

# Using simple(ish) tools for appraising electronic records

Presented by Eira Tansey, Digital Archivist/Records Manager  
University of Cincinnati

# Electronic Records at UC

---

- Born digital vs. digitized
- Records retention schedules
- Transfer of records
- Legal vs ethical exclusion of data

# Sensitive data

---

- Looking at file metadata versus looking inside files
- To accession or not to accession
- Start with these two questions...
  1. What stuff do you have?
  2. What's lurking in the stuff you have?

# Beware the U. Oregon situation

March 26, 2015 by [Nick DeSantis](#)

    Comments (6)

## Archivists Suspended in Records-Leak Case Won't Return to U. of Oregon

Two archivists at the University of Oregon who had been placed on leave after a cache of confidential records was released to a professor will not be returning to their jobs, *The Oregonian* reports.

University officials had described the release of the records as unlawful. A lawyer for [William T. Harbaugh](#), an economics professor who had received the documents, [returned the records](#) to the university in late January. Mr. Harbaugh runs the blog [UOMatters](#) and has been a vocal advocate for transparency by Oregon's administration.

An investigation into the incident found that the records had been released before customary processing had been carried out and that they included information protected under federal and state privacy laws.



# A brief word on appraisal...

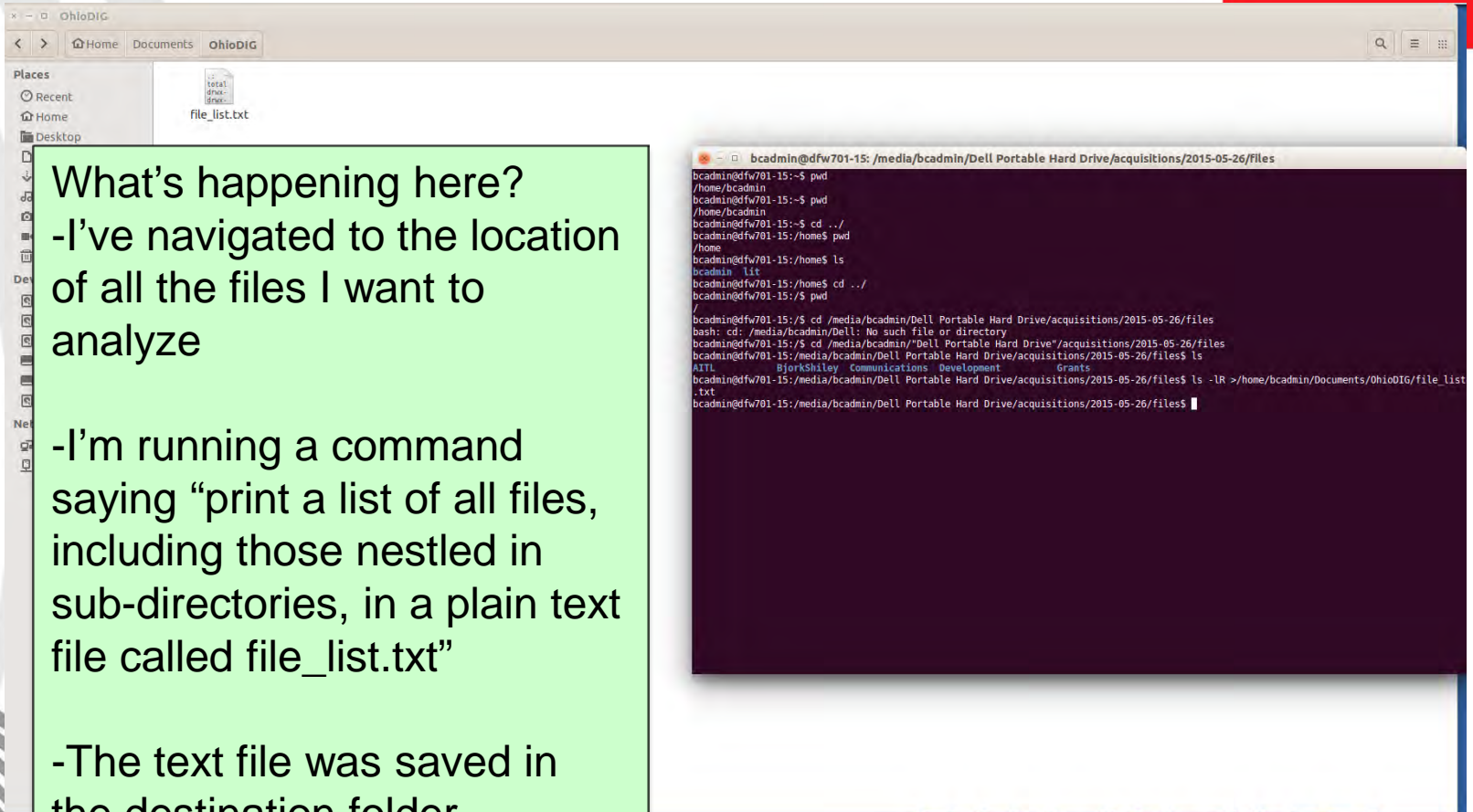


Image via <https://www.flickr.com/photos/denverjeffrey/1950409800/in/photostream/>

# 1. What stuff do you have?

- Imagine files in nests upon nests upon nests... that's too much clicking!
- Use a combination of the command line and simple spreadsheets to get a birds' eye view
- List of file names, extensions, dates, size
- Bertram Lyons' excellent tutorial
  - <http://bit.ly/1ctsgpF>

# Fire up the terminal!



The image shows a Linux desktop environment. On the left, a file manager window is open, displaying a file named 'file\_list.txt' on the desktop. A green text box is overlaid on the file manager, containing instructions. On the right, a terminal window is open, showing the execution of several commands to navigate to a specific directory and run the 'ls -lR' command to list files recursively, with the output being redirected to the 'file\_list.txt' file.

