BitCurator: Digital Forensics for Collecting Institutions

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BitCurator

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The Andrew W. Mellon Foundation

CurateGEAR 2014 - January 8, 2014 - University of North Carolina at Chapel Hill

What it is

- **BitCurator packages forensics software (in a Linux virtual machine) to augment digital curation workflows in real-world collecting institutions:**

- **Reliable acquisition of bitstreams from digital media**
- **Scalable forensic analysis of disk images / heterogeneous collections of documents**
- **Metadata acquisition from common file systems**
- **Preservation metadata and finding aid metadata export**
- **Data visualization for complex data sources**
- **Redaction of private and sensitive information**
- **Identification and removal of duplicate files**

Why it's different

Commercial forensics tools are typically **expensive**, and not always as **reliable** as you'd expect.

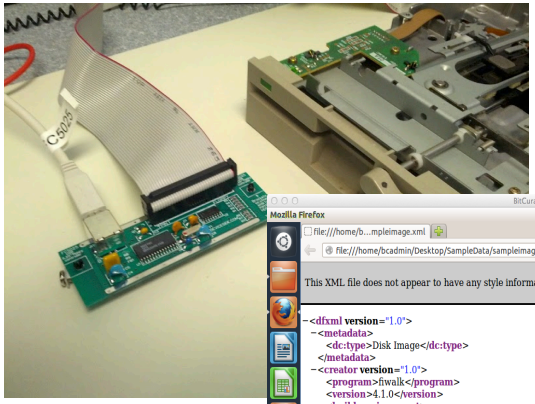
Lots of things important to **collecting institutions** that **aren't a priority** for forensics developers: **access, redaction, preservation metadata**, etc…

BitCurator packages open source forensics tech into a simple-to-use virtual environment to help you avoid getting bogged down.

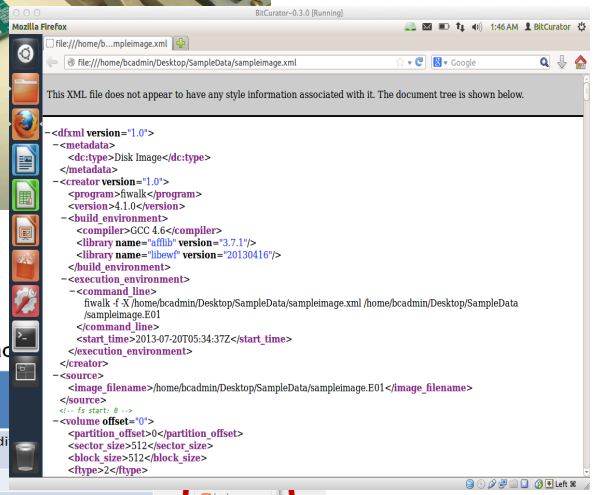
Image credit: http://www.quickmeme.com/

The cruising altitude view

Write-blocked physical media acquisition



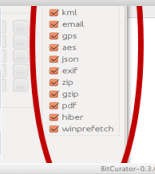
Creating Digital Forensics XML to describe disk images



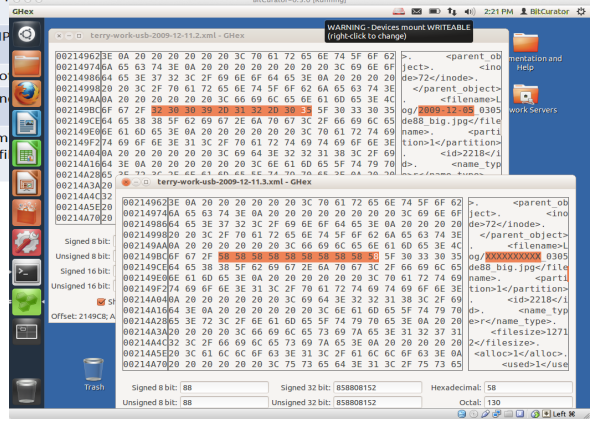
Identifying potentially private information

Bulk Extrac

Scanner	Description
scan-accts	Looks for phone numbers, credi
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 f streams
scan_gzip	Detects and decompresses GZIP streams
scan_pdf	Extracts text from some kinds o
scan_hiber	Detects and decompresses Win file fragments
scan_winpref etch	Detects and extracts fields from fields from Windows prefetch fi fragments



