

Taking Bitstreams Seriously: Digital Forensics and the BitCurator Environment

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BitCurator 



UNC
SCHOOL OF INFORMATION
AND LIBRARY SCIENCE

Two Main Acquisition Paths

Systematic Transfer	Dealing with Whatever you Get
Close pre-coordination between Producer and Archive*	Little pre-coordination between Producer and Archive
Archive has (at least some) say in how materials are produced, packaged and transferred	Archive has relatively little say in how materials are produced, packaged and transferred
Relatively little need to engage in guess work or ad hoc description after the transfer	Substantial need to engage in guess work or ad hoc description after the transfer

*Archive in the OAIS sense – can be library, archives, museum, data center, ...

Examples of Systematic Transfer Developments

- Protocols and tools for transfer (e.g. BagIt)¹
- Systematic and predictable ingest workflows²
- Substantial, well-documented Producer-Archive interactions (e.g. PAIMAS)³

1. "BagIt: Transferring Content for Digital Preservation" (Video). Library of Congress, August 6, 2009.
http://www.youtube.com/watch?v=l3p3ao_JSfo

2. Glick, Kevin, and Eliot Wilczek. "Ingest Guide." Tufts University and Yale University, 2006.
http://dca.lib.tufts.edu/features/nhprc/reports/3_1_draftpublic3.pdf

3. Producer-Archive Interface Methodology Abstract Standard (PAIMAS). CCSDS 651.0-M-1. Consultative Committee for Space Data Systems. May 2004.

Sometimes things are a little messier



Applying Digital Forensics to Digital Collections – Previous Work*

- Ross and Gow (1999) - potential relevance of advances in data recovery and digital forensics to collecting institutions
- More recently - active stream of literature related to use of forensic tools and methods for digital collections, including activities at the British Library, National Library of Australia and Indiana University
- PERPOS (Georgia Tech) – has applied data capture and extraction to US presidential materials
- “Computer Forensics and Born-Digital Content in Cultural Heritage Collections” - symposium and report (2010)
- Born Digital Collections: An Inter-Institutional Model for Stewardship (AIMS) - framework for the stewardship of born-digital materials, including digital forensics methods
- Digital Records Forensics project - has articulated connections between the concepts of digital forensics and archival science
- Two Open Planets Foundation (OPF) Hackathons this year – one in Copenhagen, one in Chapel Hill

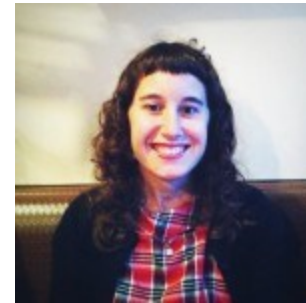
*See citations in: Lee, Christopher A. "[Archival Application of Digital Forensics Methods for Authenticity, Description and Access Provision](#)." In *Proceedings of the International Council on Archives Congress, Brisbane, Australia, August 20-24, 2012*.

BitCurator

- Funded by Andrew W. Mellon Foundation
 - Phase 1: October 1, 2011 – September 30, 2013
 - Phase 2 – October 1, 2013 – September 30, 2014
- Partners: School of Information and Library Science (SILS) at UNC and Maryland Institute for Technology in the Humanities (MITH)

Core BitCurator Team

- Cal Lee, PI
- Matt Kirschenbaum, Co-PI
- Kam Woods, Technical Lead
- Alex Chassonoff, Project Manager (UNC)
- Sunitha Misra, GA (UNC)
- Porter Olsen, GA (MITH)



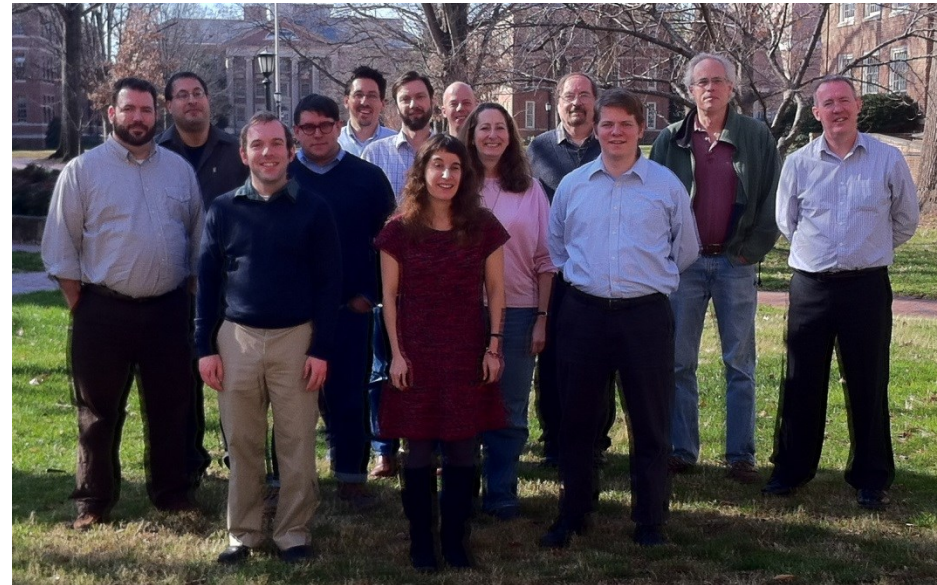
Two Groups of Advisors

Professional Experts Panel

- Bradley Daigle, University of Virginia Library
- Erika Farr, Emory University
- Jennie Levine Knies, University of Maryland
- Jeremy Leighton John, British Library
- Leslie Johnston, Library of Congress
- Naomi Nelson, Duke University
- Erin O'Meara, Gates Archive
- Michael Olson, Stanford University Libraries
- Gabriela Redwine, Harry Ransom Center, University of Texas
- Susan Thomas, Bodleian Library, University of Oxford

Development Advisory Group

- Barbara Guttman, National Institute of Standards and Technology
- Jerome McDonough, University of Illinois
- Mark Matienzo, Yale University
- Courtney Mumma, Artefactual Systems
- David Pearson, National Library of Australia
- Doug Reside, New York Public Library
- Seth Shaw, University Archives, Duke University
- William Underwood, Georgia Tech



BitCurator Goals

- Develop a system for collecting professionals that incorporates the functionality of open-source digital forensics tools
- Address two fundamental needs not usually addressed by the digital forensics industry:
 - incorporation into the workflow of archives/library ingest and collection management environments
 - provision of public access to the data