What's happening here?

- I've navigated to the location of all the files I want to analyze
- I'm running a command saying "print a list of all files, including those nestled in sub-directories, in a plain text file called file\_list.txt"
- The text file was saved in the destination folder

```
bcadmin@dfw701-15:~/media/bcadmin/Dell Portable Hard Drive/acquisitions/2015-05-26/files$ pwd
/home/bcadmin
bcadmin@dfw701-15:~/media/bcadmin/Dell Portable Hard Drive/acquisitions/2015-05-26/files$ cd ../
bcadmin@dfw701-15:~/media/bcadmin/Dell Portable Hard Drive/acquisitions/2015-05-26/files$ cd ../
bcadmin@dfw701-15:~/media/bcadmin/Dell Portable Hard Drive/acquisitions/2015-05-26/files$ ls -lR ->/home/bcadmin/Documents/OhioDIG/file_list.txt
```



# Uh..... Why is this useful?

```
file_list.txt (-/Documents/OhioDIG) - gedit
File List.txt x
.:
total 60
drwx----- 1 bcaadmin bcaadmin 4096 May 26 2015 AITL
drwx----- 1 bcaadmin bcaadmin 4096 Mar 31 2011 AnnualReports
drwx----- 1 bcaadmin bcaadmin 4096 Mar 31 2011 BjorkShiley
drwx----- 1 bcaadmin bcaadmin 0 May 26 2015 CHHP
drwx----- 1 bcaadmin bcaadmin 4096 Mar 31 2011 Communications
drwx----- 1 bcaadmin bcaadmin 4096 May 22 2015 Council
drwx----- 1 bcaadmin bcaadmin 12288 Jan 28 2013 Development
drwx----- 1 bcaadmin bcaadmin 4096 May 22 2015 GovernmentRelations
drwx----- 1 bcaadmin bcaadmin 24576 Apr 26 2012 Grants

./AITL:
total 32
drwx----- 1 bcaadmin bcaadmin 4096 Mar 31 2011 Advisory
drwx----- 1 bcaadmin bcaadmin 0 Mar 31 2011 EmergencyPlan
drwx----- 1 bcaadmin bcaadmin 4096 Mar 31 2011 Events
drwx----- 1 bcaadmin bcaadmin 12288 Nov 4 2013 MCP
drwx----- 1 bcaadmin bcaadmin 0 Mar 31 2011 Mission
drwx----- 1 bcaadmin bcaadmin 0 Mar 31 2011 News
drwx----- 1 bcaadmin bcaadmin 4096 Mar 3 2014 Outreach
drwx----- 1 bcaadmin bcaadmin 8192 Mar 31 2011 Website

./AITL/Advisory:
total 140
drwx----- 1 bcaadmin bcaadmin 4096 May 22 2015 Agendas
-rw----- 2 bcaadmin bcaadmin 30208 Jul 18 2001 AIT 07.01 labels.doc
-rw----- 2 bcaadmin bcaadmin 30208 Jul 18 2001 AIT 3.01 labels.doc
drwx----- 1 bcaadmin bcaadmin 0 Mar 31 2011 Handouts
drwx----- 1 bcaadmin bcaadmin 4096 Mar 31 2011 Letters of Invitation
drwx----- 1 bcaadmin bcaadmin 4096 Jun 18 2014 Members
drwx----- 1 bcaadmin bcaadmin 4096 Mar 31 2011 Minutes
-rw----- 2 bcaadmin bcaadmin 31744 Mar 15 2001 (OLD) AIT labels.doc
-rw----- 2 bcaadmin bcaadmin 25600 Jul 17 2001 Retreat action plan memo to advisory committees 5-01.doc

./AITL/Advisory/Agendas:
total 456
-rw----- 2 bcaadmin bcaadmin 43520 Jun 24 2005 Agenda 20050322.doc
-rw----- 2 bcaadmin bcaadmin 43520 Jun 27 2005 Agenda 20050628.doc
-rw----- 2 bcaadmin bcaadmin 44032 Sep 26 2005 Agenda 20050927.doc
-rw----- 2 bcaadmin bcaadmin 44544 Jan 20 2006 Agenda 20060124.doc
-rw----- 2 bcaadmin bcaadmin 42496 May 26 2006 Agenda 20060530.doc
-rw----- 2 bcaadmin bcaadmin 42496 Sep 12 2006 Agenda 20060919.doc
-rw----- 2 bcaadmin bcaadmin 42496 Jan 22 2007 Agenda 20070123.doc
```