Selective data redaction

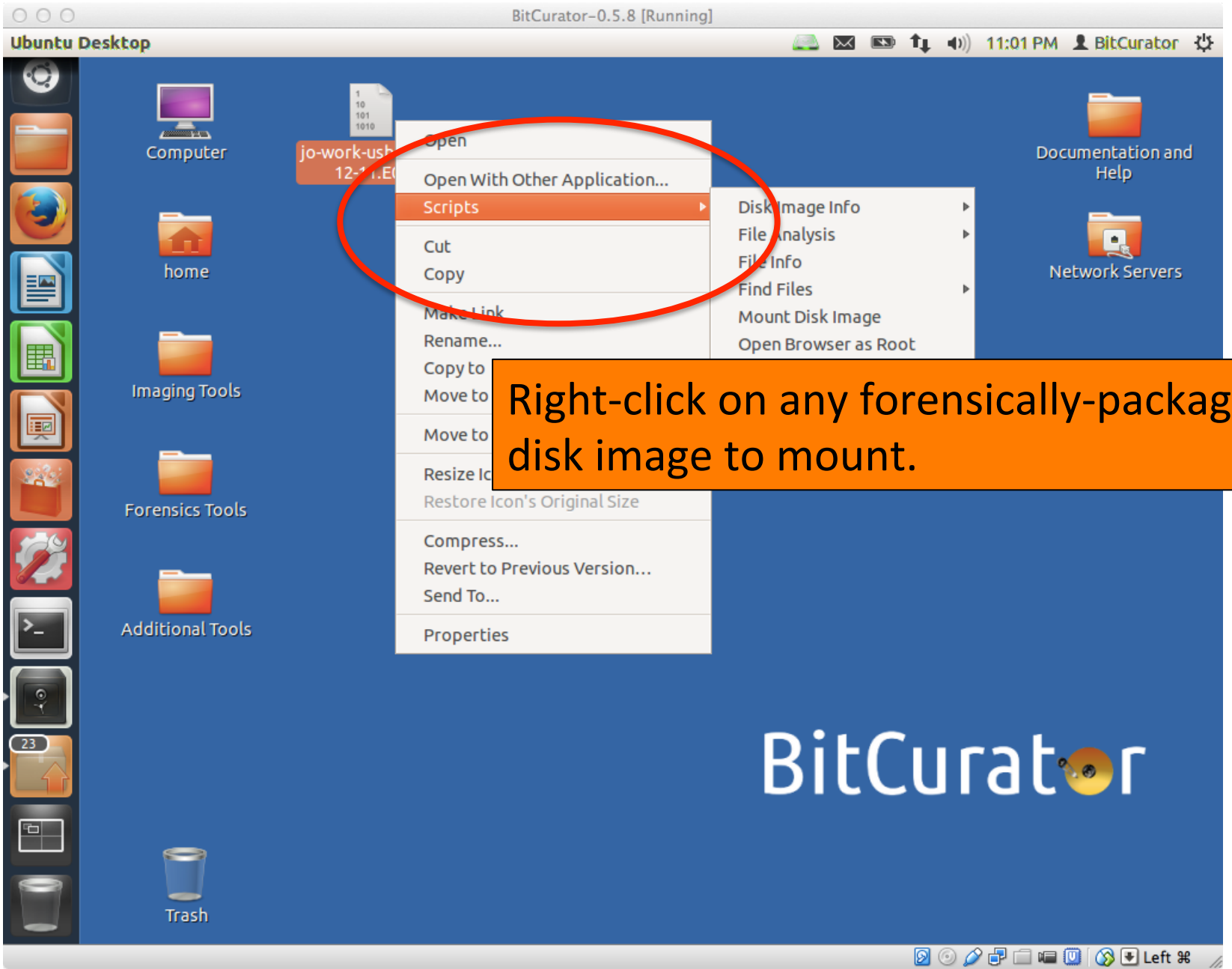


What's new in the past year

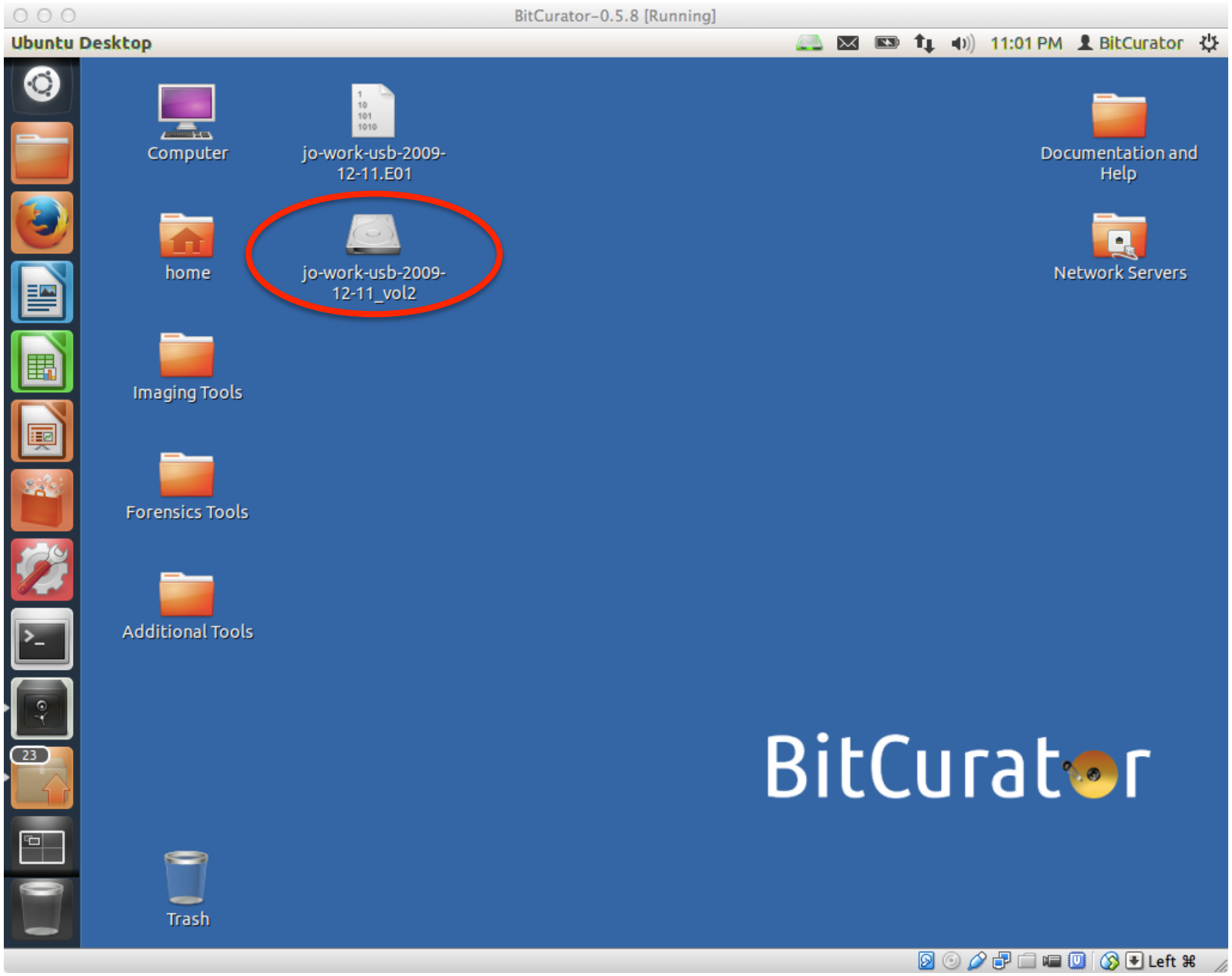
BitCurator has had 15 public releases (4 major releases) in the past year. Some highlights (as of 0.5.8):

- BitCurator-specific GUI to assist collections professionals running complex forensic tools.
- One-click mounting of forensically-packaged disk images
- Improved metadata export facilities (PDF, .xslx, and visualizations)
- PREMIS metadata generation for forensic events and objects
- DFXML improvements and participation in the DFXML working group
- Duplicate file detection and removal
- Byte-level redaction of pattern-matched features (e.g. potentially sensitive information)

