20 20-57	50 44 20 00 95 DC 66 FEC971 WPD . . U f
00b0	3E 26 3E 26 00 00 A6 6C-3D	23 23 00 1F 1F 00 00 > s > s . . .   l = # # . . . . .
00c0	41 76 00 69 00 74 00 61-00	2E 00 0F 00 5A 77 00 A v . i . t . a . . . . . Z w .
00d0	70 00 64 00 00 00 FF FF-FF	FF 00 00 FF FF FF FF p d . . . y y y y . . y y y y
00e0	56 49 54 41 20 20 20 20-57	50 44 20 00 8B F7 66 VITA WPD . . . f
00f0	3E 26 3E 26 00 00 BD 89-41	25 33 00 EA 3B 01 00 > s > s . . . % A 3 . e ; . .
0100	00 00 00 00 00 00 00 00-00	00 00 00 00 00 00 00 00 . . . . .
0110	00 00 00 00 00 00 00 00-00	00 00 00 00 00 00 00 00 . . . . .
0120	00 00 00 00 00 00 00 00-00	00 00 00 00 00 00 00 00 . . . . .
0130	00 00 00 00 00 00 00 00-00	00 00 00 00 00 00 00 00 . . . . .
0140	00 00 00 00 00 00 00 00-00	00 00 00 00 00 00 00 00 . . . . .
0150	00 00 00 00 00 00 00 00-00	00 00 00 00 00 00 00 00 . . . . .
0160	00 00 00 00 00 00 00 00-00	00 00 00 00 00 00 00 00 . . . . .

Cursor pos = 0; log sec = 19

Export Results

1 folder(s) and 4 file(s) exported successfully.  
105032 bytes copied.

OK

NewEditRemoveRemove AllCreate Image

Hex Value InterpreterCustom Content Sources

For User Guide, press F1



Issue:

# Unknown / Unrecognized Filesystems



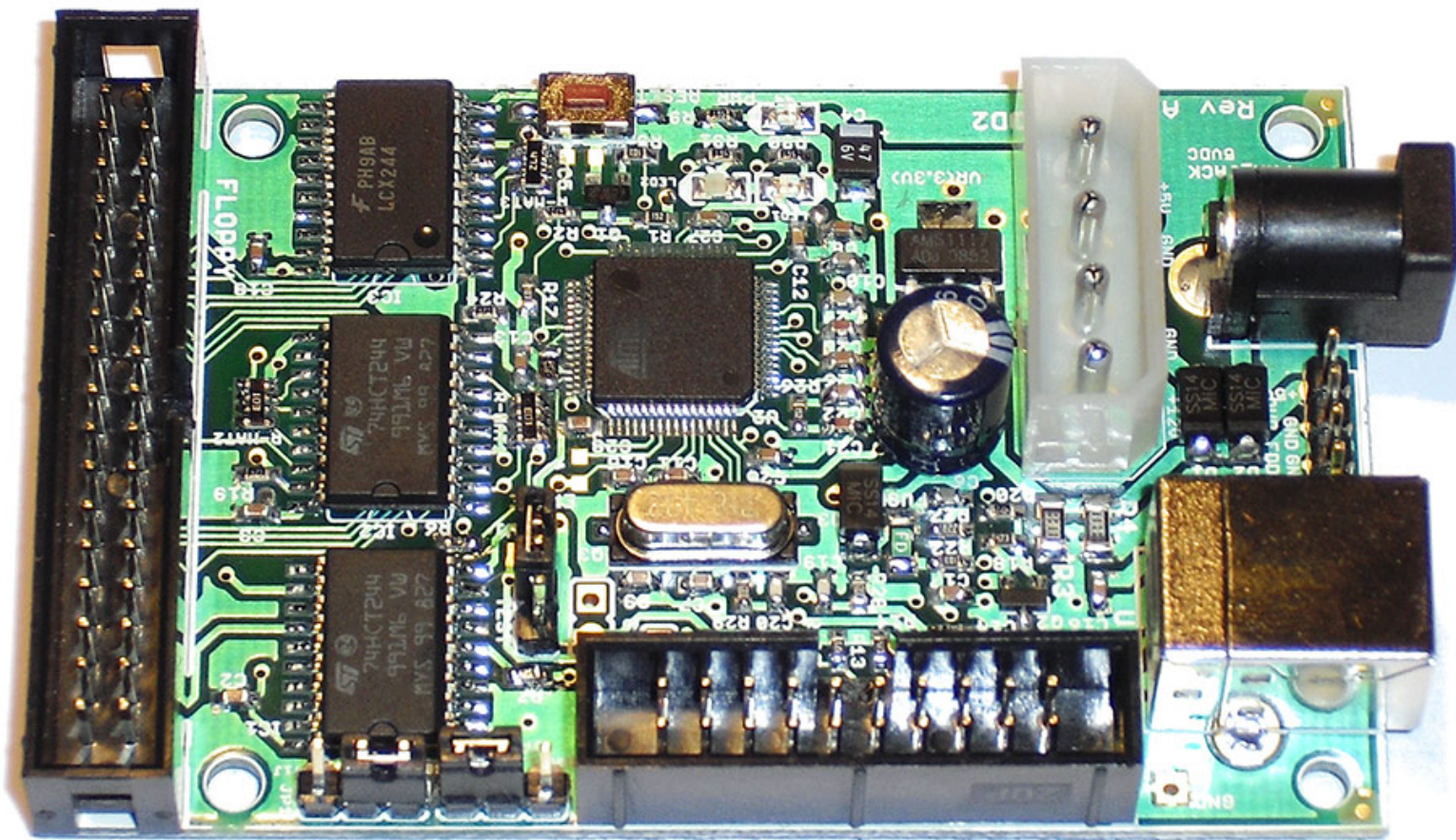
INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative

COUNCIL OF STATE ARCHIVISTS

# Kryoflux



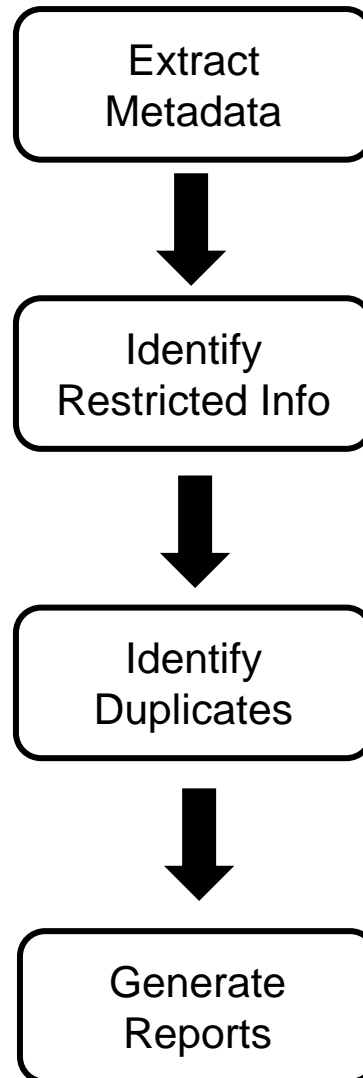
INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative

COUNCIL OF STATE ARCHIVISTS

# Initial Analysis



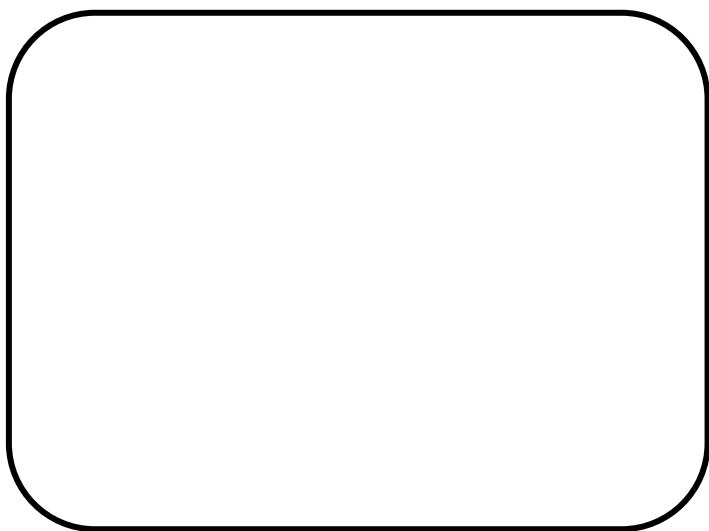
INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative  
COUNCIL OF STATE ARCHIVISTS