BitCurator Environment

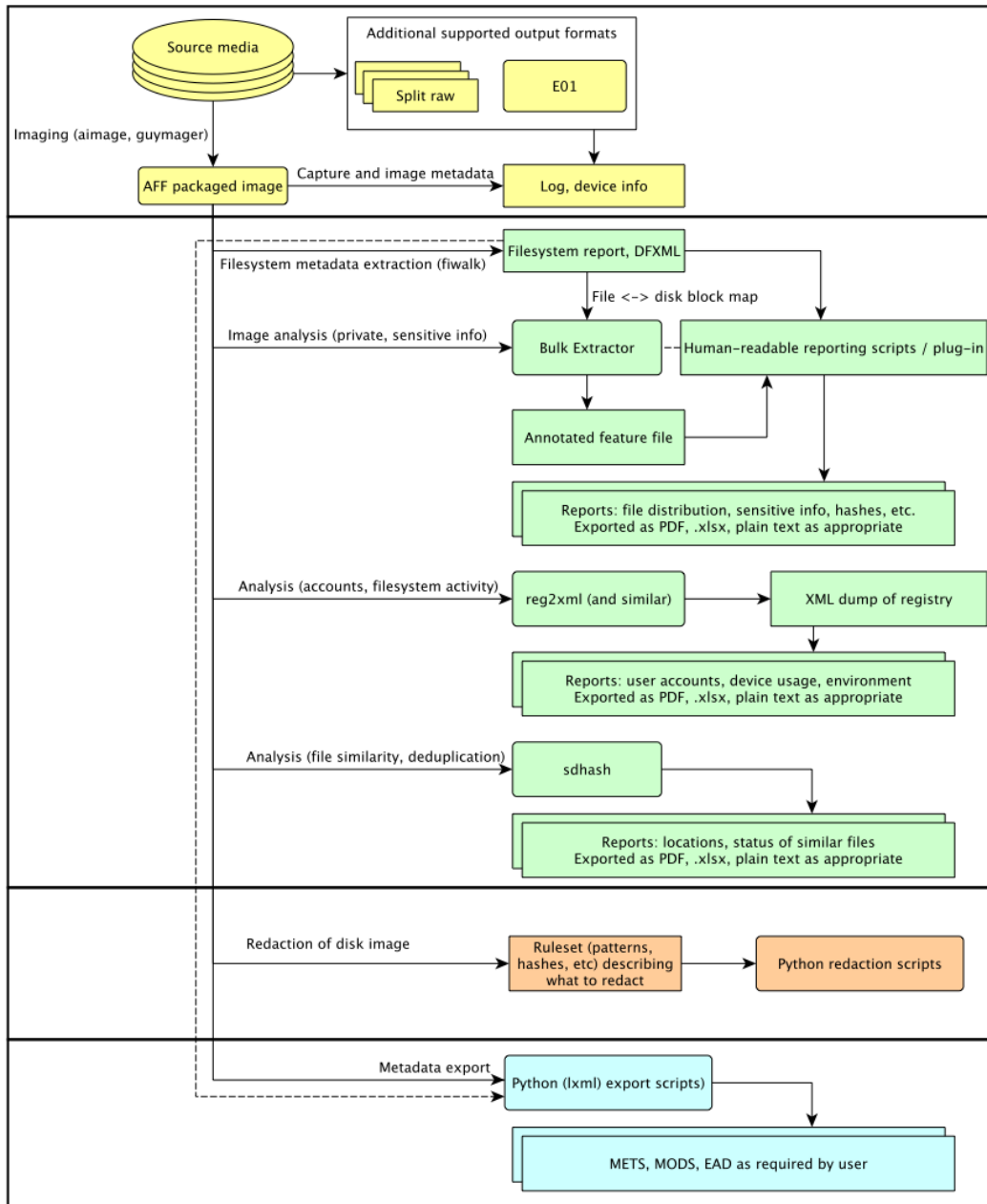
- Bundles, integrates and extends functionality (primarily data capture and reporting) of open source software: fiwalk, bulk extractor, Guymager, The Sleuth Kit, sdhash and others
- Can be run as:
 - Self-contained environment (based on Ubuntu Linux) running directly on a computer (download installation ISO)
 - Self-contained Linux environment in a virtual machine using VirtualBox
 - As individual components run directly in your own Linux environment or (whenever possible) Windows environment

Acknowledgement to Simson Garfinkel



- Digital forensics scholar at Naval Postgraduate School
- Responsible for:
 - fiwalk
 - Bulk Extractor
 - Digital Forensics XML (DFXML) metadata conventions
 - forensicswiki.org
 - digitalcorpora.org