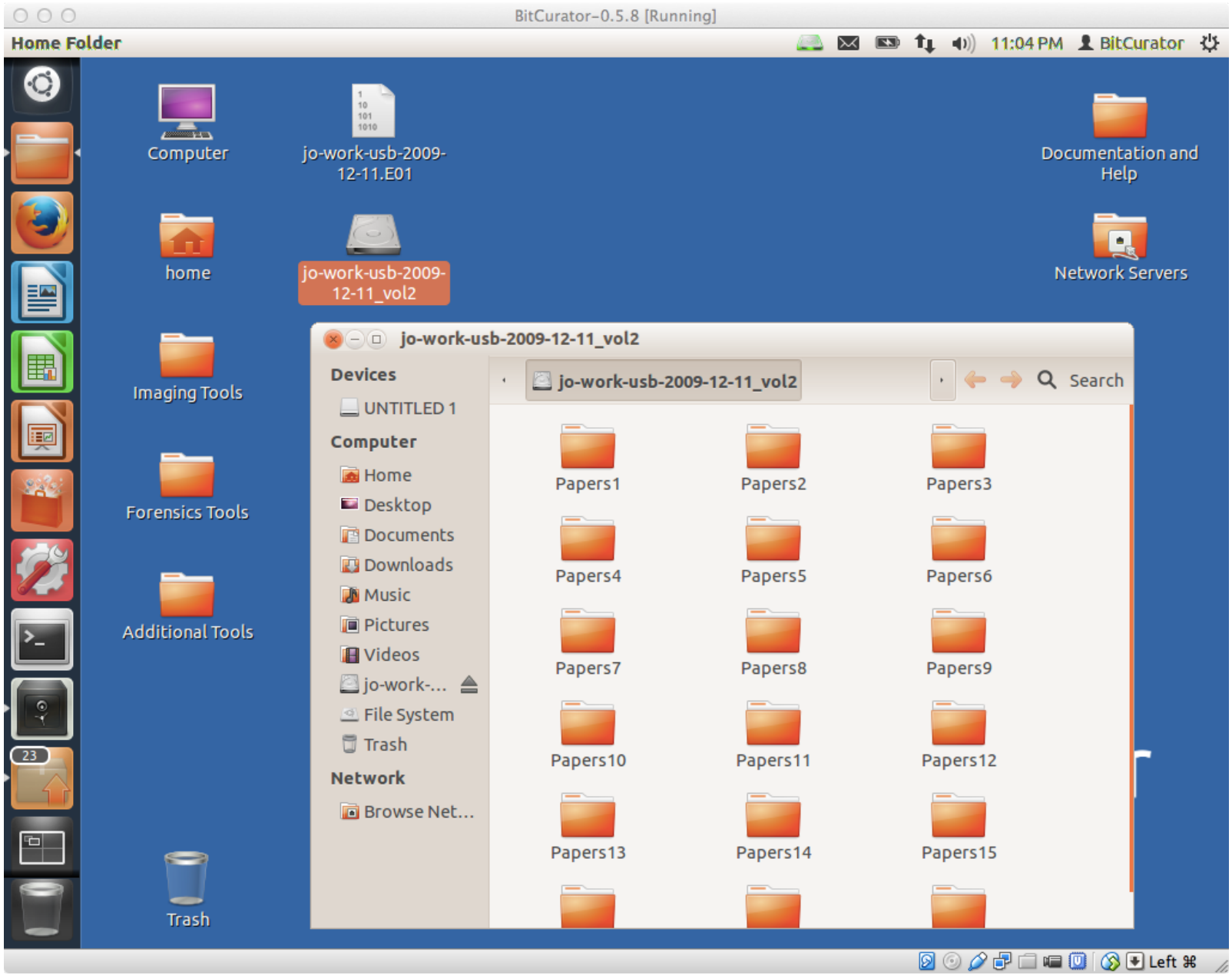
Interacting with disk images