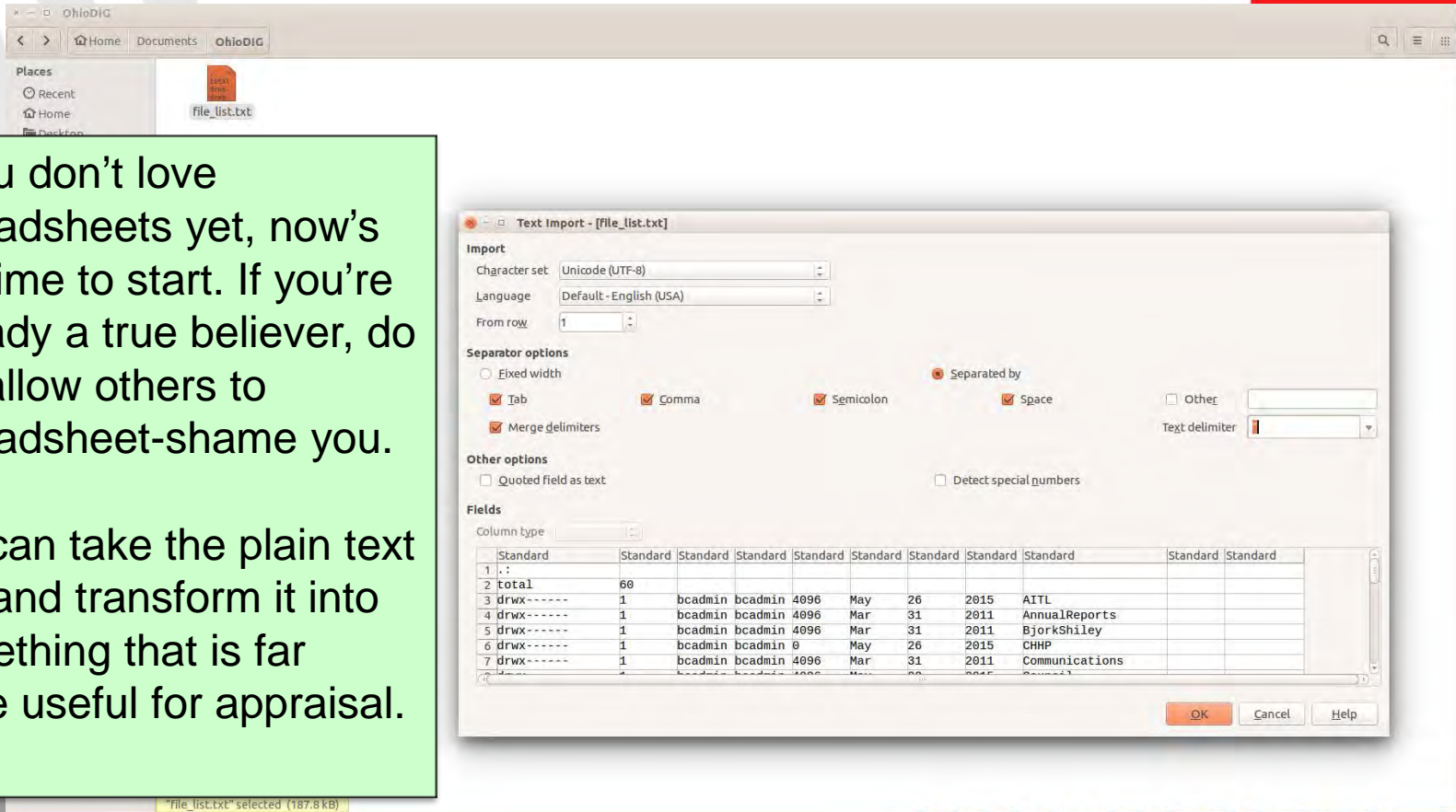
Plain Text ▾ Tab Width: 8 Ln 1, Col 1 INS



# Wait, there's more!

If you don't love spreadsheets yet, now's the time to start. If you're already a true believer, do not allow others to spreadsheet-shame you.

We can take the plain text file, and transform it into something that is far more useful for appraisal.