BitCurator-Supported Workflow



Acquisition

Reporting

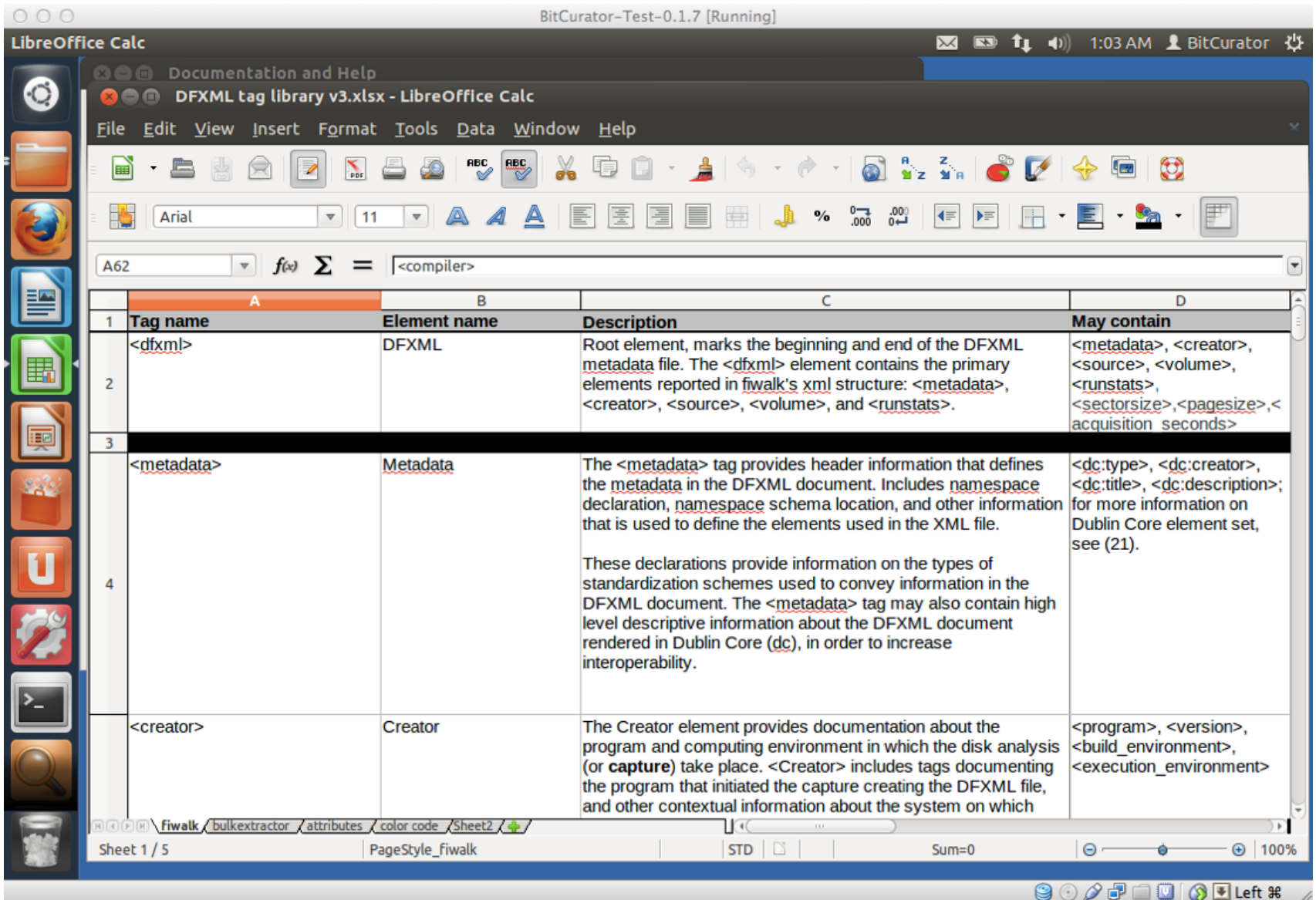
Redaction

Metadata export

- Acquisition
- Reporting
- Redaction
- Metadata Export

See: <http://bitcurator.net>

Metadata Conventions of the BitCurator Tools: Digital Forensics XML (DFXML)

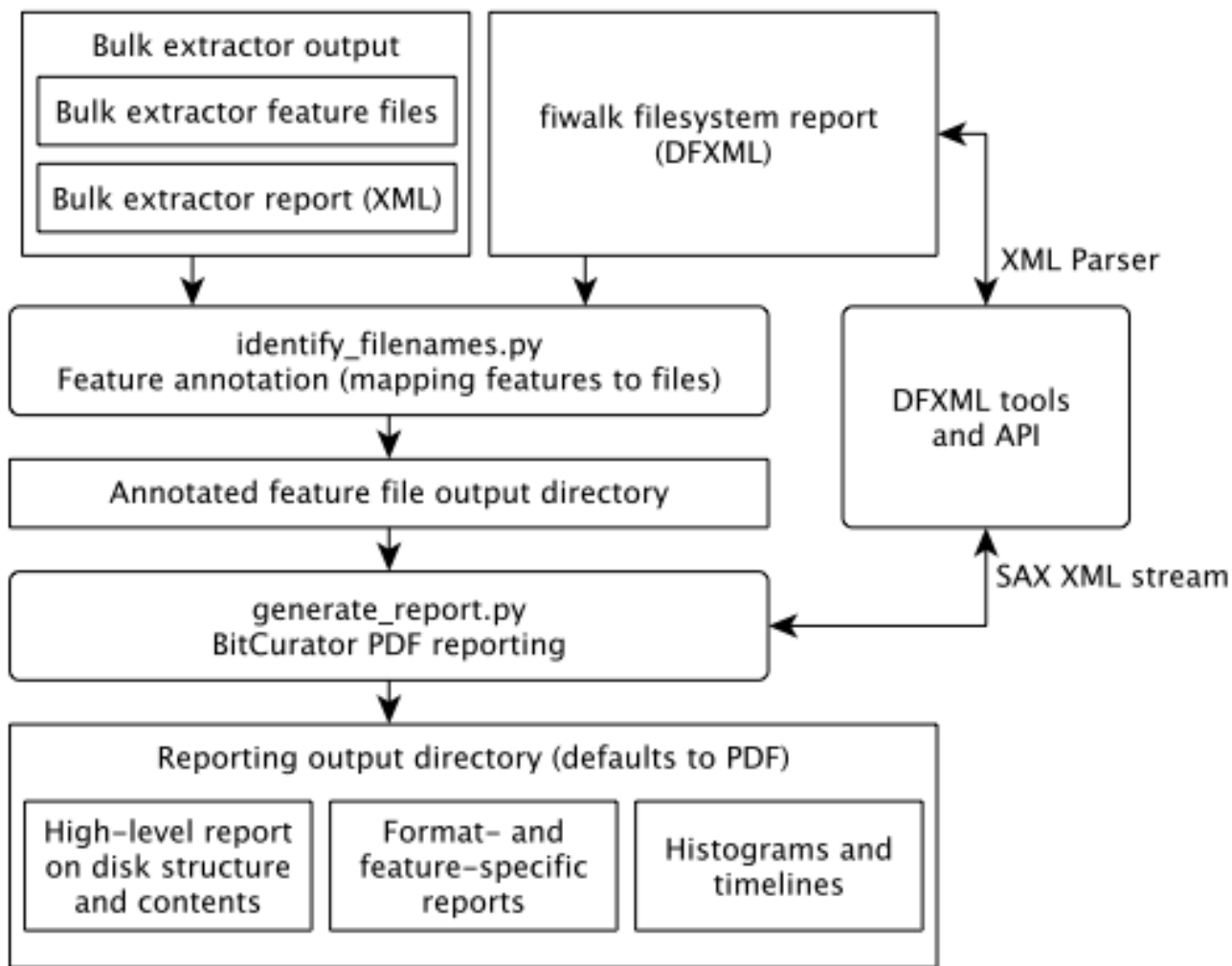


The screenshot shows a LibreOffice Calc spreadsheet titled "DFXML tag library v3.xlsx". The spreadsheet contains a table with the following data:

	A	B	C	D
1	Tag name	Element name	Description	May contain
2	<dfxml>	DFXML	Root element, marks the beginning and end of the DFXML metadata file. The <dfxml> element contains the primary elements reported in <u>fiwalk's xml</u> structure: <metadata>, <creator>, <source>, <volume>, and <runstats>.	<metadata>, <creator>, <source>, <volume>, <runstats>, <sectorsize>, <pagesize>, <acquisition seconds>
3	<metadata>	Metadata	The <metadata> tag provides header information that defines the metadata in the DFXML document. Includes namespace declaration, namespace schema location, and other information that is used to define the elements used in the XML file. These declarations provide information on the types of standardization schemes used to convey information in the DFXML document. The <metadata> tag may also contain high level descriptive information about the DFXML document rendered in Dublin Core (dc), in order to increase interoperability.	<dc:type>, <dc:creator>, <dc:title>, <dc:description>; for more information on Dublin Core element set, see (21).
4	<creator>	Creator	The Creator element provides documentation about the program and computing environment in which the disk analysis (or capture) take place. <Creator> includes tags documenting the program that initiated the capture creating the DFXML file, and other contextual information about the system on which	<program>, <version>, <build_environment>, <execution_environment>

<http://www.bitcurator.net/2013/02/06/dfxml-tag-library/>

Metadata Generation and Reporting



See: Woods, Kam, Christopher Lee, and Sunitha Misra. "Automated Analysis and Visualization of Disk Images and File Systems for Preservation." In *Proceedings of Archiving 2013* (Springfield, VA: Society for Imaging Science and Technology, 2013), 239-244.