# Initial Analysis

Hardware



Software



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative

COUNCIL OF STATE ARCHIVISTS



# BitCurator

Tools for Digital Forensics Methods and Workflows  
in Real-World Collecting Institutions

“an effort to build, test, and analyze systems and software  
for incorporating digital forensics methods  
into the workflows of a variety of collecting institutions”



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative

COUNCIL OF STATE ARCHIVISTS

BitCurator:

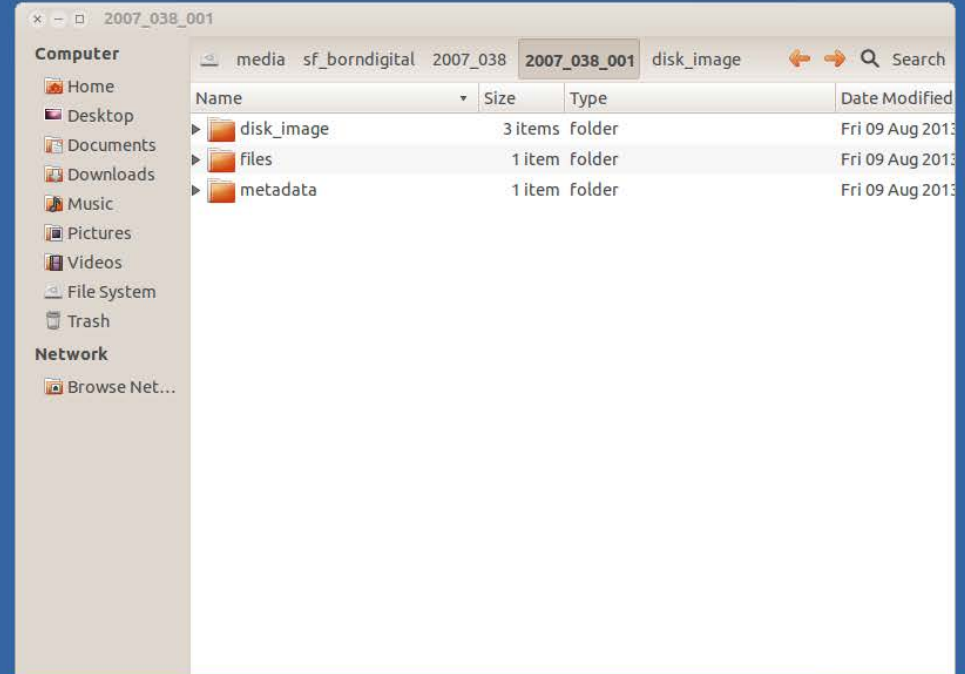
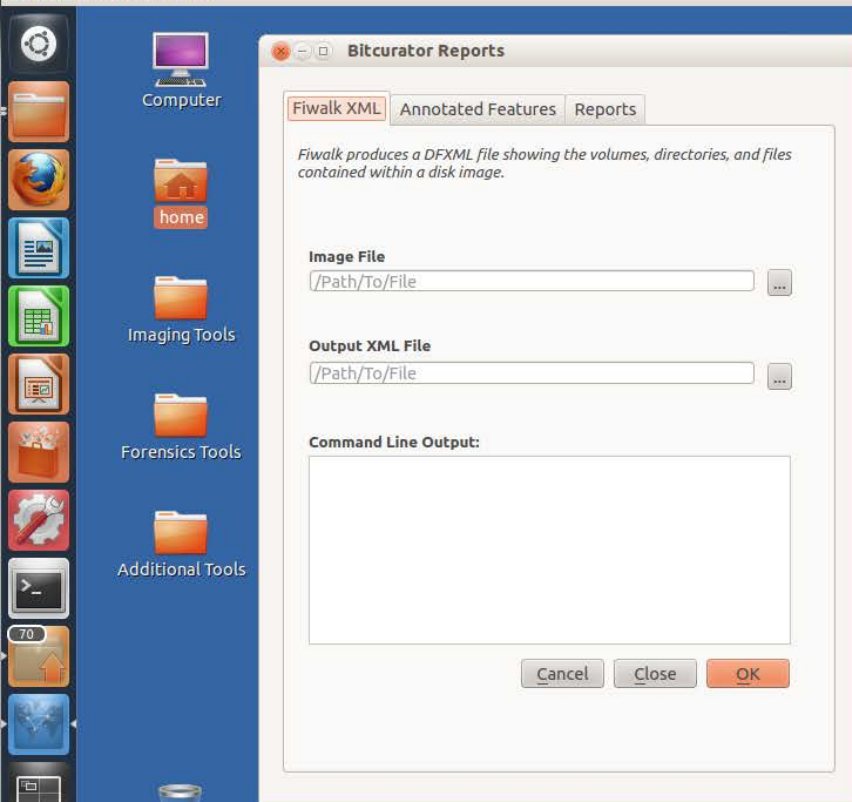
fiwalk



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative  
COUNCIL OF STATE ARCHIVISTS



# BitCurator



Bitcurator Reports

Fiwalk XML

Annotated Features

Reports

Fiwalk produces a DFXML file showing the volumes, directories, and files contained within a disk image.

**Image File**  
2007\_038/2007\_038\_001/disk\_image/2007\_038\_001.aff

**Output XML File**  
/2007\_038/2007\_038\_001/metadata/2007\_038\_001.xml

**Command Line Output:**

```
>> Command Executed for Fiwalk = ['fiwalk', '-F', '-X',
'/media/sf_borndigital/2007_038/2007_038_001/metadata/2007_038_001.xml',
'/media/sf_borndigital/2007_038/2007_038_001/disk_image/2007_038_001.aff']

>> Success!!! Fiwalk crated the following file(s):

o
```

Cancel

Close

OK

2007\_038\_001

media sf\_borndigital 2007\_038 2007\_038\_001 disk\_image

Search

Name	Size	Type	Date Modified
disk_image	3 items	folder	Fri 09 Aug 2013
files	1 item	folder	Fri 09 Aug 2013
metadata	1 item	folder	Fri 09 Aug 2013

Computer

Home

Desktop

Documents

Downloads

Music

Pictures

Videos

File System

Trash

Network

Browse Net...

# BitCurator





2007\_038\_001.xml ✕

```

<?xml version='1.0' encoding='UTF-8'?>
<dfxml version='1.0'>
  <metadata
    xmlns='http://www.forensicswiki.org/wiki/Category:Digital_Forensics_XML'
    xmlns:xsi='http://www.w3.org/2001/XMLSchema-instance'
    xmlns:dc='http://purl.org/dc/elements/1.1/'>
    <dc:type>Disk Image</dc:type>
  </metadata>
  <creator version='1.0'>
    <program>fiwalk</program>
    <version>4.1.0</version>
    <build_environment>
      <compiler>GCC 4.6</compiler>
      <library name="afflib" version="3.7.1"/>
      <library name="libewf" version="20130416"/>
    </build_environment>
    <execution_environment>
      <command_line>fiwalk -f -X /media/sf_borndigital/2007_038/2007_038_001/metadata/2007_038_001.xml /media/
sf_borndigital/2007_038/2007_038_001/disk_image/2007_038_001.aff</command_line>
      <start_time>2013-08-09T19:35:17Z</start_time>
    </execution_environment>
  </creator>
  <source>
    <image_filename>/media/sf_borndigital/2007_038/2007_038_001/disk_image/2007_038_001.aff</image_filename>
  </source>
  <!-- fs start: 0 -->
  <volume offset='0'>
    <partition_offset>0</partition_offset>
    <sector_size>512</sector_size>
    <block_size>512</block_size>
    <ftype>2</ftype>
    <ftype_str>fat12</ftype_str>
    <block_count>2880</block_count>
    <first_block>0</first_block>
    <last_block>2879</last_block>
    <fileobject>
      <parent_object>
        <inode>2</inode>
      </parent_object>
      <filename>junk holder.wpd</filename>
      <partition>1</partition>
      <id>1</id>
      <name_type>r</name_type>
      <filesize>2328</filesize>
      <alloc>1</alloc>
      <used>1</used>
    </fileobject>
  </volume>
</dfxml>

```

# BitCurator: bulk\_extractor



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative  
COUNCIL OF STATE ARCHIVISTS