# Cleaning up the file

	A	B	C	D	E	F	G	H
1	total	60						
2	drwx-----	1 bcadmin	bcadmin		4096 May		26	2015 AITL
3	drwx-----	1 bcadmin	bcadmin		4096 Mar		31	2011 AnnualReports
4	drwx-----	1 bcadmin	bcadmin		4096 Mar		31	2011 BjorkShiley
5	drwx-----	1 bcadmin	bcadmin		0 May		26	2015 CHHP
6	drwx-----	1 bcadmin	bcadmin		4096 Mar		31	2011 Communications
7	drwx-----	1 bcadmin	bcadmin		4096 May		22	2015 Council
8	drwx-----	1 bcadmin	bcadmin		12288 Jan		28	2013 Development
9	drwx-----	1 bcadmin	bcadmin		4096 May		28	2015 GovernmentRela
10	drwx-----	1 bcadmin	bcadmin		24576 Apr		26	2012 Grants
11	drwx-----	1 bcadmin	bcadmin					
12	drwx-----	1 bcadmin	bcadmin					
13	drwx-----	1 bcadmin	bcadmin					
14	drwx-----	1 bcadmin	bcadmin					
15	drwx-----	1 bcadmin	bcadmin		4096 Mar		31	2011 Advisory
16	drwx-----	1 bcadmin	bcadmin		0 Mar		31	2011 EmergencyPlan
17	drwx-----	1 bcadmin	bcadmin		4096 Mar		31	2011 Events
18	drwx-----	1 bcadmin	bcadmin		12288 Nov		4	2013 MCP
19	drwx-----	1 bcadmin	bcadmin		0 Mar		31	2011 Mission
20	drwx-----	1 bcadmin	bcadmin		0 Mar		31	2011 News
21	drwx-----	1 bcadmin	bcadmin		4096 Mar		3	2014 Outreach
22	drwx-----	1 bcadmin	bcadmin		8192 Mar		31	2011 Website
23	drwx-----	1 bcadmin	bcadmin					
24	drwx-----	1 bcadmin	bcadmin					
25	total	140						
26	drwx-----	1 bcadmin	bcadmin		4096 May		22	2015 Agendas
27	-rw-----	2 bcadmin	bcadmin		30208 Jul		18	2001 AIT
28	-rw-----	2 bcadmin	bcadmin		30208 Jul		18	2001 AIT
29	drwx-----	1 bcadmin	bcadmin		0 Mar		31	2011 Handouts
30	drwx-----	1 bcadmin	bcadmin		4096 Mar		31	2011 Letters
31	drwx-----	1 bcadmin	bcadmin		4096 Jun		18	2014 Members
32	drwx-----	1 bcadmin	bcadmin		4096 Mar		31	2011 Minutes
33	-rw-----	2 bcadmin	bcadmin		31744 Mar		15	2001 (OLD)
34	-rw-----	2 bcadmin	bcadmin		25600 Jul		17	2001 Retreat
35	drwx-----	1 bcadmin	bcadmin					
36	drwx-----	1 bcadmin	bcadmin					
37	total	456						
38	-rw-----	2 bcadmin	bcadmin		43520 Jun		24	2005 Agenda
39	-rw-----	2 bcadmin	bcadmin		43520 Jun		27	2005 Agenda
40	-rw-----	2 bcadmin	bcadmin		44032 Sep		26	2005 Agenda
41	-rw-----	2 bcadmin	bcadmin		44544 Jan		20	2006 Agenda
42	-rw-----	2 bcadmin	bcadmin		42496 May		26	2006 Agenda
43	-rw-----	2 bcadmin	bcadmin		42496 Sep		12	2006 Agenda
44	-rw-----	2 bcadmin	bcadmin		42496 Jan		22	2007 Agenda
45	-rw-----	2 bcadmin	bcadmin		45056 May		11	2007 Agenda
46	-rw-----	2 bcadmin	bcadmin		45056 Oct		9	2007 Agenda
47	-rw-----	2 bcadmin	bcadmin		29184 Oct		15	2007 Agenda
48	-rw-----	2 bcadmin	bcadmin		26624 Jul		11	2001 June
49	drwx-----	1 bcadmin	bcadmin					
50	total	0						
51	total	0						
52	total	0						
53	total	0						