Computer



home



Imaging Tools



Forensics Tools



Additional Tools



Trash



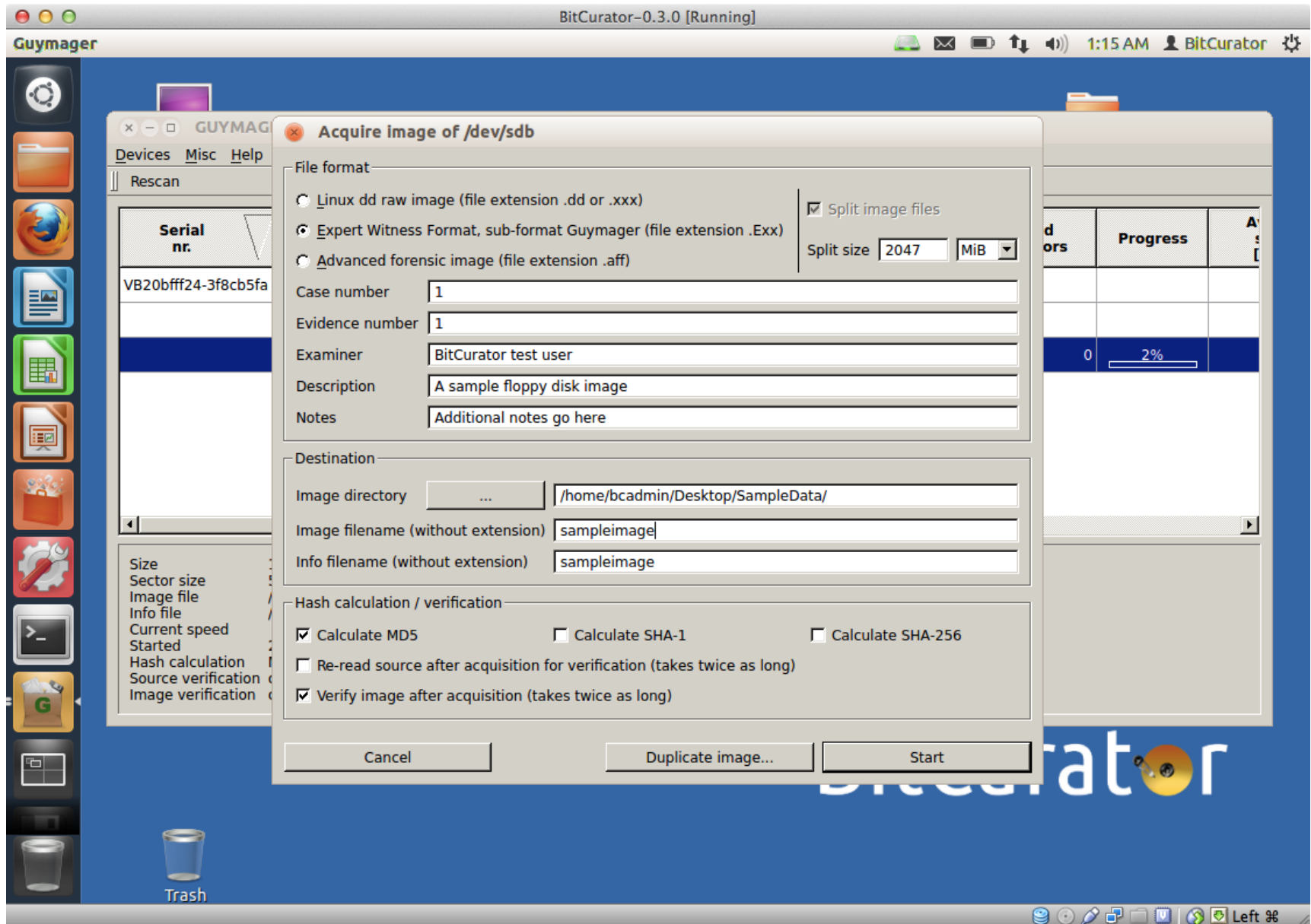
Documentation and Help



Network Servers

BitCurator

Acquiring Disk Images with Guymager



Exporting Filesystem Content Using fiwalk

The screenshot shows the BitCurator Reports dialog box in an Ubuntu Desktop environment. The dialog box is titled "Bitcurator Reports" and has three tabs: "Fiwalk XML", "Annotated Features", and "Reports". The "Reports" tab is selected. The text inside the dialog box reads: "Fiwalk produces a DFXML file showing the volumes, directories, and files contained within a disk image." Below this text are two input fields: "Image File" with the path "/home/bcadmin/Desktop/SampleData/sampleimage.E01" and "Output XML File" with the path "/home/bcadmin/Desktop/SampleData/sampleimage.xml". At the bottom of the dialog box are three buttons: "Cancel", "Close", and "OK". The background shows the Ubuntu Desktop with a blue background, a sidebar on the left with various icons, and a top panel with system information and a taskbar at the bottom.

BitCurator-0.3.0 [Running]

Ubuntu Desktop

1:32 AM 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
/home/bcadmin/Desktop/SampleData/sampleimage.E01

Output XML File
/home/bcadmin/Desktop/SampleData/sampleimage.xml

Command Line Output:

Cancel Close OK

tCurator

Viewing the Command Line Output

The screenshot displays the BitCurator Forensics GUI with a 'Bitcurator Reports' dialog box open. The dialog has three tabs: 'Fiwalk XML', 'Annotated Features', and 'Reports'. The 'Reports' tab is selected, showing a text area with the following content:

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

Image File
/home/bcadmin/Desktop/SampleData/sampleimage.E01

Output XML File
/home/bcadmin/Desktop/SampleData/sampleimage.xml

Command Line Output:

```
>> Command Executed for Fiwalk = ['fiwalk', '-f', '-X',  
'/home/bcadmin/Desktop/SampleData/sampleimage.xml',  
'/home/bcadmin/Desktop/SampleData/sampleimage.E01']  
  
>> Success!!! Fiwalk crated the following file(s):  
  
o /home/bcadmin/Desktop/SampleData/sampleimage.xml
```

The 'Command Line Output' section is circled in red. At the bottom of the dialog are 'Cancel', 'Close', and 'OK' buttons. The background shows a desktop environment with various icons and a taskbar at the bottom.