File Edit View Tools Help

Highlight:  ☒ Match case

Reports

Feature Filter ☐ Match case

Feature File *None*

Referenced Feature File *None*

Referenced Feature *None*

Navigation

☒ ☐ *None*

Image File *None*

Feature File *None*

Feature Path *None*

Feature *None*

Image

Text ☒ Hex ☐

2007\_038 2007\_038\_001 disk\_image

Size Type Date Modified

3 items	folder	Fri 09 Aug 2013
1 item	folder	Fri 09 Aug 2013
1 item	folder	Fri 09 Aug 2013

urator

# Bulk Extractor Viewer

File Edit View Tools Help

Highlight:

Reports

Feature Filter

Feature File

Referenced F

Referenced F

## Run bulk\_extractor

Required Parameters

Scan: ☒ Image File ☐ Raw Device ☐ Directory of Files

Image file

Output Feature Directory

General Options

☐ Use Banner File

☐ Use Alert List File

☐ Use Stop List File

☐ Use Find Regex Text File

☐ Use Find Regex Text

Tuning Parameters

☐ Use Context Window Size

☐ Use Page Size

☐ Use Margin Size

☐ Use Min Word Size

☐ Use Max Word Size

☐ Use Block Size

☐ Use Number of Threads

Scanner Controls

☐ Use Plugin Directory

☐ Use Scan Option Name

☐ Use Wait Time

Parallelizing

☐ Use start processing at offset

☐ Use process range offset n1-n2

Restore Defaults Start bulk\_extractor Cancel

- ### Scanners
- ☐ bulk
  - ☒ wordlist
  - ☒ accts
  - ☒ aes
  - ☒ base16
  - ☒ base64
  - ☒ elf
  - ☒ email
  - ☒ exif
  - ☒ gps
  - ☒ gzip
  - ☒ hiber
  - ☒ json
  - ☒ kml
  - ☒ net
  - ☒ pdf
  - ☒ vcard
  - ☒ windirs
  - ☒ winpe
  - ☒ winprefetch
  - ☒ zip

2007\_038 2007\_038\_001 disk\_image

Size	Type	Date Modified
3 items	folder	Fri 09 Aug 2013
1 item	folder	Fri 09 Aug 2013
1 item	folder	Fri 09 Aug 2013

urator







# Bulk Extractor Viewer

## Bulk Extractor Viewer

File Edit View Tools Help



Highlight: **harcourt** ☐ Match case

### Reports

- bulk
  - packets.pcap
  - windirs.txt
  - wordlist.txt**

Feature Filter ☒ Match case

Feature File wordlist.txt

22697 (Ithaca  
22705 House,  
22723 BETWEEN  
22731 OCEANS(  
**22754 Harcourt,Brace**  
22787 World,  
22826 prizes  
22837 awards  
22850 National  
22859 Endowment  
22882 Creative  
22891 Writing  
22899 Fellowship,  
22913 Pushcart  
22922 Prize,  
22933 William  
22941 Carlos  
22948 Williams

Referenced Feature File *None*

Referenced Feature *None*

### Navigation

2007\_038\_001.aff, 22754, Harcourt,Brace

Image File 2007\_038\_001.aff

Feature File wordlist.txt

Feature Path 22754

Feature Harcourt,Brace

### Image

21760 r.1990..Her most recent collection is INVISIBLE HORSES, publishe  
21824 d.in.November, 1996.by Milkweed Editions.....In the spring.o  
21888 f.1993.Goedicke was an artist in residence at the Rockefeller Fo  
21952 undation's Villa.....Serbelloni.....on.  
22016 Lake Como, in.....Bellagio.....Italy...  
22080 .....Her books of poetry are:.....INVISIBLE HORSES, (Milkwee  
22144 d. Editions, 1996).....PAUL BUNYAN'S BEARSKIN, (Milkweed Editio  
22208 ns, 1992).....THE TONGUES WE SPEAK, "New and Selected Poems", (Mi  
22272 lkweed Editions, 1989).....LISTEN, LOVE, (.....Barnwo  
22336 od.....Press, 1986).....THE WIND OF OUR GOING(Coppe  
22400 r Canyon Press, 1985).....THE KING OF CHILDHOOD, (Confluence Pre  
22464 ss, 1984).....CROSSING THE SAME RIVER, (The University of Massac  
22528 husetts Press, 1980).....THE DOG THAT WAS BARKING YESTERDAY (Lyn  
22592 x House Press, 1980).....THE TRAIL THAT TURNS ON ITSELF, (Ithaca  
22656 House, 1978).....FOR THE FOUR CORNERS, (Ithaca House, 1976)...  
22720 ...BETWEEN OCEANS(.....Harcourt,Brace.....  
22784 .& World, Inc., 1968).....Among her prizes and awards are  
22848 a National Endowment for the Arts Creative Writing Fellowship, a  
22912 .Pushcart Prize, the William Carlos Williams Prize from New Lett  
22976 ers, a.....COLM.....Prize for a poem pub  
23040 lished in The.....Hampden.....Sydney Rev  
23104 iew and, most recently, the 1987 Carolyn.....Kizer,  
23168 .....Prize from the Monmouth Institute, the 1987.....  
23232 .....Hohenberg.....Award from The Memphis Stat  
23296 e Review and the 1987.....Strousse.....A  
23360 ward and 1992 Edward Stanley Award from Prairie Schooner.....  
23424 .....8, '.....Her work appears in anthologies such as  
23488 NO MORE MASKS!, STRONG MEASURES, (CONTEMPORARY POETRY IN TRADITI  
23552 ONAL FORMS); CROSSING THE RIVER, (Poets of the Western United Sta  
23616 tes); WRITING IN A NUCLEAR AGE, (from New England Review and.....  
23680 .....Breadloaf.....Quarterly publications); T  
23744 HE PUSHCART PRIZE ANTHOLOGY #II; WOMEN BRAVE IN THE FACE OF DANG  
23808 ER, (Photographs of and Writings by Latin and North American Wome  
23872 n); WALT WHITMAN, (The Measure of His Song); A GEOGRAPHY OF POETS  
23936 (Bantam); EDITOR'S CHOICE, (The Spirit That Moves Us Press); THE  
24000 TREASURY OF AMERICAN POETRY, (Doubleday); PSYCHE; THE FEMININE P

☒ Text ☐ Hex



**32 Files Found - Search for Files**

Name contains:

Look in folder:

▼ Select more options

Contains the text:

Available options:

Search results: 32 files found

Name	Folder	Size	Type	Date Modified
MILKPR.rtf	files/2007_038_015/[root]	5.3 kB	RTF document	Wednesday, September 17 1997 at 4:26:04 AM
MILKPRCR.rtf	files/2007_038_015/[root]	31.2 kB	RTF document	Wednesday, September 17 1997 at 4:27:02 AM
PGBIO.rtf	files/2007_038_015/[root]	11.9 kB	RTF document	Wednesday, September 17 1997 at 4:42:42 AM
PGCHRON.rtf	files/2007_038_015/[root]	14.1 kB	RTF document	Wednesday, September 17 1997 at 4:42:58 AM
PGCHRON	files/2007_038_024/[root]	9.9 kB	unknown	Wednesday, December 1 1993 at 11:37:46 AM
MILKPR	files/2007_038_025/[root]	2.7 kB	unknown	Tuesday, December 17 1991 at 7:42:58 AM
PGBIO	files/2007_038_025/[root]	7.7 kB	unknown	Saturday, January 4 1997 at 12:24:42 PM
MWPRIH95	files/2007_038_028/[root]	65.3 kB	unknown	Wednesday, October 11 1995 at 12:17:58 PM
PGBIO	files/2007_038_028/[root]	7.7 kB	unknown	Friday, July 28 1995 at 12:34:06 PM