What's happening here?

If you look at the columns on the right, you see that spaces in the file names (BOO! HISS!) broke apart into several columns

# After cleaning...

The file names have been rejoined using the Excel concatenate function

	A	B	C	D	E	F	G	H
25	total		140					
26	drwx-----	1	bcadmin	bcadmin	4096	May	22	201
27	-rw-----	2	bcadmin	bcadmin	30208	Jul	18	200
28	-rw-----	2	bcadmin	bcadmin	30208	Jul	18	200
29	drwx-----	1	bcadmin	bcadmin	0	Mar	31	201
30	drwx-----	1	bcadmin	bcadmin	4096	Mar	31	201
31	drwx-----	1	bcadmin	bcadmin	4096	Jun	18	201
32	drwx-----	1	bcadmin	bcadmin	4096	Mar	31	201
33	-rw-----	2	bcadmin	bcadmin	31744	Mar	15	200
34	-rw-----	2	bcadmin	bcadmin	25600	Jul	17	2001
35								2001 Retreat action plan memo to advisory committees 5-01.doc
36	./AITL/Advisory/Agendas:							
37	total		456					
38	-rw-----	2	bcadmin	bcadmin	43520	Jun	24	2005
39	-rw-----	2	bcadmin	bcadmin	43520	Jun	27	2005
40	-rw-----	2	bcadmin	bcadmin	44032	Sep	26	2005
41	-rw-----	2	bcadmin	bcadmin	44544	Jan	20	2006
42	-rw-----	2	bcadmin	bcadmin	42496	May	26	2006
43	-rw-----	2	bcadmin	bcadmin	42496	Sep	12	2006
44	-rw-----	2	bcadmin	bcadmin	42496	Jan	22	2007
45	-rw-----	2	bcadmin	bcadmin	45056	May	11	2007
46	-rw-----	2	bcadmin	bcadmin	45056	Oct	9	2007
47	-rw-----	2	bcadmin	bcadmin	29184	Oct	15	2007
48	-rw-----	2	bcadmin	bcadmin	26624	Jul	11	2001
49								2001 June 12 2001 Meeting Agenda.doc
50	./AITL/Advisory/Handouts:							
51	total		0					
52								
53	./AITL/Advisory/Letters	of	Invitation:					
54	total		352					
55	drwx-----	1	bcadmin	bcadmin	4096	Mar	31	2011
56	-rw-----	2	bcadmin	bcadmin	25088	Jan	10	2008
57	-rw-----	2	bcadmin	bcadmin	25088	Jan	10	2008
58	-rw-----	2	bcadmin	bcadmin	25088	Jan	10	2008
59	-rw-----	2	bcadmin	bcadmin	25088	Jan	10	2008
60	-rw-----	2	bcadmin	bcadmin	25088	Jan	10	2008
61	-rw-----	2	bcadmin	bcadmin	25088	Jan	10	2008
62	-rw-----	2	bcadmin	bcadmin	25088	May	13	2008
63	-rw-----	2	bcadmin	bcadmin	25088	Jan	10	2008
64	-rw-----	2	bcadmin	bcadmin	25088	Jan	10	2008
65	-rw-----	2	bcadmin	bcadmin	25088	Jan	10	2008
66	-rw-----	2	bcadmin	bcadmin	37376	Jan	10	2008
67	-rw-----	2	bcadmin	bcadmin	25088	Jan	10	2008
68								2008 Whalen01.07.08.doc
69	./AITL/Advisory/Letters	of	Invitation/Archives:					
70	total		240					
71	-rw-----	2	bcadmin	bcadmin	20480	Sep	13	2001
72	-rw-----	2	bcadmin	bcadmin	20992	Sep	13	2001
73	-rw-----	2	bcadmin	bcadmin	19968	Sep	27	2001
74	-rw-----	2	bcadmin	bcadmin	19968	Dec	13	2001
75	-rw-----	2	bcadmin	bcadmin	19968	Nov	14	2000
76	-rw-----	2	bcadmin	bcadmin	20480	Oct	27	2000
77	-rw-----	2	bcadmin	bcadmin	19968	Oct	27	2000