DFXML Output from fiwalk

BitCurator-0.3.0 [Running]

Mozilla Firefox

file:///home/b...mpleimage.xml

file:///home/bcadmin/Desktop/SampleData/sampleimage.xml

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

```
-<dfxml version="1.0">
  -<metadata>
    <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 /home/bcadmin/Desktop/SampleData/sampleimage.xml /home/bcadmin/Desktop/SampleData/sampleimage.E01
      </command_line>
      <start_time>2013-07-20T05:34:37Z</start_time>
    </execution_environment>
  </creator>
  -<source>
    <image_filename>/home/bcadmin/Desktop/SampleData/sampleimage.E01</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>
  </volume>
</dfxml>
```

Left 96

DFXML for a Specific File

```
<fileobject>
  <filename>Documents and Settings/All Users/Documents/
    My Pictures/Sample Pictures/Blue hills.jpg
  </filename>
  ...
  <filesize>28521</filesize>
  <alloc>1</alloc>
  <used>1</used>
  <inode>6245</inode>
  ...
  <uid>0</uid>
  <gid>0</gid>
  <mtime>1208174400</mtime>
  <ctime>1257729636</ctime>
  <atime>1257729636</atime>
  <ctime>1257729636</ctime>
  <seq>2</seq>
  <libmagic>JPEG image data, JFIF standard 1.02</libmagic>
  <byte_runs>
    <run file_offset='0' fs_offset='0' img_offset='363200512'
      len='0' />
  </byte_runs>
  <hashdigest type='MD5'>
    6fb2a38dc107eachb41cf1656e899cf70
  </hashdigest>
  <hashdigest type='SHA1'>
    4eee44b18576e84de7b163142b537d2fe6231845
  </hashdigest>
</fileobject>
```


Identifying “Features” of Interest in Disk Images or Directories

Bulk Extractor

Bulk Extractor Viewer

File Edit View Tools Help



Highlight:

Reports Feature Filter

Feature File None

Referenced Feature
Referenced Feature

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

Scanners

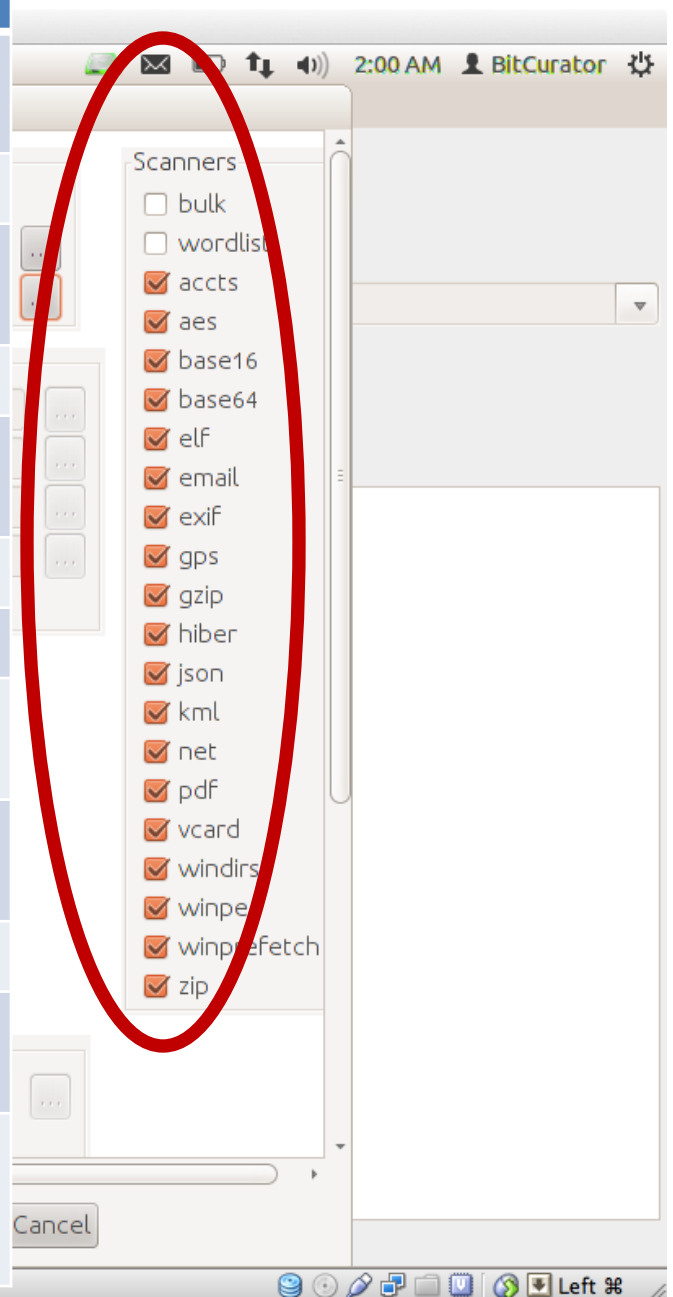
- bulk
- wordlist
- accts
- aes
- base16
- base64
- elf
- email
- exif
- gps
- gzip
- hiber
- json
- kml
- net
- pdf
- vcard
- windirs
- winpe
- winprefetch
- zip

Restore Defaults

Start bulk_extractor

Cancel

Scanner	Description
scan-accts	Looks for phone numbers, credit card numbers, etc
scan_base64	Decodes BASE64 text
scan_kml	Detects KML (Keyhole Markup Language) files – used to identify geographic locations
scan_gps	Detects XML from Garmin GPS devices
scan_aes	Detects in-memory AES (Advanced Encryption Standard) keys from the key schedules
scan_json	Detects JavaScript Object Notation files
scan_exif	Detects EXIF structures from JPEG files
scan_zip	Detects and decompresses ZIP files and zlib streams
scan_gzip	Detects and decompresses GZIP files and gzip streams
scan_pdf	Extracts text from some kinds of PDF files
scan_hiber	Detects and decompresses Windows hibernation file fragments
scan_winprefetch	Detects and extracts fields from windows prefetch fields from Windows prefetch files and file fragments



Bulk Extractor Viewer

File Edit View Tools Help



Highlight: Match case

Reports Feature Filter Match case Navigation

bulk_extractor Scan

Image File sampleimage.E01
 Feature Directory bulk-extractor-output

Progress **Done**
 bulk_extractor scan completed. See Status, below, for details.

Options

```
'bulk_extractor'
'-o'
'/home/bcadmin/Desktop/sampleimage.E01'
'/home/bcadmin/Desktop/bulk-extractor-output'
```

Report is Ready

bulk_extractor has completed.
 Report bulk-extractor-output has been opened and is ready for viewing.

OK

Status

```
Elapsed time: 0.4985 sec.
Overall performance: 2.958 MBytes/sec.
Total email features found: 0
Done.
```

Close

Text Hex



Histogram of Email Addresses (Specific Instances in Context on Right)

The screenshot shows the BitCurator-0.2.0 Bulk Extractor Viewer interface. The main window displays a histogram of email addresses extracted from various files. The histogram is titled "Histogram File email_histog..." and lists the following data:

Count	Email Address
n=12	privacy@motorola.com
n=3	0mj5nj@0itgx.ib.dj
n=3	73t@fo.pa
n=3	john@humaniz.com
n=3	newton@planetb.fr
n=3	sales@integrationnew
n=1	5kda_c@kqahw.sl
n=1	dqf@40mt.ro
n=1	fodfv@nwa4.ck
n=1	imki@73yjt.lr
n=1	jqnmq@17.pn
n=1	kjph@sj.gr
n=1	nq9@5c7k.sg
n=1	pdcnfb@tft.ao
n=1	gyf@j65.de
n=1	tw+4vsa@xf.ms