# BitCurator



INSTITUTE of  
Museum and Library  
SERVICES



CoSA  
State Electronic  
Records Initiative





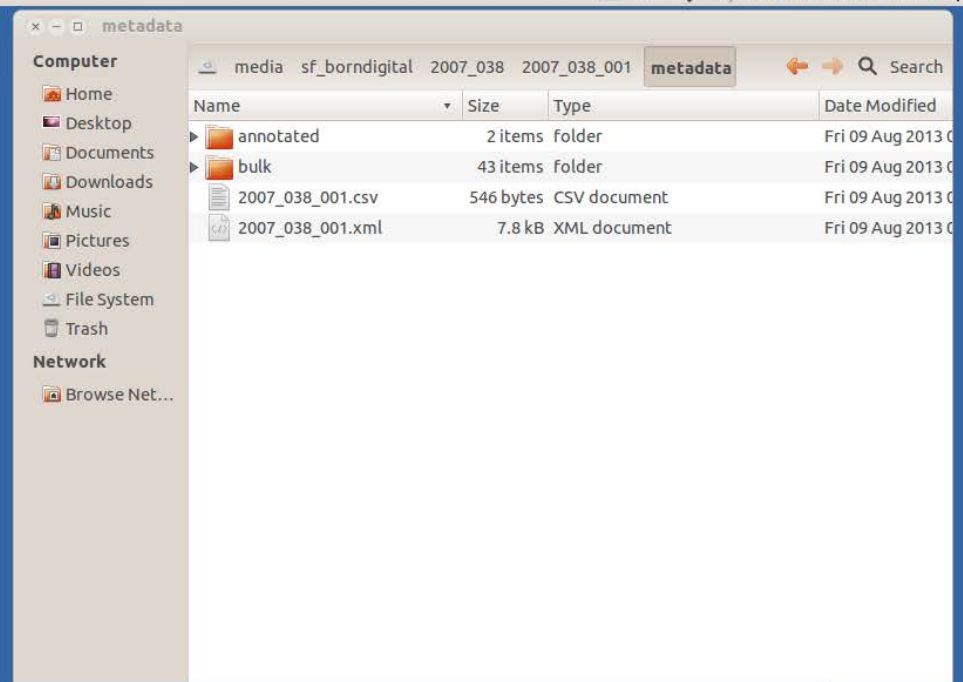
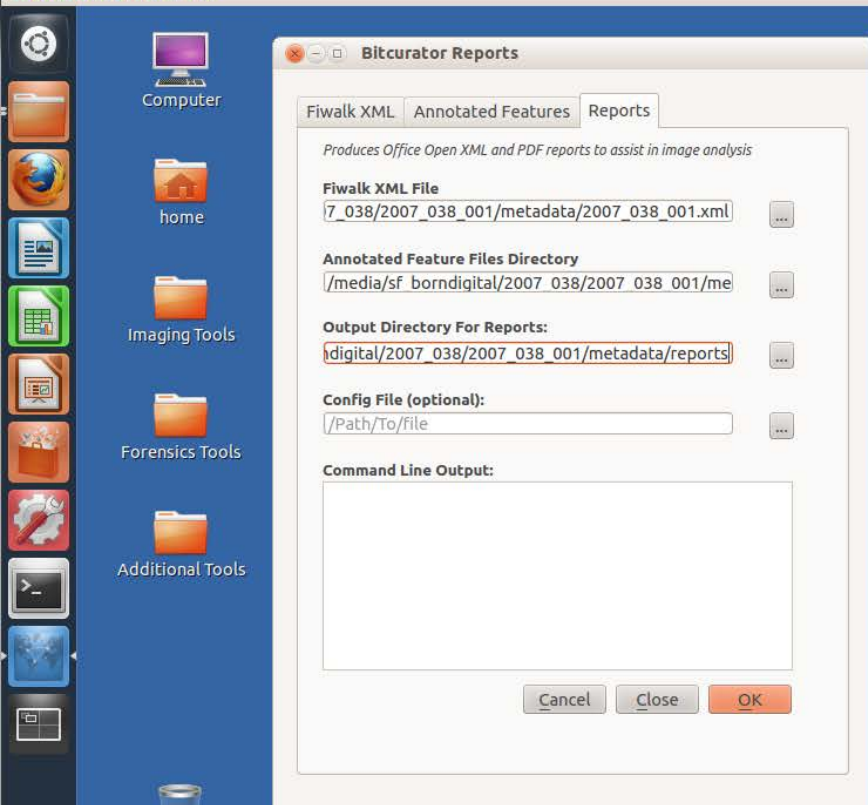
# BitCurator: Reports



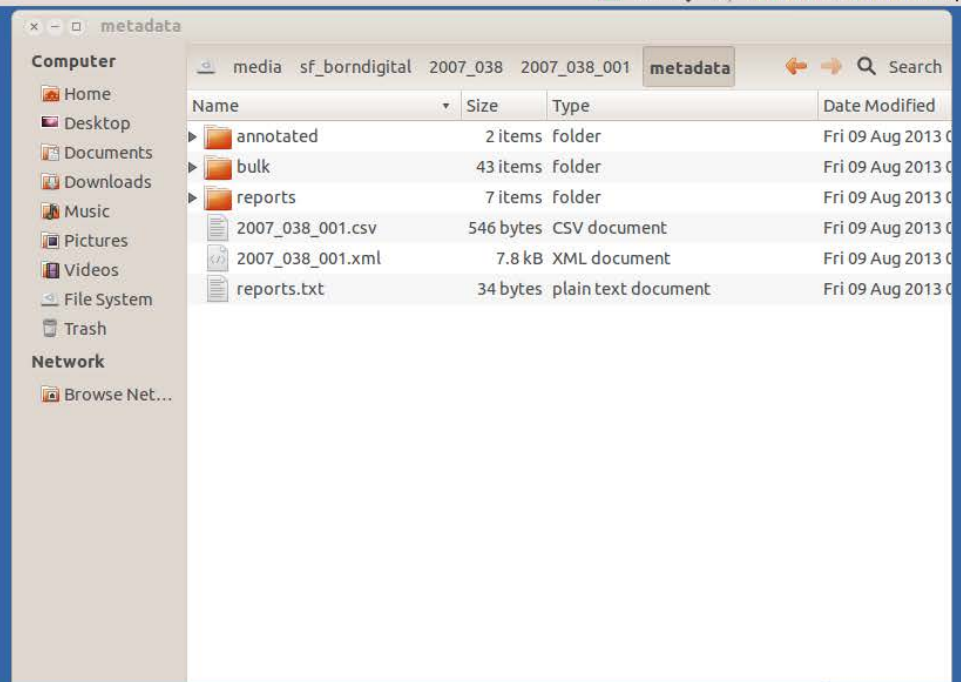
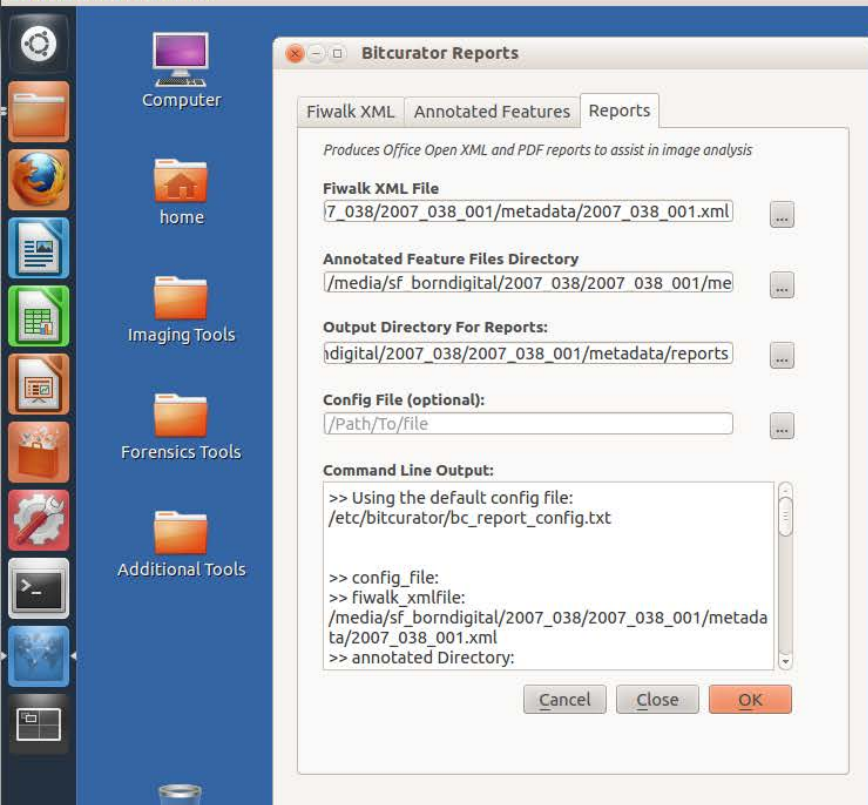
INSTITUTE of  
Museum and Library  
SERVICES