# And eventually...

File names

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	-rw----	2	bcadmin	bcadmin				2001	AIT 7.01 labels.doc	doc	Total files	Total GB		File extensions			
2	-rw----	2	bcadmin	bcadmin	30208	Jul	18	2001	AIT 3.01 labels.doc	doc	2054	1.088550546		cfm	1		
3	-rw----	2	bcadmin	bcadmin	31744	Mar	15	2001	(OLD)AIT labels.doc	doc				css	1		
4	-rw----	2	bcadmin	bcadmin	25600	Jul	17	2001	Retreat action plan memo to advisory committees 5-01.doc	doc				doc	1105		
5	-rw----	2	bcadmin	bcadmin	43520	Jun	24	2005	Agenda 20050322.doc	doc				docm	1		
6	-rw----	2	bcadmin	bcadmin	43520	Jun	27	2005	Agenda 20050628.doc	doc				docx	156		
7	-rw----	2	bcadmin	bcadmin	44032	Sep	26	2005	Agenda 20050927.doc	doc				dot	1		
8	-rw----	2	bcadmin	bcadmin	44544	Jan	20	2006	Agenda 20060124.doc	doc				fla	1		
9	-rw----	2	bcadmin	bcadmin	42496	May	26	2006	Agenda 20060530.doc	doc				gif	27		
10	-rw----	2	bcadmin	bcadmin	42496	Sep	12	2006	Agenda 20060919.doc	doc				htm	6		
11	-rw----	2	bcadmin	bcadmin	42496	Jan	22	2007	Agenda 20070123.doc	doc				html	35		
12	-rw----	2	bcadmin	bcadmin	45056	May	11	2007	Agenda 20070515.doc	doc				jpg	320		
13	-rw----	2	bcadmin	bcadmin	45056	Oct	9	2007	Agenda 20071016.doc	doc				js	6		
14	-rw----	2	bcadmin	bcadmin	29184	Oct	15	2007	Agenda 20071016 SAM notes.doc	doc				LOG	4		
15	-rw----	2	bcadmin	bcadmin	26624	Jul	11	2001	June 12 2001 Meeting Agenda.doc	doc				mht	1		
16	-rw----	2	bcadmin	bcadmin	25088	Jan	10	2008	Buring01.07.08.doc	doc				pdf	233		
17	-rw----	2	bcadmin	bcadmin	25088	Jan	10	2008	Cuppoletti01.07.08.doc	doc				ppt	3		
18	-rw----	2	bcadmin	bcadmin	25088	Jan	10	2008	DeHoop01.07.08.doc	doc				pptx	1		
19	-rw----	2	bcadmin	bcadmin	25088	Jan	10	2008	Diers01.07.08.doc	doc				psd	1		
20	-rw----	2	bcadmin	bcadmin	25088	Jan	10	2008	Gibson01.07.08.doc	doc				rtf	6		
21	-rw----	2	bcadmin	bcadmin	25088	Jan	10	2008	Harrett01.07.08.doc	doc				swf	65		
22	-rw----	2	bcadmin	bcadmin	25088	May	13	2008	Letter of Invitation.doc	doc				wav	4		
23	-rw----	2	bcadmin	bcadmin	25088	Jan	10	2008	Maddox01.07.08.doc	doc				WPG	1		
24	-rw----	2	bcadmin	bcadmin	25088	Jan	10	2008	Manual01.07.08.doc	doc				xls	52		
25	-rw----	2	bcadmin	bcadmin	25088	Jan	10	2008	Nussbaum01.07.08.doc	doc				xlsx	18		
26	-rw----	2	bcadmin	bcadmin	37376	Jan	10	2008	Smith01.10.08.doc	doc							
27	-rw----	2	bcadmin	bcadmin	25088	Jan	10	2008	Whalen01.07.08.doc	doc							
28	-rw----	2	bcadmin	bcadmin	20480	Sep	13	2001	Degen invite letter.doc	doc							
29	-rw----	2	bcadmin	bcadmin	20992	Sep	13	2001	Hageman invite letter.doc	doc							
30	-rw----	2	bcadmin	bcadmin	19968	Sep	27	2001	Howard Jackson Invitation Letter.doc	doc							
31	-rw----	2	bcadmin	bcadmin	19968	Dec	13	2001	Howington Letter of Invite 12.01.doc	doc							
32	-rw----	2	bcadmin	bcadmin	19968	Nov	14	2000	Mark Faulkner Letter of Invitation 11.14.00.doc	doc							
33	-rw----	2	bcadmin	bcadmin	20480	Oct	27	2000	Michael Calhoun Invitation Letter 10.26.00.doc	doc							
34	-rw----	2	bcadmin	bcadmin	19968	Oct	27	2000	Molly Gordon Invitation Letter 10.26.00.doc	doc							
35	-rw----	2	bcadmin	bcadmin	20992	Jan	10	2002	Rodriguez Invitation Ltr 01.02.doc	doc							
36	-rw----	2	bcadmin	bcadmin	25088	Jan	5	2005	Ronnie Homer 01.05.05.doc	doc							
37	-rw----	2	bcadmin	bcadmin	20992	Mar	31	2003	Shauna Buring 03.31.03.doc	doc							
38	-rw----	2	bcadmin	bcadmin	19968	May	2	2001	Wexler Invite Ltr 4.20.01.doc	doc							
39	-rw----	2	bcadmin	bcadmin	36864	Jan	7	2008	AITL Advisory Committee 01.02.08.doc	doc							
40	-rw----	2	bcadmin	bcadmin	38912	Jan	28	2008	AITL Advisory Committee 01.23.08.doc	doc							
41	-rw----	2	bcadmin	bcadmin	37888	May	14	2007	AITL Advisory Committee 01.24.07.doc	doc							
42	-rw----	2	bcadmin	bcadmin	37888	Oct	2	2007	AITL Advisory Committee 07.17.07.doc	doc							
43	-rw----	2	bcadmin	bcadmin	37888	Oct	15	2007	AITL Advisory Committee 10.10.07.doc	doc							
44	-rw----	2	bcadmin	bcadmin	24064	Nov	28	2001	AITAC Members 07.01doc.doc	doc							
45	-rw----	2	bcadmin	bcadmin	26624	Jan	12	2005	AITAC Members List 01.05.doc	doc							
46	-rw----	2	bcadmin	bcadmin	26624	May	20	2003	AITAC Members List 05.20.03.doc	doc							
47	-rw----	2	bcadmin	bcadmin	26624	Jul	11	2003	AITAC Members List 06.20.03.doc	doc							
48	-rw----	2	bcadmin	bcadmin	27136	Sep	16	2003	AITAC Members List 07.11.03.doc	doc							
49	-rw----	2	bcadmin	bcadmin	31232	Sep	17	2003	AITAC Members List 09.16.03.doc	doc							
50	-rw----	2	bcadmin	bcadmin	30720	Sep	20	2004	AITAC Members List 09.20.04.doc	doc							
51	-rw----	2	bcadmin	bcadmin	26112	Oct	24	2002	AITAC Members List 10.02.doc	doc							
52	-rw----	2	bcadmin	bcadmin	23040	Nov	29	2001	AITAC Members List 11.01.doc	doc							

The column with the numbers represents bytes, so you can determine the GB or MB of your files.

In addition, you can run a function to count the number of unique file extensions