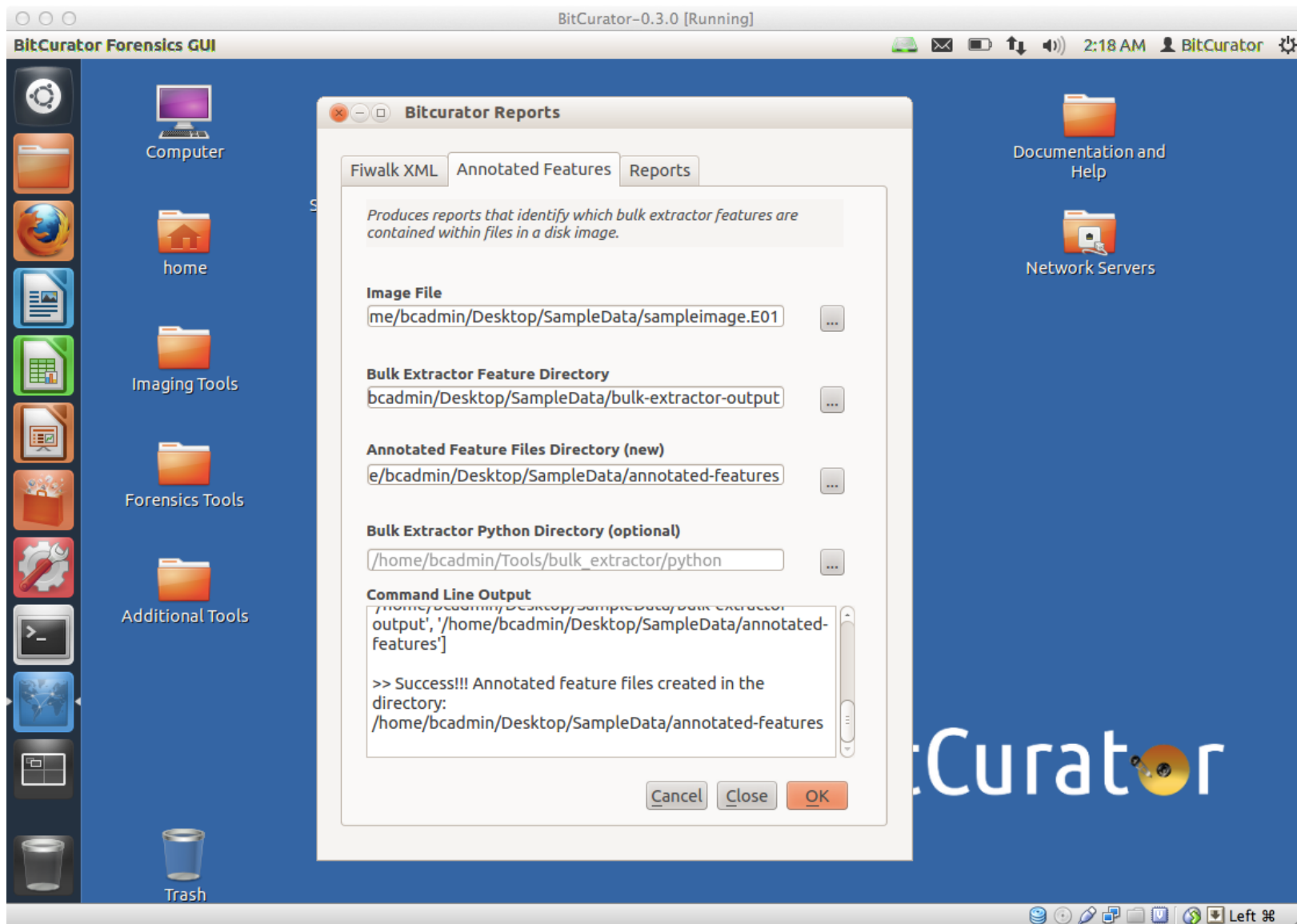
Below the histogram is a table of "Referenced Feature File" and "Referenced Feature":

Referenced Feature File	Referenced Feature
34804080	privacy@Motor
34807246	privacy@Motor
34808676	privacy@Motor
42271602	privacy@Motor
42273785	privacy@Motor
42274743	privacy@Motor
42347307	privacy@Motor
42349490	privacy@Motor
42350448	privacy@Motor
74735841	privacy@Motor
74738019	privacy@Motor
74738989	privacy@Motor

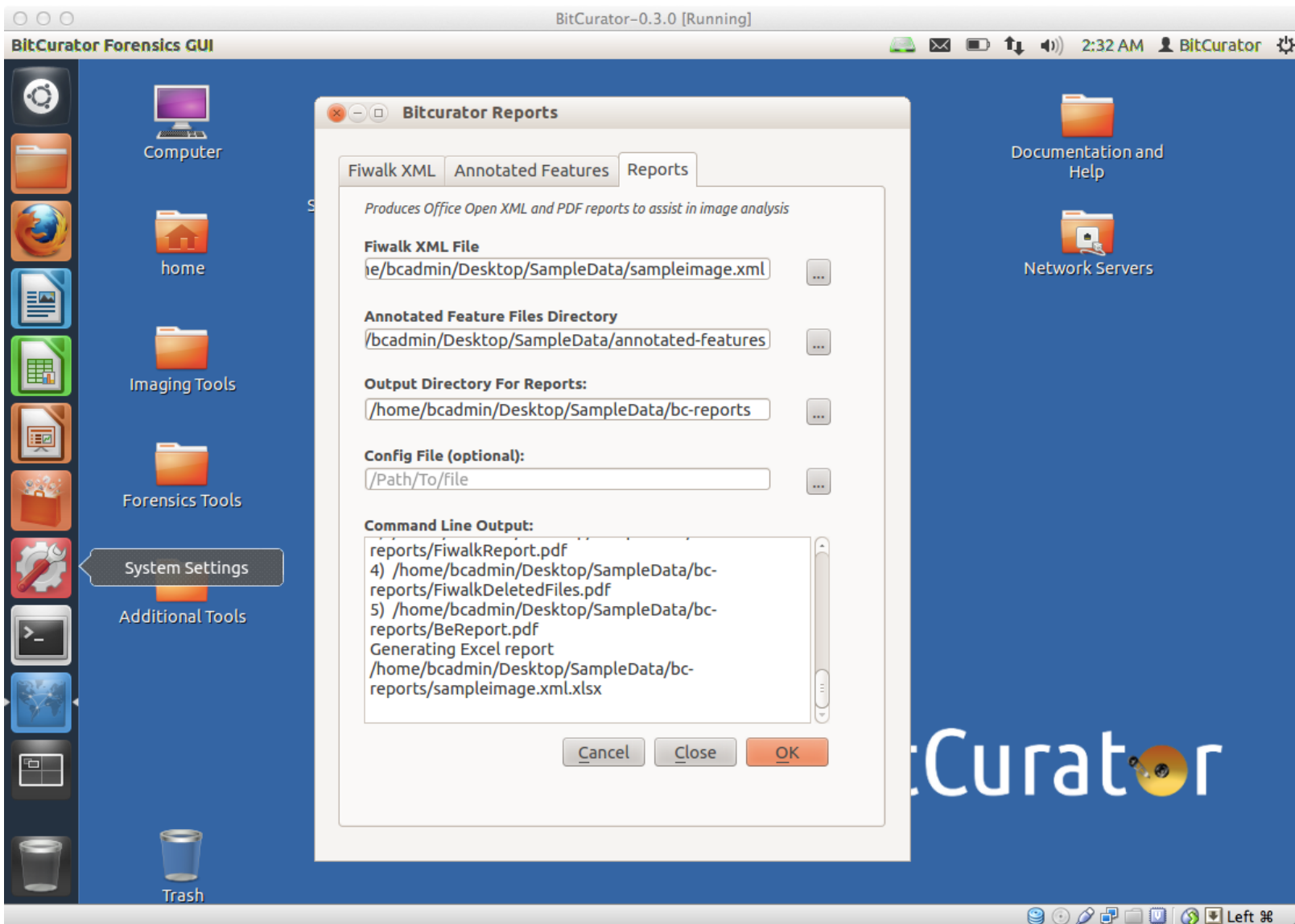
The right pane shows a specific instance in context, titled "Image File sampleimage.E01". The feature file is "email.txt" and the feature path is "42273785". The feature is "privacy@Motorola.com". The image content is a snippet of text from a document, likely a privacy policy, which includes the following text:

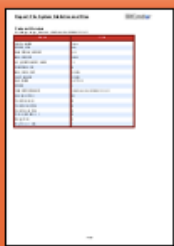
your credit card number, so this information can only be viewed by Motorola. Motorola uses Secure Sockets Layer (SSL) encryption technology, the highest level of security on the Internet. The SSL protocol provides server authentication, data integrity, and privacy on the Web. This security measure helps ensure that no impostors, eavesdroppers, or vandals get your personal information. SSL not only encrypts your personal and financial information transmitted, including credit card information, but also verifies the identity of the server and that the original message arrives safely at its destination. However, no data transmission over the Internet can be guaranteed to be 100% secure. As a result, while we strive to protect your personal information, Motorola cannot ensure or warrant the security of any information you transmit to us or from our Web site, and therefore you use our site at your own risk. Once we receive your transmission, we use our best effort to ensure its security on our systems. .0002000007AE000038B6.7A8,As a global company Motorola has international sites and users all over the world. When you give Motorola personal information, that information may be sent electronically to servers outside of the country where you originally entered the information. In addition, that information may be used, stored and processed outside of the country where you entered that information. Whenever Motorola handles personal information, regardless of where this occurs, it takes steps to ensure that your information is treated securely and in accordance with the relevant Terms of Use and this Privacy Policy. How can I correct or change my personal information? If you would like to review, correct or change any personal information you have provided, or remove your name from our mailing list, please e-mail us at privacy@Motorola.com. If you have established a "user profile" on a Motorola website, you may change the information you provided at an

Matching Bulk Extractor Output (Based on Byte Offsets) to fiwalk Output (Based on Filesystem Location)



Generating BitCurator Reports





1



2



3

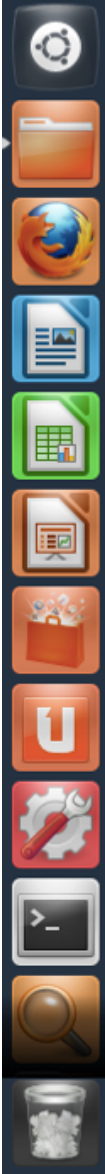
Report: File System Statistics and Files

BitCurator

Technical Metadata

Disk Image: image_filename: charlie-work-usb-2009-12-11.aff

Feature	Value
SECTORSIZE	1024
FTYPE STR	ntfs
PARTITION OFFSET	512
BLOCK SIZE	4096
ACQUISITION SECONDS	73
FIRST BLOCK	0
BLOCK COUNT	258559
LAST BLOCK	258558
PAGESIZE	16777216
FTYPE	1
IMAGE FILENAME	charlie-work-usb-2009-12-11.aff
Number of Files	128
Total Directories	23
Total Deleted Files	0
Total Unused Files	0
Files with Nlinks > 1	0



BeReport.pdf

↑ Previous ↓ Next 1 (1 of 1) Fit Page Width

Thumbnails



1

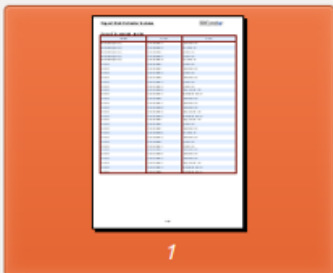
Report: Bulk Extractor Features

BitCurator

*Note:**FIUF: Total features unallocated to files**FIUF: Total features unallocated to files**FICR: Total features in compressed regions*

Bulk Extractor Report Files	Feature Instances	FLTF	FIUF	FICR
annotated_telephone.txt	5	4	1	2
annotated_rfc822.txt	258	39	219	110
annotated_zip.txt	127	8	119	3
annotated_windirs.txt	466	13	453	180
annotated_domain.txt	653	48	605	317
annotated_exif.txt	2	2	0	0
annotated_winpe.txt	1	1	0	0
annotated_email.txt	500	42	458	224

Thumbnails



1



2



3



Report: Bulk Extractor Features

BitCurator

Feature File: annotated_email.txt

Filename	Position	Feature
Email\Charlie_Email.zip	2299 1360-ZIP-115	charlie@m57.biz
Email\Charlie_Email.zip	2299 1360-ZIP-148	terry@m57.biz
Email\Charlie_Email.zip	2299 1360-ZIP-55	pat@m57.biz
Email\Charlie_Email.zip	2299 1360-ZIP-648	pat@m57.biz
Email\Charlie_Email.zip	2299 1858-ZIP-130	terry@m57.biz
Unknown	2299 1858-ZIP-37	pat@m57.biz
Unknown	2299 1858-ZIP-97	charlie@m57.biz
Unknown	2299 2313-ZIP-129	pat@m57.biz
Unknown	2299 2313-ZIP-55	charlie@m57.biz
Unknown	2299 2313-ZIP-712	pat@m57.biz
Unknown	2299 2313-ZIP-732	pat@m57.biz
Unknown	2299 2834-ZIP-108	alix.pery@yahoo.com
Unknown	2299 2834-ZIP-129	rubinfritz31@mail.com
Unknown	2299 2834-ZIP-45	charlie@m57.biz
Unknown	2299 3168-ZIP-133	charlie@m57.biz
Unknown	2299 3168-ZIP-204	charlie@m57.biz
Unknown	2299 3168-ZIP-226	alix.pery@yahoo.com
Unknown	2299 3168-ZIP-247	rubinfritz31@mail.com
Unknown	2299 3168-ZIP-51	alix.pery@yahoo.com
Unknown	2299 3587-ZIP-37	pat@m57.biz
Unknown	2299 3587-ZIP-97	charlie@m57.biz