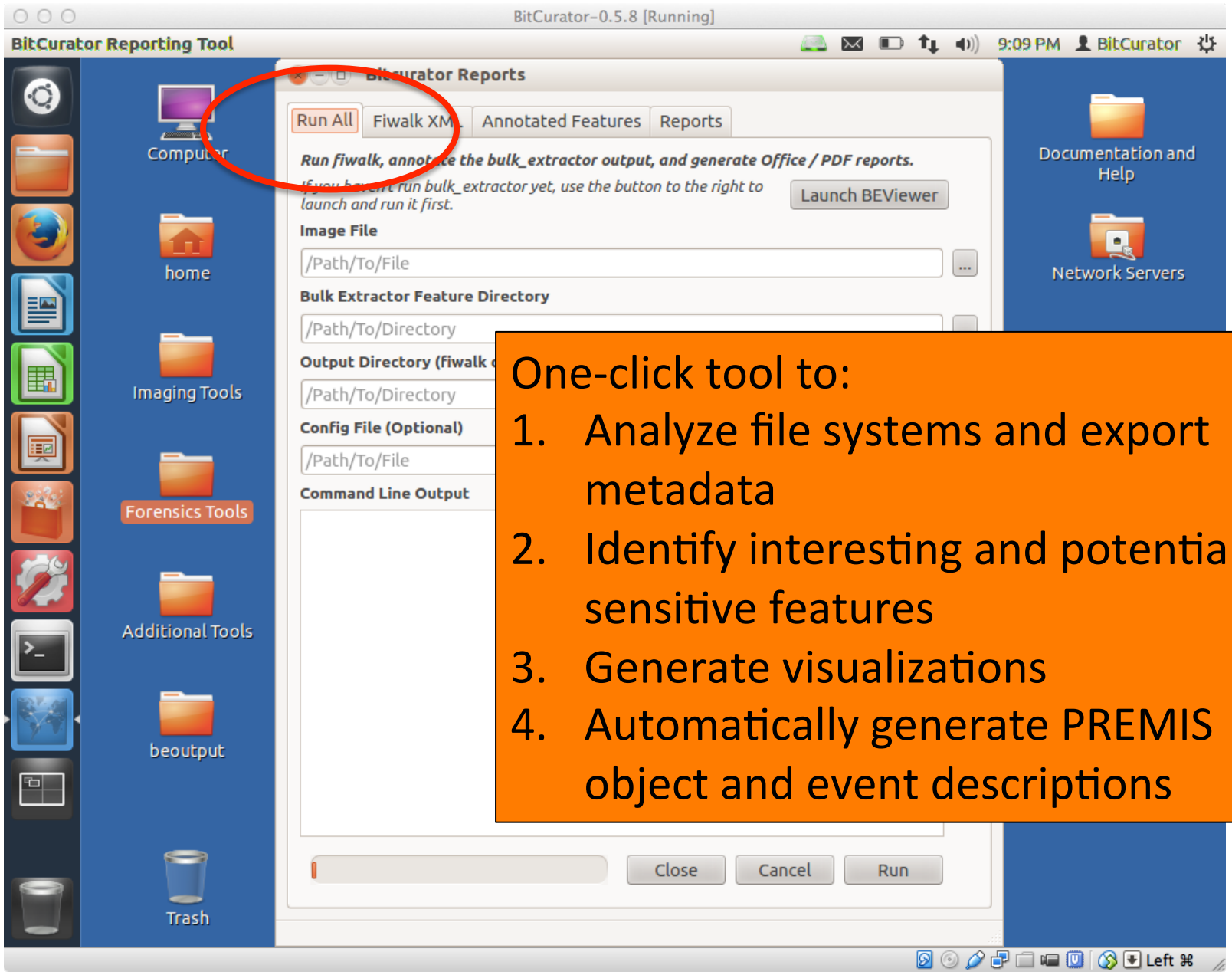
Interacting with disk images



Interacting with disk images