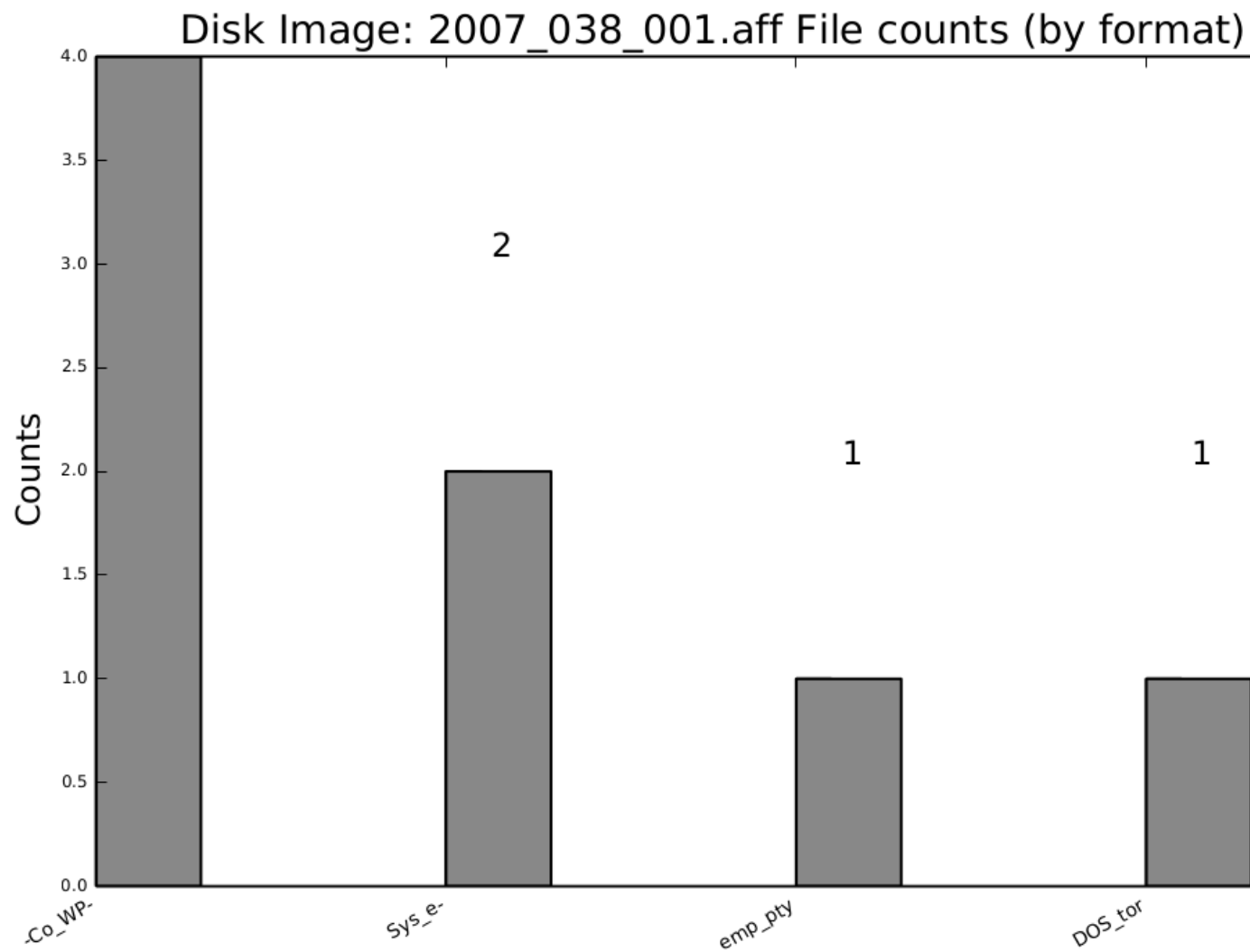
**SERI**  
State Electronic  
Records Initiative  
COUNCIL OF STATE ARCHIVISTS



# BitCurator



# BitCurator





## Report: File System Statistics and Files

### Technical Metadata

*Found 1 Partition in this disk*

Disk Image: 2007\_038\_001.aff

Feature	Value
Partition	1
PARTITION OFFSET	0
BLOCK COUNT	2880
FIRST BLOCK	0
LAST BLOCK	2879
BLOCK SIZE	2880
FTYPE	2
FTYPE STR	fat12
Number of Files	4
Total Directories	1
Total Deleted Files	0
Total Unused Files	0
Files with Nlinks > 1	0
Empty Files	1
Big Files(> 1 MB)	0

## Report: File System Statistics and Files

### File Format Table

Disk Image: 2007\_038\_001.aff

Format	Short Form	Files
DOS floppy 1440k, x86 hard disk boot sector	DOS_tor	1
empty	emp_pty	1
SysEx File -	Sys_e-	2
(Corel/WP)	-Co_WP-	4

2007\_038\_001

New Volume borndigital 2007\_038 **2007\_038\_001** objects disk\_image

← → 🔍 Search

Name	Size	Type	Date Modified
logs	0 items	folder	Mon 12 Aug 2013 01:37:14
(Empty)			
metadata	8 items	folder	Tue 17 Dec 2013 02:52:41 P
annotated	2 items	folder	Fri 09 Aug 2013 01:44:05 PM
bulk	43 items	folder	Tue 17 Dec 2013 02:36:35 P
reports	7 items	folder	Fri 10 Jan 2014 10:52:48 AM
2007_038_001.csv	546 bytes	CSV document	Fri 09 Aug 2013 11:58:13 AM
2007_038_001.xml	7.8 kB	XML document	Fri 09 Aug 2013 01:35:18 PM
alert_list	6 bytes	plain text document	Tue 17 Dec 2013 02:37:28 P
alert_list.txt	6 bytes	plain text document	Tue 17 Dec 2013 02:39:19 P
reports.txt	34 bytes	plain text document	Fri 09 Aug 2013 02:07:55 PM
objects	1 item	folder	Thu 05 Dec 2013 02:06:57 P
disk_image	3 items	folder	Fri 09 Aug 2013 01:29:21 PM
2007_038_001.aff.csv	1.5 kB	CSV document	Fri 09 Aug 2013 11:13:40 AM
2007_038_001.aff.txt	1.2 kB	plain text document	Fri 09 Aug 2013 11:13:40 AM
2007_038_001.aff	1.5 MB	program	Fri 09 Aug 2013 11:13:40 AM

**Devices**

- System Rese...
- 40 GB Filesy...
- New Vol...

**Computer**

- Home
- Desktop
- Documents
- Downloads
- Music
- Pictures
- Videos
- File System
- Trash

**Network**

- Browse Net...



# Produce AIP

AIP = Archival Information Package



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative  
COUNCIL OF STATE ARCHIVISTS

# Produce AIP

Hardware

Software

Archivematica



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative

COUNCIL OF STATE ARCHIVISTS





“a free and open-source digital preservation system  
that is designed to maintain standards-based,  
long-term access  
to collections of digital objects”



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative  
COUNCIL OF STATE ARCHIVISTS

Standard

Type

Transfer name

Accession no.

/home/borndigital/shareddisk/bor



Browse

Start transfer

## Transfer

## UUID

## Transfer start time

2007_038_001	2dbbc8f8-c018-4c9d-b03e-cfbd4c85ab31	2013-11-01 12:27	
▶ Micro-service: Characterize and extract metadata			
Job: Characterize and extract metadata	Executing command(s)		
▶ Micro-service: Clean up names			
Job: Sanitize Transfer name	Completed successfully		
Job: Sanitize object's file and directory names	Completed successfully		
▶ Micro-service: Scan for viruses			
Job: Scan for viruses	Completed successfully		
▶ Micro-service: Extract packages			
▶ Micro-service: Quarantine			
▶ Micro-service: Generate METS.xml document			
▶ Micro-service: Verify transfer checksums			
▶ Micro-service: Assign file UUIDs and checksums			
▶ Micro-service: Include default Transfer processingMCP.xml			
▶ Micro-service: Rename with transfer UUID			
▶ Micro-service: Verify transfer compliance			
▶ Micro-service: Approve transfer			
Job: Approve standard transfer	Completed successfully		
2004_010_001	33f13af2-4370-45c2-9cdb-2a418ab8847d	2013-09-05 13:08	
▶ Micro-service: Create SIP from Transfer			
▶ Micro-service: Complete transfer			
▶ Micro-service: Characterize and extract metadata			
▶ Micro-service: Clean up names			
▶ Micro-service: Scan for viruses			
▶ Micro-service: Extract packages			
▶ Micro-service: Quarantine			
▶ Micro-service: Generate METS.xml document			
▶ Micro-service: Verify transfer checksums			
▶ Micro-service: Assign file UUIDs and checksums			
▶ Micro-service: Include default Transfer processingMCP.xml			
▶ Micro-service: Rename with transfer UUID			
▶ Micro-service: Verify transfer compliance			
▶ Micro-service: Approve transfer			

Standard

Type

Transfer name

Accession no.