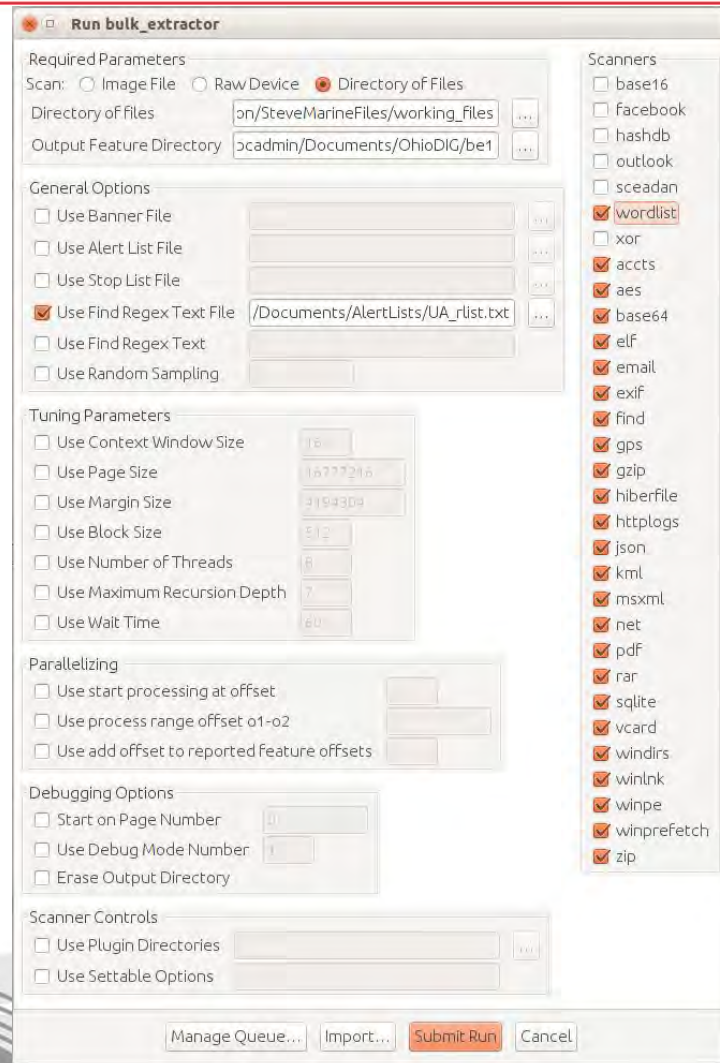


## 2. What's lurking in the stuff you have?

---

- BitCurator is a package of open-source digital forensics tools
- Digital forensics originated in the law enforcement community to deliver legally-admissible digital evidence
- May not want to forensically image everything, but forensics tools can be helpful for other tasks

# Diving Inside with Bulk Extractor



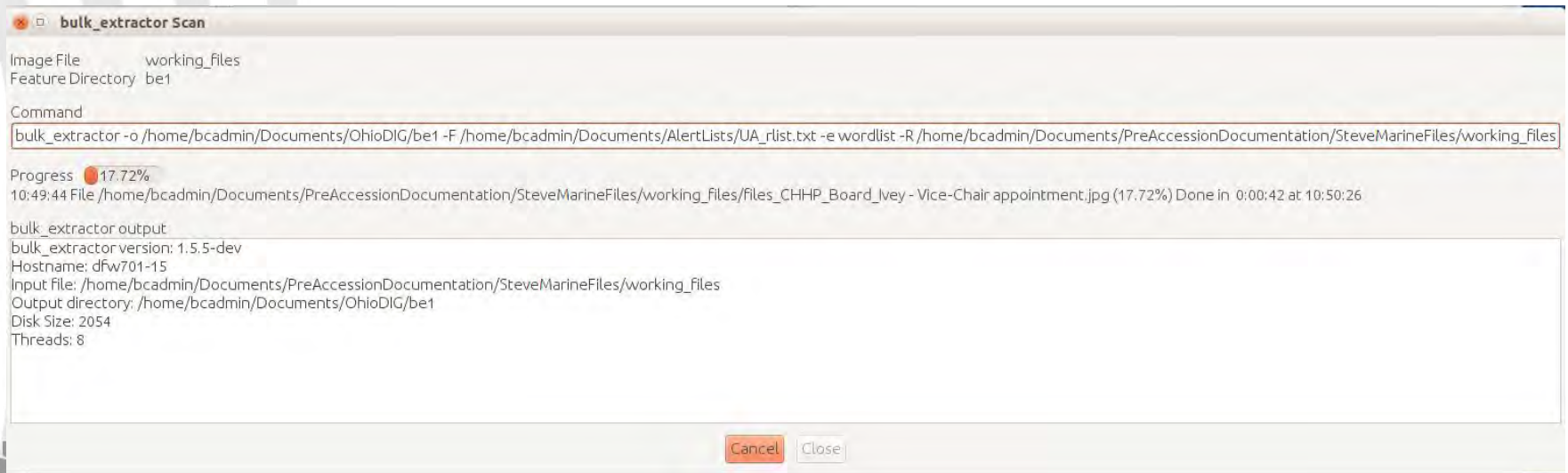
What's happening here?

-The top box is where you point BE to the origin set of files (or forensic disk image) and designate an output destination