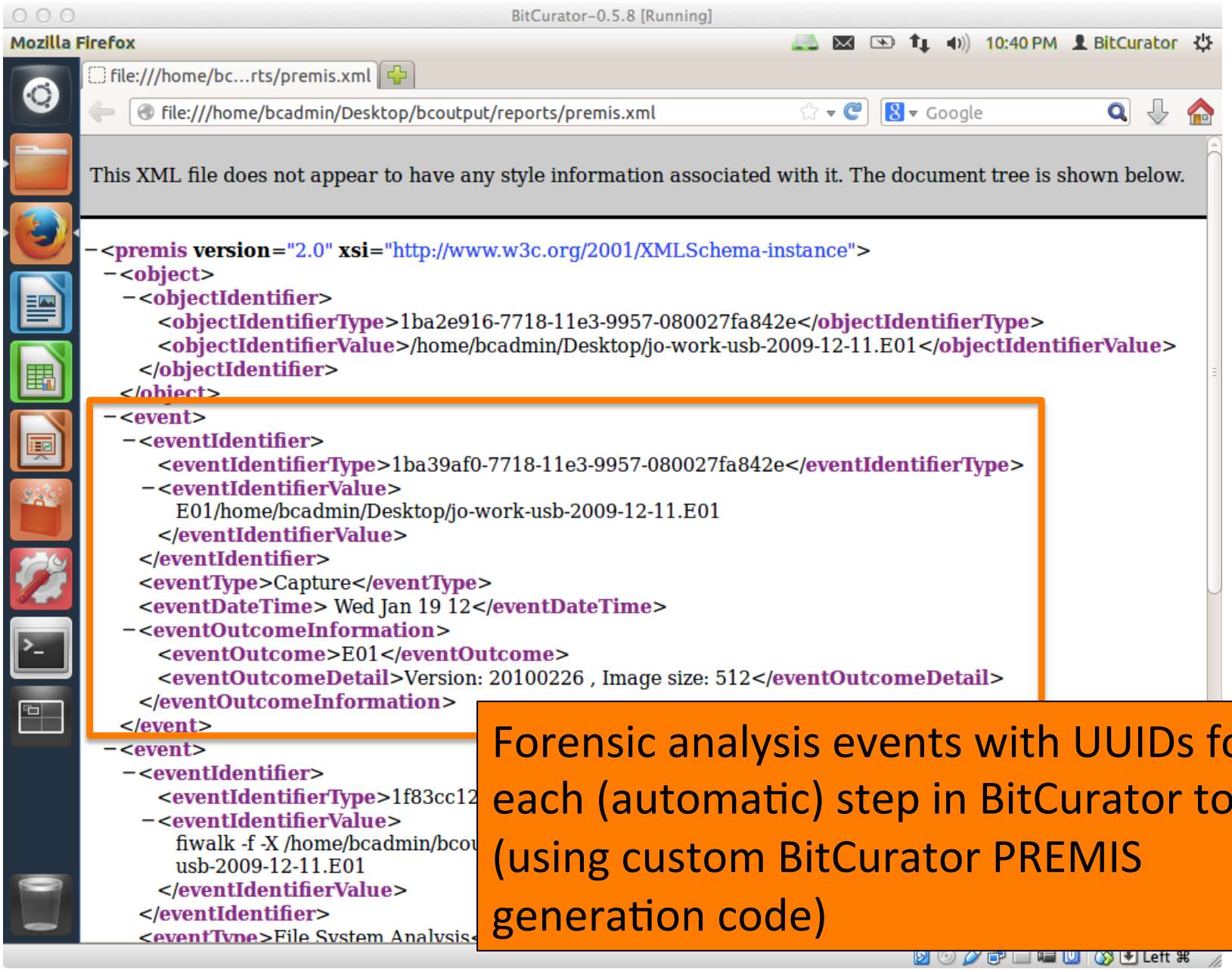
Forensic workflow



One-click tool to:

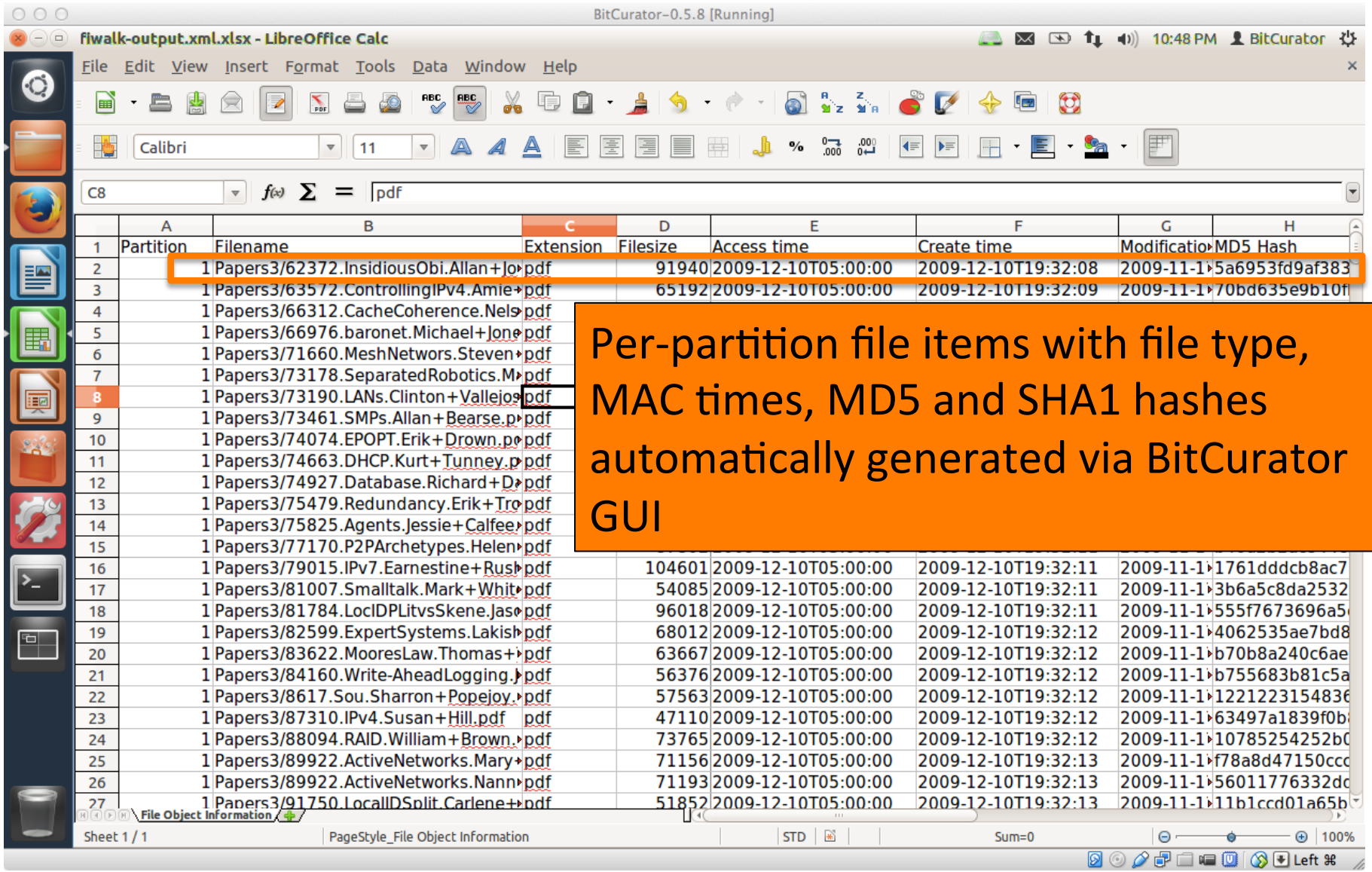
1. Analyze file systems and export metadata
2. Identify interesting and potentially sensitive features
3. Generate visualizations
4. Automatically generate PREMIS object and event descriptions

PREMIS metadata



Forensic analysis events with UUIDs for each (automatic) step in BitCurator tool (using custom BitCurator PREMIS generation code)

File system metadata...simplified



Per-partition file items with file type, MAC times, MD5 and SHA1 hashes automatically generated via BitCurator GUI