/home/borndigital/shreddisk/bor




Browse

Start transfer

## Transfer

## UUID

## Transfer start time

 2007_038_001	2dbbc8f8-c018-4c9d-b03e-cfbd4c85ab31	2013-11-01 12:27	 
▶ Micro-service: Create SIP from Transfer			
Job: Create SIP(s) [?]	Awaiting decision		Actions
Job: Load options to create SIPs	Completed successfully		
Job: Check transfer directory for objects	Completed successfully		
▶ Micro-service: Complete transfer			
▶ Micro-service: Characterize and extract metadata			
Job: Load labels from metadata/file_labels.csv	Completed successfully		
Job: Identify Files ByExtension	Completed successfully		
Job: Characterize and extract metadata	Completed successfully		
▶ Micro-service: Clean up names			
Job: Sanitize Transfer name	Completed successfully		
Job: Sanitize object's file and directory names	Completed successfully		
▶ Micro-service: Scan for viruses			
Job: Scan for viruses	Completed successfully		
▶ Micro-service: Extract packages			
▶ Micro-service: Quarantine			
▶ Micro-service: Generate METS.xml document			
▶ Micro-service: Verify transfer checksums			
▶ Micro-service: Assign file UUIDs and checksums			
▶ Micro-service: Include default Transfer processingMCP.xml			
▶ Micro-service: Rename with transfer UUID			
▶ Micro-service: Verify transfer compliance			
▶ Micro-service: Approve transfer			
Job: Approve standard transfer	Completed successfully		
 2004_010_001	33f13af2-4370-45c2-9cdb-2a418ab8847d	2013-09-05 13:08	 
▶ Micro-service: Create SIP from Transfer			
▶ Micro-service: Complete transfer			
▶ Micro-service: Characterize and extract metadata			
▶ Micro-service: Clean up names			
▶ Micro-service: Scan for viruses			
▶ Micro-service: Extract packages			




























Any  Keyword  ☐ Show files?

[Add New](#)

Submission Information Package	UUID	Ingest start time	
2007_038_001 ▶ Micro-service: Normalize Job: Select format identification tool Job: Set resume link after tool selected. Job: Find options to normalize as Job: Move to workFlowDecisions-createDip directory Job: Grant normalization options for no pre-existing DIP Job: Set remove preservation and access normalized files to renormalize link. Job: Check for Access directory Job: Check for Service directory Job: Identify manually normalized files ▶ Micro-service: Clean up names ▶ Micro-service: Remove cache files ▶ Micro-service: Include default SIP processingMCP.xml ▶ Micro-service: Rename SIP directory with SIP UUID ▶ Micro-service: Verify transfer compliance ▶ Micro-service: Verify SIP compliance ▶ Micro-service: Approve SIP creation	e2c46162-e037-4ff4-ab83-2e7c6e675ace	2013-11-01 12:31	 Awaiting decision Completed successfully Completed successfully Completed successfully Completed successfully Completed successfully Completed successfully Completed successfully Completed successfully
2004_010_030 ▶ Micro-service: Upload DIP Job: Upload DIP ▶ Micro-service: Store AIP ▶ Micro-service: Prepare AIP ▶ Micro-service: Prepare DIP ▶ Micro-service: Process metadata directory ▶ Micro-service: Process submission documentation ▶ Micro-service: Normalize ▶ Micro-service: Clean up names ▶ Micro-service: Remove cache files ▶ Micro-service: Include default SIP processingMCP.xml ▶ Micro-service: Rename SIP directory with SIP UUID ▶ Micro-service: Verify transfer compliance ▶ Micro-service: Verify SIP compliance	13dfb75e-3468-4b84-be83-1db2a8e2d58b	2013-09-06 16:41	 Awaiting decision

Any Keyword Search transfer backlog Show files? ☐

Add New

Submission Information Package	UUID	Ingest start time	
2007_038_001	e2c46162-e037-4ff4-ab83-2e7c6e675ace	2013-11-01 12:31	
Micro-service: Store AIP			
Job: Remove the processing directory		Completed successfully	
Job: Store the AIP		Completed successfully	
Job: Move to processing directory		Completed successfully	
Job: Store AIP location		Completed successfully	
Job: Store AIP [?]		Completed successfully	
Job: Move to the store AIP approval directory		Completed successfully	
Micro-service: Prepare AIP			
Job: Removed bagged files		Completed successfully	
Job: Set bag file permissions		Completed successfully	
Job: Compress AIP		Completed successfully	
Job: Select compression level		Completed successfully	
Job: Select compression algorithm		Completed successfully	
Job: Prepare AIP		Completed successfully	
Job: Index AIP contents		Completed successfully	
Job: Generate METS.xml document		Completed successfully	
Job: Remove empty manual normalization directories		Completed successfully	
Job: Copy transfers metadata and logs		Completed successfully	
Job: Verify checksums generated on ingest		Completed successfully	
Job: Remove files without linking information (failed normalization artifacts etc.)		Completed successfully	
Micro-service: Upload DIP			
Job: Upload DIP		Awaiting decision	 Actions
Micro-service: Prepare DIP			
Micro-service: Process metadata directory			
Micro-service: Process submission documentation			
Micro-service: Normalize			
Job: Load finished with manual normalized link		Completed successfully	
Job: Check for manual normalized files		Completed successfully	
Job: Set file permissions		Completed successfully	
Job: Move to processing directory		Completed successfully	
Job: Set resume link after handling any manual normalized files		Completed successfully	
Job: Approve normalization [?]		Completed successfully	 



Archivematica Dashboard - Archival storage - Mozilla Firefox

Archivematica Dashboard - ... x http://local...\_cc8HbGGVw/ x file:///home/...6e675ace.xml x +

localhost/archival-storage/ Google

archivematica. Transfer <sup>3</sup> Ingest Archival storage Preservation planning Access Administration borndigital v

Any  Keyword  ☐ Show files?

[Add New](#)

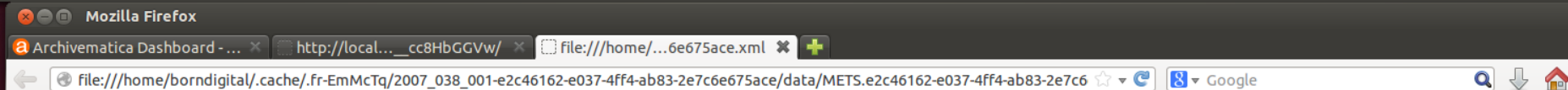
## Browse archival storage

Total size: 28.80 MB Total files: 2376 indexed

AIP	Size	UUID	Date stored
<a href="#">2004_010_001</a>	0.70 MB	74bb5cd2-1d70-44ac-8ba1-33b520c16083	2013-09-05 13:24
<a href="#">2004_010_003</a>	0.74 MB	7c84cf12-1094-4e73-97fe-e8993a976664	2013-09-05 14:48
<a href="#">2007_038_001</a>	0.40 MB	f90358a0-7102-41af-9d91-5ea3b79744b6	2013-05-29 16:16
<a href="#">2007_038_002</a>	0.30 MB	bac7b381-008d-44df-91b4-ff424ec55373	2013-05-30 11:37
<a href="#">2007_038_004</a>	4.10 MB	5250ebb5-5832-4f6d-8afc-33743416186b	2013-06-17 15:44
<a href="#">2007_038_005</a>	5.20 MB	253d5d3f-986c-471e-a3da-f42130ba071e	2013-06-19 10:47
<a href="#">2007_038_006</a>	4.20 MB	092d9b83-c022-4e63-bfb1-180aef16710d	2013-06-19 11:28
<a href="#">2007_038_007</a>	4.31 MB	706d004d-8370-445a-b458-59d15b25bf3d	2013-06-19 11:41
<a href="#">2007_038_009</a>	4.34 MB	754f7859-fc22-4447-8ee6-206830ac7d00	2013-06-19 12:38
<a href="#">2007_038_015</a>	4.51 MB	7f85597b-1b6f-46b0-941e-f8af198c1967	2013-06-19 14:50