Nautilus Scripts

- Scripts that can be run using the GNOME file manager called Nautilus (Linux analog to Windows Explorer or Mac OS X Finder)
- Can be used in the BitCurator environment or your own Linux environment

MD5 Hashes of Files (Nautilus Script)

The screenshot shows a Linux desktop environment. On the left is the Nautilus file manager window, displaying a directory tree with 'testdocs' selected. The main window shows the contents of 'md5Results.md5', which is a list of MD5 hashes and corresponding file paths. The gedit window is titled 'md5Results.md5 (~/.Research/FromLaptop/testdocs) - gedit'. The text in the gedit window is as follows:

```
k210f06f75bfc5ed09ef853280010bbd /home/kam/Research/FromLaptop/testdocs/archaeol6-69760_1.docx
bacd0311caaafdd0de8d7c38bf15d64 /home/kam/Research/FromLaptop/testdocs/archaeol21-81016_2.docx
77a39ca3ac7124c7374ad146be17c1b8 /home/kam/Research/FromLaptop/testdocs/archaeol21-81048_1.docx
a3d9c64b823c95a59c9309de6d3842b0 /home/kam/Research/FromLaptop/testdocs/archaeol21-81740_1.docx
7f76beba6d6c1bb30c14a6a35befad3 /home/kam/Research/FromLaptop/testdocs/archaeol21-83991_1.docx
b6279b34c082c6abfa9686e90fb91798 /home/kam/Research/FromLaptop/testdocs/archaeol21-85873_2.docx
b393d82ca450dfe85dbbd82fbfaa4e82 /home/kam/Research/FromLaptop/testdocs/archaeol21-105745_1.docx
7e8933260fea7f3ade57f255f8c102a4 /home/kam/Research/FromLaptop/testdocs/cameron1-88343_1.docx
9ec5781e7d6ca810da7ae3da43c3e1e7 /home/kam/Research/FromLaptop/testdocs/contexto1-66217_1.docx
d08bf83b14c92221b8f7147bec7973c5 /home/kam/Research/FromLaptop/testdocs/contexto1-69471_1.docx
3c85ecd7e128bf4b3ccbba8da3993010 /home/kam/Research/FromLaptop/testdocs/contexto1-79006_1.docx
61ed85e3d39fa22fc43b74ae30836f96 /home/kam/Research/FromLaptop/testdocs/contexto1-80765_1.docx
b19b44cd870acd5d546d829a7b7f2e0d /home/kam/Research/FromLaptop/testdocs/contexto1-85055_1.docx
b5aea481497bf36f936e545653a6a3c2 /home/kam/Research/FromLaptop/testdocs/dennisp1-58597_2.docx
51bf7f5bc623c5ff9db88a154541a42f /home/kam/Research/FromLaptop/testdocs/dennisp1-70846_3.docx
adf11d9c854486c70db3746e252e8e18 /home/kam/Research/FromLaptop/testdocs/dennisp1-76116_2.docx
c28d100f1f064de7fc365a660e470789 /home/kam/Research/FromLaptop/testdocs/dennisp1-83743_1.docx
b9345190327e0debb113e287c258ea7a /home/kam/Research/FromLaptop/testdocs/dennisp1-91925_1.docx
b224123f788d7c0fd7a73a2dfb34a219 /home/kam/Research/FromLaptop/testdocs/national3-99879_1.docx
b4bce311d0c97b4009b3c3cd6d50529ae /home/kam/Research/FromLaptop/testdocs/quaterna1-62216_1.docx
e245d76ce027cd79309024ab9e83c6d1 /home/kam/Research/FromLaptop/testdocs/scotiaar1-104626_2.docx
bb0eccd64d98db2660c909c276f30398 /home/kam/Research/FromLaptop/testdocs/scotiaar1-104630_1.docx
5b7bb2476374212e849e1513923c670d /home/kam/Research/FromLaptop/testdocs/scotiaar1-104632_2.docx
638cc2ed4562380fdad3bb87d570250a /home/kam/Research/FromLaptop/testdocs/scotiaar1-104662_10.docx
e440d9f4f6eaa9dc188f9b5fb8ad23c7 /home/kam/Research/FromLaptop/testdocs/scotiaar1-106279_2.docx
4ed53bc15578a68f1ec8cc14ac2a9503 /home/kam/Research/FromLaptop/testdocs/scotiaar1-106334_1.docx
bb1e322e94e13bc91a57be59f7a905ab /home/kam/Research/FromLaptop/testdocs/universi1-84908_1.docx
bb1e322e94e13bc91a57be59f7a905ab /home/kam/Research/FromLaptop/testdocs/universi1-84908_2.docx
5f8ef69582e68b68d2ad9ecf8e37e564 /home/kam/Research/FromLaptop/testdocs/universi1-84914_1.docx
```

The Nautilus window shows a directory tree with 'testdocs' selected. The desktop background shows several document icons with the title 'quaterna1-62216_1.docx' selected.

BitCurator Tools and Further Information

BitCurator

The screenshot shows the BitCurator website's 'An Introduction to BitCurator' page. The page features a navigation menu on the left with links for Home, About, People, Software, FAQ, Publications, Presentations, and Related Resources. The main content area includes a title 'An Introduction to BitCurator', a paragraph describing the project's goals, and a section titled 'Getting Started' with a list of steps. A video player is embedded in the content. The right sidebar contains sections for 'Software' (with links to BitCurator Virtual Machine and BitCurator Installation ISO), 'Community and Docs' (with links to Source Code and Packages, Quickstart Guide, Documentation, and a Google Group), and 'Twitter'.

Get the software
Documentation and technical specifications
Screencasts
Google Group
<http://wiki.bitcurator.net/>

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

The screenshot shows the BitCurator project's landing page. It features a navigation menu at the top with links for Home, About, People, Software, FAQ, Publications, Presentations, and Related Resources. Below the menu is a 'WELCOME TO THE BITCURATOR PROJECT.' section with a social media follow button for @BITCURATOR. A paragraph below describes the project as an effort to build, test, and analyze systems and software for incorporating digital forensics methods into the workflows of a variety of collecting institutions. A 'Read more about BitCurator here...' link is provided.

People
Project overview
Publications
News
<http://www.bitcurator.net/>

The screenshot shows a blog post from the BitCurator website. The post is dated July 10, 2012, and is by Kam. The text of the post reads: 'Looking for the test release of the BitCurator virtual environment? You can find the latest release on the front page of our wiki, in the Downloads section. We've also posted instructions to help you get started.' There is a 'Leave a comment' link at the bottom of the post.

- Archives
- June 2013
 - May 2013
 - February 2013
 - November 2012
 - October 2012
 - September 2012
 - August 2012

Marty Gengenbach selected for National Digital Stewardship Alliance Innovation Award

Twitter: @bitcurator