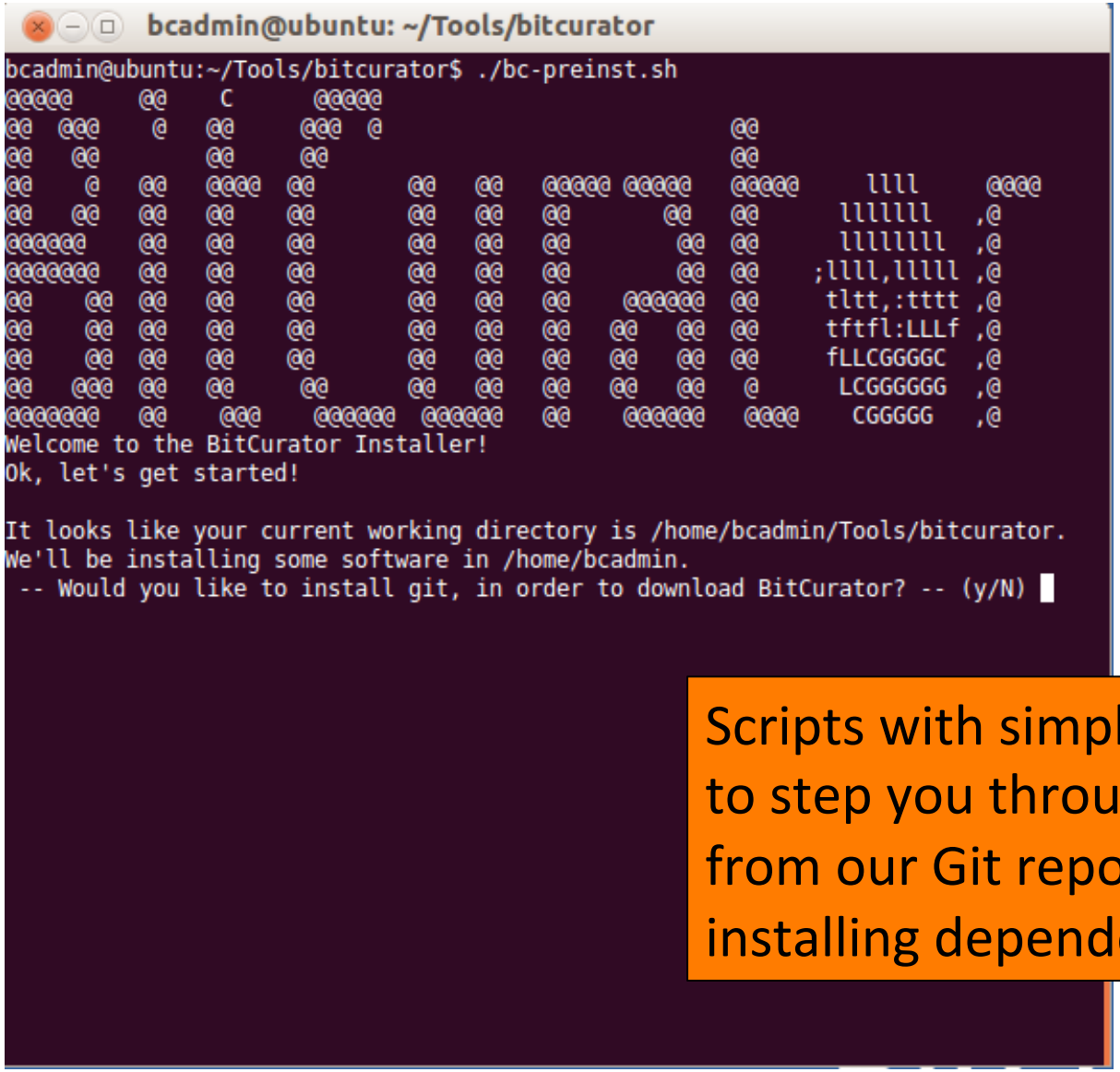
Things can still get messy…

Image credit: http://www.quickmeme.com/

…and we know there are some issues

- Main forensic workflow does not support HFS volumes (only HFS+ - but we have other tools that can help)
- Disk image mount scripts fail on more exotic disks (multiple volumes)
- Really nice GUIs like Autopsy don't run well (or at all) in Ubuntu LTS (12.04) without some major fiddling.
- VirtualBox doesn't have USB 3.0 support…yet.
- Distributing large VMs is a bandwidth hog. (we've partnered with iBiblio to alleviate this)
- Preservation metadata is easy to generate but hard to make useful for those with limited infrastructure
- Likewise for EAD
- Redaction of private and sensitive information is not a major use case for forensics investigators. We're rolling our own.

We're making it easier to upgrade BitCurator and use modules individually



Scripts with simple YES/NO questions to step you through pulling software from our Git repo, upgrading, and installing dependencies

Phew! Time to go use it!

Software and docs: http://wiki.bitcurator.net/

News and blog: http://www.bitcurator.net/

Source code: https://www.github.com/kamwoods/bitcurator

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