Showing 1-10 of 35

Next



This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
-<mets xsi:schemaLocation="http://www.loc.gov/METS/ http://www.loc.gov/standards/mets/version18/mets.xsd">
  <metsHdr CREATEDATE="2013-11-01T18:36:46"/>
  -<amdSec ID="amdSec_1">
    -<techMD ID="techMD_1">
      -<mdWrap MDTYPE="PREMIS:OBJECT">
        -<xmlData>
          -<object xsi:type="file" xsi:schemaLocation="info:lc/xmlns/premis-v2 http://www.loc.gov/standards/premis/v2/premis-v2-2.xsd" version="2.2">
            -<objectIdentifier>
              <objectIdentifierType>UUID</objectIdentifierType>
              <objectIdentifierValue>86660b58-459f-47e5-a024-f06bf2d8ed82</objectIdentifierValue>
            </objectIdentifier>
            -<objectCharacteristics>
              <compositionLevel>0</compositionLevel>
            -<fixity>
              <messageDigestAlgorithm>sha256</messageDigestAlgorithm>
            -<messageDigest>
              db800ae1daef77c250516f9c72ff4a501be1c6bb59ddaa1f7f3b3e8fd821da
            </messageDigest>
            </fixity>
            <size>1528</size>
          -<format>
            -<formatDesignation>
              <formatName>Comma Separated Values</formatName>
              <formatVersion/>
            </formatDesignation>
            -<formatRegistry>
              <formatRegistryName>PRONOM</formatRegistryName>
              <formatRegistryKey>x-fmt/18</formatRegistryKey>
            </formatRegistry>
          </format>
          -<objectCharacteristicsExtension>
            -<fits xsi:schemaLocation="http://hul.harvard.edu/ois/xml/ns/fits/fits_output http://hul.harvard.edu/ois/xml/xsd/fits/fits_output.xsd" version="0.6.1">
              timestamp="11/1/13 12:29 PM">
                -<identification status="CONFLICT">
                  -<identity format="Plain text" mimeType="text/plain" toolname="FITS" toolversion="0.6.1">
                    <tool toolname="file utility" toolversion="5.09"/>
                  </identity>
                  -<identity format="MPEG 1/2 Audio Layer 3" mimeType="audio/mpeg" toolname="FITS" toolversion="0.6.1">
                    <tool toolname="Exiftool" toolversion="7.74"/>
                  </identity>
                  -<identity format="Comma Separated Values" mimeType="text/csv" toolname="FITS" toolversion="0.6.1">
                    <tool toolname="Droid" toolversion="3.0"/>
                  </identity>
                </identification>
              </fits>
            </objectCharacteristicsExtension>
          </object>
        </xmlData>
      </mdWrap>
    </techMD>
  </amdSec>
</mets>
```

# Produce AIP

## Archivematica

### Current

Using version 0.10 on  
dedicated workstation  
(testing as virtual server)