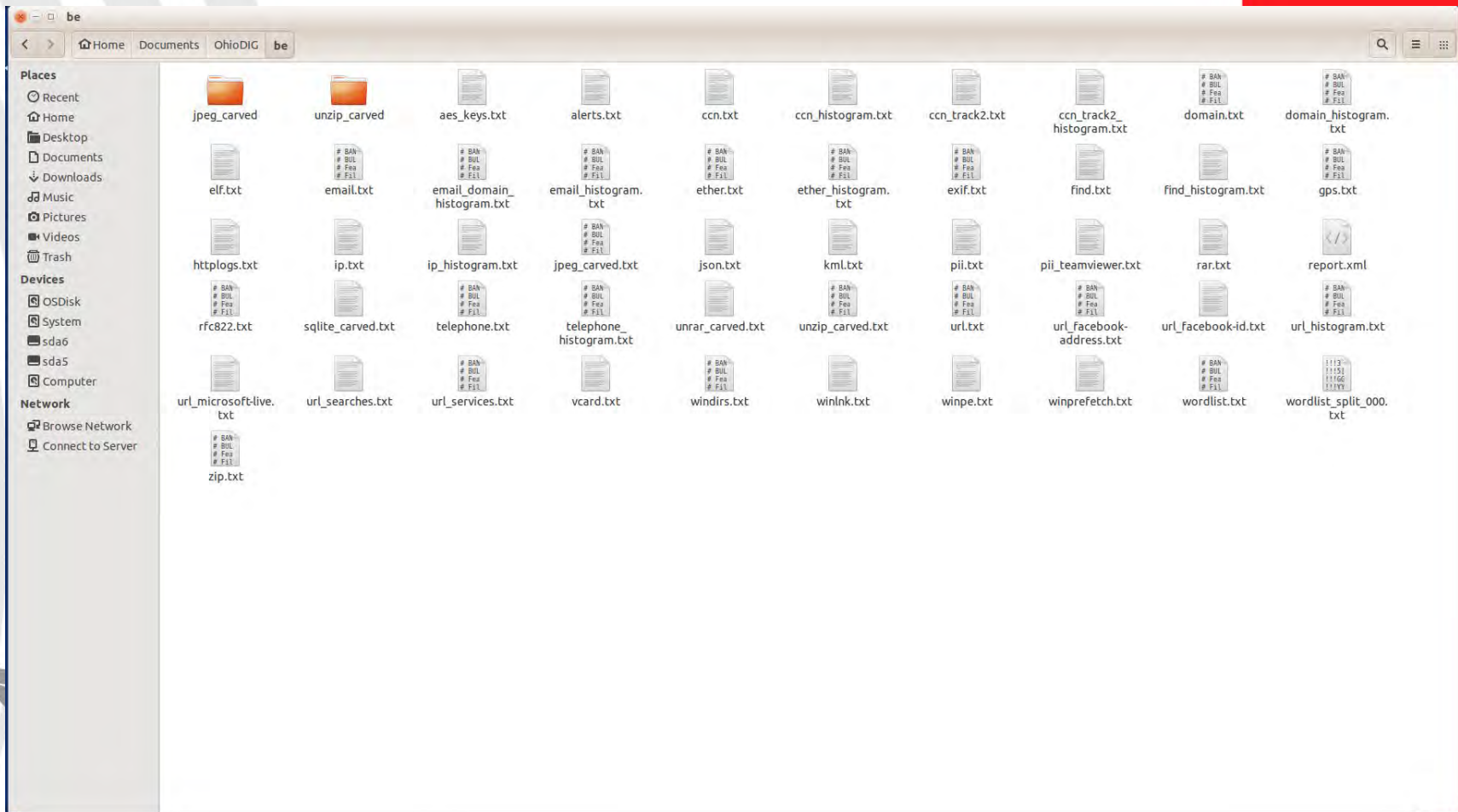
-The middle box is where you can select a list of keywords you want to flag

-The right column allows you to select pre-programmed "scanners" (e.g., credit card numbers, emails)

# Running Bulk Extractor



# Let's Explore These Files





# Looking Inside Flagged Files

What's happening here?

The items in bold in the left column represent scanners that found something.

The histogram shows how many files match an alert. This helps you establish rough idea of review time needed.

The screen on right shows which file has the matching word so you can determine whether to retain.

The screenshot shows the Bulk Extractor Viewer interface. The left pane lists reports, with several items in bold: **Find\_Histogram.txt**, **url\_facebook-address**, **url\_facebook-id.txt**, **url\_microsoft-live.txt**, **url\_services.txt**, **wordlist.txt**, and **zip.txt**. The main pane displays a histogram for 'Find\_Histogram.txt' with the following data:

Feature Filter	Match case
n=919	review
n=192	performance
	candidate
n=72	discipline
n=57	disciplinary
n=19	appraisal
n=3	misconduct

The bottom pane shows a list of 'Referenced Feature File' entries, with several 'Candidate' entries highlighted in yellow:

Referenced Feature File	find.txt	candidate
43690	candidate	
43769	candidate	
20815	candidate	
	<b>Candidate</b>	
80973-PDF-1321	candidate	
5471	candidate	
4959	candidate	
2736	<b>Candidate</b>	
5765	candidate	
5905	candidate	
5926	candidate	
58214-PDF-280	candidate	
2370-ZIP-237227	candidate	
2370-ZIP-242138	candidate	
2370-ZIP-0-MSXML-40203	candidate	
2370-ZIP-0-MSXML-40892	candidate	
1956	<b>Candidate</b>	
2925	candidate	
40385	candidate	
41074	candidate	
2846	<b>Candidate</b>	
2496-ZIP-11412	candidate	
2496-ZIP-0-MSXML-717	candidate	
2370-ZIP-236838	candidate	
2370-ZIP-241671	candidate	
2370-ZIP-0-MSXML-39824	candidate	
2370-ZIP-0-MSXML-40513	candidate	
15418-ZIP-20364	candidate	
15418-ZIP-0-MSXML-14946	candidate	

The right pane shows a list of image files with their corresponding feature files and forensic paths. A blue box highlights the 'Image' column header. Below it, a snippet of text is visible, mentioning 'BIOGRAPHICAL SKETCH. Provide the following information for the key personnel in the order listed for Form Page 2. Follow th'.

# Questions or Comments?

---

<http://www.bitcurator.net>

<http://coptr.digipres.org>

<http://digitalpowrr.niu.edu/>

<https://groups.google.com/forum/#!forum/digital-curation>

eira.tansey@uc.edu