### Future

Install version 1.0 on  
server with multiple client  
nodes (workstations)

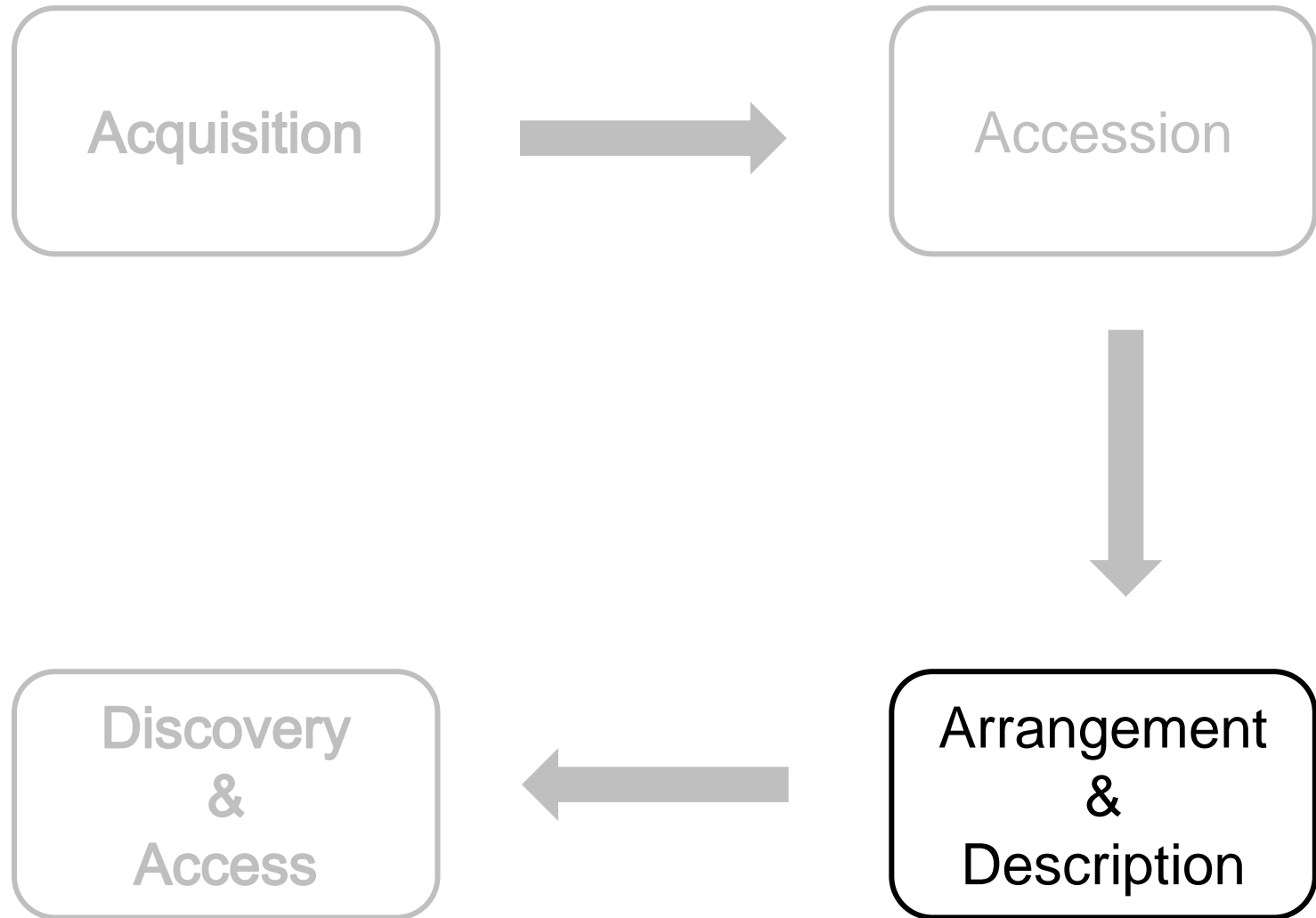


INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative

COUNCIL OF STATE ARCHIVISTS

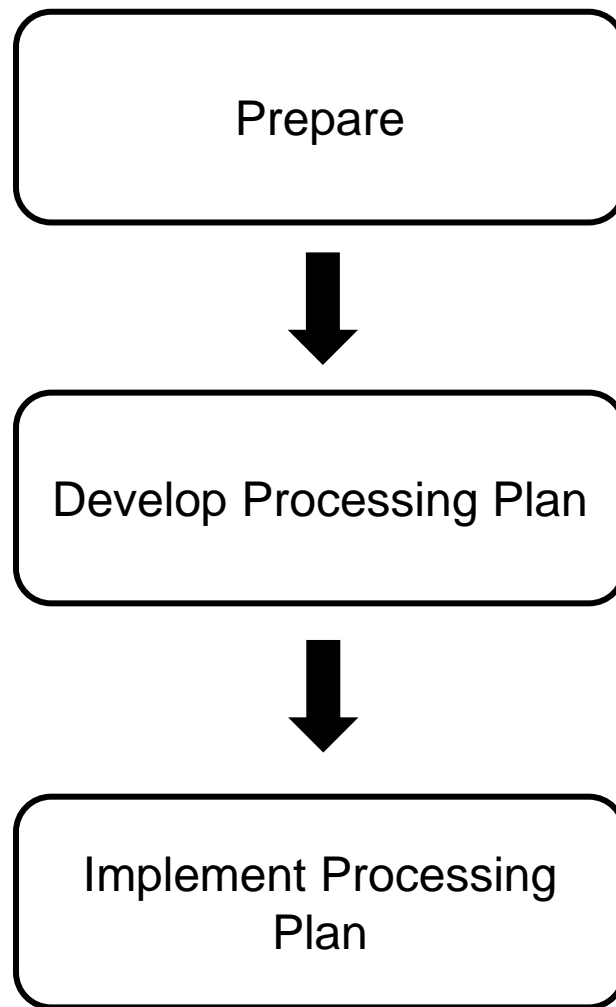


INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative  
COUNCIL OF STATE ARCHIVISTS

# A & D





# A & D

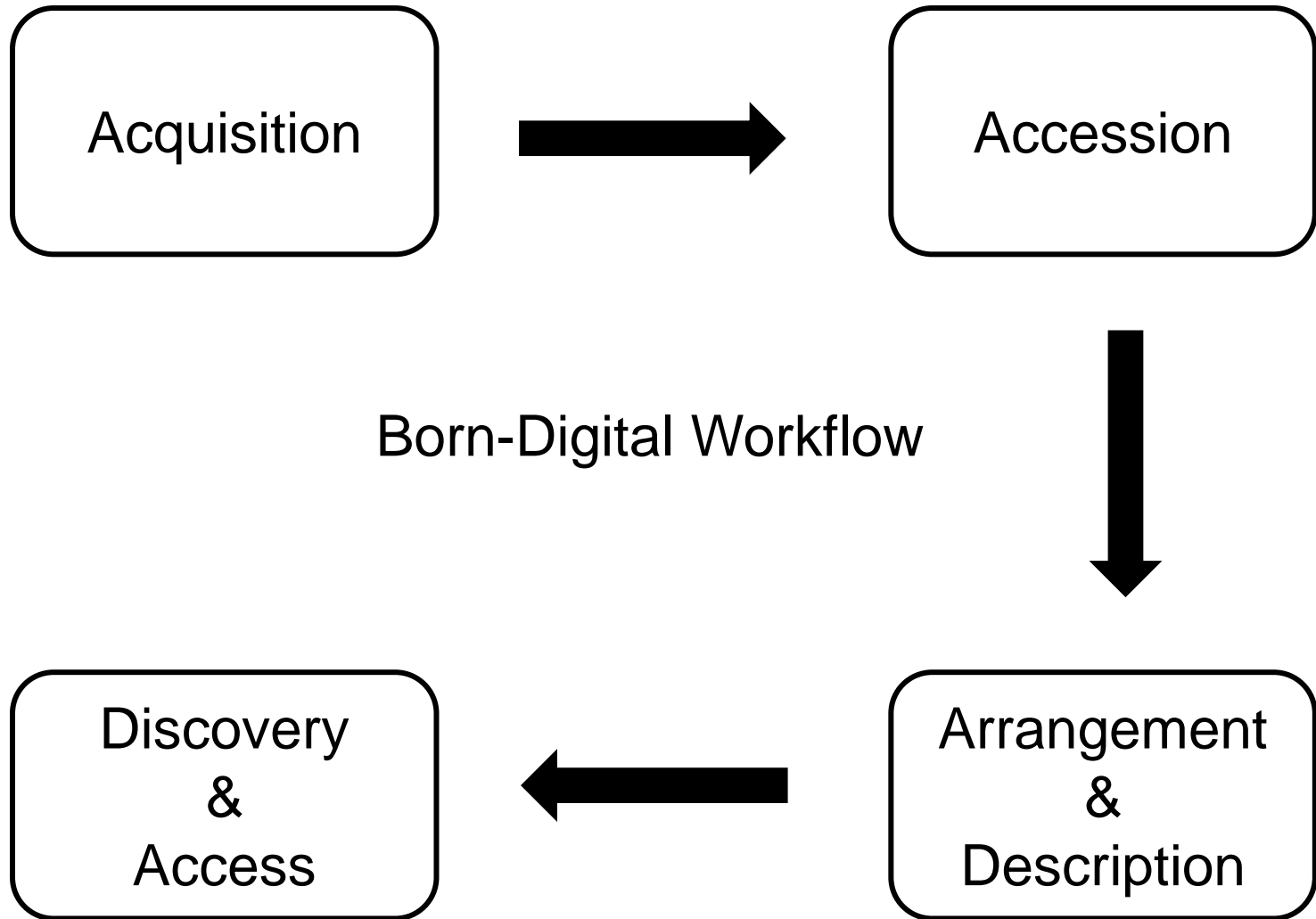
## Current

- Integrate Born Digital materials into existing A&D process / tools (mix of Excel, Word, XMetal XML editor)

## Future

- Determine tools needed for reviewing content (data visualization)
- Integrate Born Digital materials into collection management system





# Lessons Learned

- Embrace iterative approach (use what you have and get what you need when you need it)
- Capture as much metadata as possible (descriptive, structural, administrative)
- Start with workflow requirements (what needs to be done) then test tools (what things will get it done)
- Build flexibility into system (may not always be ideal scenarios)



# Open Source - Issues

- May require specific IT environment (Linux)
- Tools likely to change quickly
- User interfaces / experience may be simple
- Will need ongoing support from IT / Systems staff



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative

COUNCIL OF STATE ARCHIVISTS

# Open Source - Benefits

- Limited initial resources needed to install and test
- Provides opportunity to engage systems / IT in new areas
- Designed and developed in collaboration with archival community
- Direct communication channels to contribute to / modify development roadmap
- Quickly build initial standards-compliant workflow



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative

COUNCIL OF STATE ARCHIVISTS



# Resources

FC5205 Disk Image

<http://www.deviceside.com/fc5025.html>

Kryoflux

<http://www.kryoflux.com/>

BitCurator

<http://www.bitcurator.net/>

Archivematica

[https://www.archivematica.org/wiki/Main\\_Page](https://www.archivematica.org/wiki/Main_Page)

# Thanks!

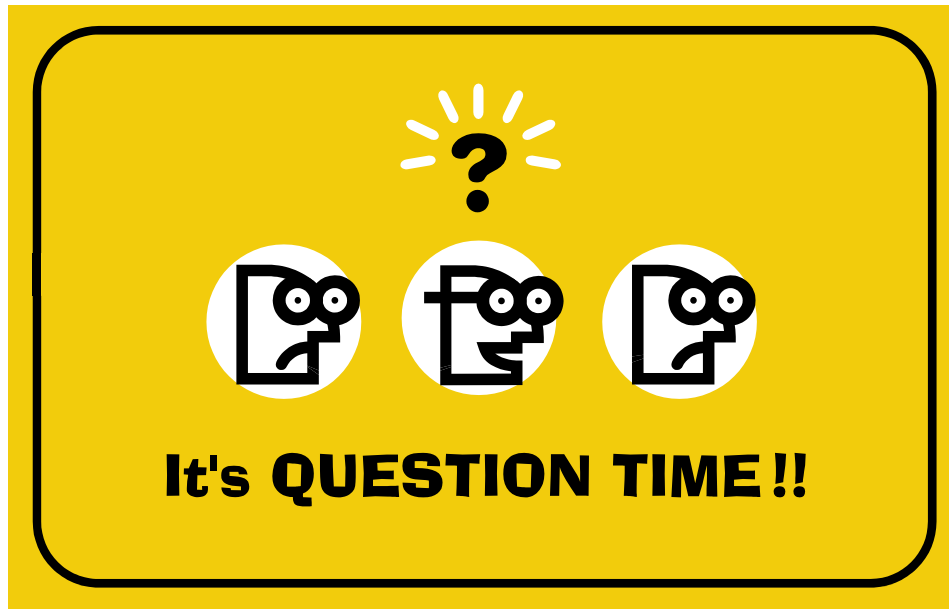
[sam.meister@mso.umt.edu](mailto:sam.meister@mso.umt.edu)  
@samalanmeister



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative  
COUNCIL OF STATE ARCHIVISTS



INSTITUTE of  
Museum and Library  
SERVICES



**SERI**  
State Electronic  
Records Initiative  
COUNCIL OF STATE ARCHIVISTS

# WRAP-UP

---

- Post-webinar survey in follow-up email
- SERI Educational Webinars every second Tuesday
- Webinar schedule will be posted soon
- All webinar slides available from the SERI webinar page:  
[http://www.statearchivists.org/seri/STEP/SERI\\_Educational\\_Webinars.htm](http://www.statearchivists.org/seri/STEP/SERI_Educational_Webinars.htm)